

‘We are caught up in our own world’
Conceptions of curriculum within three different
disciplines at the University of Iceland

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ABSTRACT

This study explores the conceptions that university teachers have of curriculum decision making and development within three different disciplines and the space and agency of teachers in the curriculum process. The study makes use of Basil Bernstein's concepts of the classification and framing of the pedagogic discourse of higher education disciplines and applies them to the pedagogic discourse of three disciplines (i.e. mechanical and industrial engineering, anthropology and physics) to demonstrate how it appears in traditions, communication and planning of instruction. The three disciplines were explored as specific cases. Data were collected through interviews, observations and analysis of texts. Fifteen university teachers were interviewed, eight staff meetings observed and a variety of texts analysed. Mixed phenomenological methods of data analysis such as looking for common themes and discourse analysis were applied.

The main findings of the study are the existence of a local pedagogic discourse of each discipline, characterised by different aims of the discipline, different conceptions of student identities and teacher roles, and specific instructional discourse. The local pedagogic discourse is created when a universal pedagogic discourse is recontextualised within a local socio-cultural context. The transformation creates spaces for different ideologies (personal, disciplinary, institutional and external). In the transformation process, the university teachers hold a significant and powerful role. The local pedagogic discourse is most strongly influenced by teacher conceptions acquired during their own time of studying the discipline and their experience of teaching. The discipline's organisational culture and structure as well as its saga both mould the local pedagogic discourse and create its social context within which different contesting ideologies arise. Internal and external ideologies, such as the University's research mission, influence the disciplinary ideologies in different ways, supporting some while weakening others.

The study showed that curriculum decision making and development is not experienced as troublesome or problematic. Finally, the study demonstrated that the teachers in the study sense different authority and agency in curriculum decision making between as well as within the disciplinary curriculum. The findings have

both theoretical and practical implications for the curriculum field of higher education.

ÁGRIP

Rannsókn þessi beinist að því að skoða hugmyndir háskólakennara um námskrágerð innan þriggja ólíkra háskólagreina svo og frelsi og svigrúm þeirra til að taka ákvarðanir um námskrá. Í rannsókninni er byggt á hugmyndum Basil Bernstein um flokkun (classification) og afmörkun (framing) og uppeldislega orðræðu (pedagogic discourse) háskólagreina og þær nýttar til að greina uppeldislegar orðræður þriggja háskólagreina (þ.e. véla og iðnaðarverkfræði, mannfræði og eðlisfræði) og hvernig þær orðræður birtast í hefðum og venjum, samskiptum svo og skipulagi náms og kennslu. Auk þess að byggja á kenningum Bernstein er fræðilegur grunnur rannsóknar sóttur til félagsmenningarlegra kenninga þar sem litið er á námskrágerð sem félagslega athöfn. Rannsóknin er tilviksrannsókn og greinarnar þrjár rannsakaðar sem sérstök tilvik. Gögnum var safnað með viðtölum, þátttökuathugunum og textum. Tekin voru viðtöl við fimmtán háskólakennara og þátttökuathuganir gerðar á átta fundum. Þá voru greindir textar sem taldir voru varpa ljósi á námskrágerð. Beitt var margs konar aðferðum við greiningu gagna, s.s. þemagreiningu og orðræðugreiningu. Helstu niðurstöður rannsóknarinnar eru greining sérstakar staðbundinnar uppeldislegrar orðræðu hvernar háskólagreinar þar sem finna má ólík markmið og viðhorf til hlutverka nemenda og kennara og sérstaka kennsluhætti. Hin staðbundna námskrá háskólagreina verður til þegar 'alþjóðlegar' háskólagreinar eru aðlagðar að ákveðnum félagsmenningarlegum aðstæðum og ólíkar hugmyndir (persónulegar, fræðigreinabundnar og stofnanalegar) takast á við þá umbreytingu. Í umbreytingaferlinu gegna háskólakennarar mikilvægu hlutverki og er staðbundin orðræða greinanna að verulegu leyti mótuð af hugmyndum þeirra frá eigin háskólatíð og kennslureynslu þeirra. Stofnanalegir samskiptahættir innan skora, svo og stofnanaleg saga greinarinnar, hefur áhrif á mótun staðbundna uppeldislegu orðræðu greina. Innan hinnar staðbundnu orðræðu greina takast á ólík sjónarmið um markmið greina, æskilega eiginleika nemenda svo og samstarf kennara í námskrágerð. Ríkjandi stefnur svo sem rannsóknarstefna Háskólans styður við ákveðin greinabundin sjónarmið en dregur úr öðrum. Fram kom að námskrágerð þótt lítt vandasöm og að hlutverk háskólakennara við hana er mun duldar en hlutverk þeirra sem rannsakenda og kennara. Að lokum leiddi rannsóknin í ljós að missterk flokkun og umgerð háskólagreina skapar kennurum ólíkt svigrúm og áhrifvald til

námskrángerðar. Rannsóknin er í senn fræðilegt og hagnýtt innlegg í námskrángerð á háskólastigi en þar skortir mjög innsýn og frekari rannsóknir.

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CHAPTER 1: INTRODUCTION

1.1 Starting off

I do not have a real office yet. I have a corner on the top floor but it is bright and from my window I have a good view of the city. I have moved from elementary teaching to become a part of the University. I have left a small town for the city, physically and metaphorically. I have made decisions that will influence my professional as well as my private life. At this moment these are not my thoughts. I am just sitting quietly in my third floor cubicle, wondering. My courses are about to start. I have finished the course plan using the one borrowed from my predecessor as a layout. I have written up the reading list, thought of assignments and assessment. And I am wondering if this is what my students really need. Will this course help them on their way to become good secondary school teachers? Are those important issues to cover in a course? Will this course provide my students a learning experience that will help them discover the wonders of teaching and make them want to become dedicated teachers? And am I supposed to know the answers to those questions? How do all the other teachers at the University manage this enormous task? And these questions had been asked by larger thinkers and scholars than I:

In our educational institutions, what (and whose) view of the world are we giving our students? Who is benefiting? Who is harmed? What knowledge about the world is absent, subjugated, disqualified? Why? How are the students related to each view? How do our students benefit from the way we teach them? How are they harmed? Specifically, who else benefits or is harmed? What else could we do here? Is our ability to imagine what else we might do itself insinuated in hidden regimes beyond our good intentions in raising such alternatives? What would the present and absent effects of these matters be? (Foucault, 1980, p. 135–136).

Sitting in my cubicle I finish the course plan and get ready to meet my students. But the questions go unanswered and years later they are the basis of the research project described in this thesis. I still want to understand what meaning the curriculum has for teachers at the University of Iceland.

In this study the focus is on how academics think and participate in curriculum development and teaching. I will therefore from now on use the ‘university teacher’

when referring to academics. The aim of my research is to understand how university teachers go about making decisions about the curriculum and how their ideas about the curriculum affect the way they understand teaching and learning. I want to understand how university teachers in different disciplinary fields make curriculum decisions and to see if their perceptions of knowledge or their disciplines are reflected in their curriculum planning. I would like to understand which factors, internal or institutional, are perceived by teachers as important for their curriculum planning.

It is my belief that in curriculum planning and decision making, teachers have a powerful role that is crucial for their students and their future. Teachers' planning of the curriculum may not only constitute the disciplinary world view presented to the students but also how students are expected to acquire it and which students are given the opportunity to do so.

In the first part of the chapter, the research will be situated by explaining my personal interest in the topic and discussing the importance of the curriculum within the higher education discourse.

In the second part, the focus is on the University, the setting of the research. First a short overview of the historical development of the University will be given, followed by a section on the changing landscape of higher education in Iceland. Moving back to the University, the present state and organisational structure is described with the focus on the regulatory framework that creates the conditions and boundaries for curriculum development within the institution.

1.2 Selecting the topic of research

Building on my knowledge of curriculum theory and design, I believe that the contrast of making curriculum decisions at the elementary level with the responsibility of making such decisions as a university teacher triggered my interest in the project. This interest was further deepened in my work with academics at the Centre for Teaching on educational development. In that work I have come to experience university teachers as having a powerful role in the making of the curriculum that is influential for student learning.

Becoming an academic

This research is located within the field of curriculum studies. As is often the case, my interest is embedded in and initiated by personal experience. After receiving an M.Sc. degree in Curriculum and Instruction, I accepted a teaching post in an elementary school in Iceland. For the next decade I taught various subjects and was at the forefront in the implementation of a new school-based curriculum at my school as required by the Ministry of Education, Science and Culture (hereafter the Ministry of Education). In Iceland, the curriculum at the elementary level is centralised and published in a National Curriculum Guide and its centralisation is further strengthened by state-run publication of educational materials. While curriculum decisions regarding teaching and learning are seen as part of the professional role of teachers, such decisions are made in the light of the national curriculum, the school-based curriculum, the teaching material available, the homogenous teacher education and traditions of teaching. In my school, curriculum decisions were frequently discussed and debated at staff meetings.

After 13 years of teaching at the elementary and lower secondary level, I entered academia and became an assistant professor in education at the University of Iceland where, among other courses, I taught a course on curriculum theories and design. At the University of Iceland the official curriculum is published in an annual course syllabus including the disciplinary programmes, courses taught, major topics of discussion within courses and in some instances major goals as well as assessment requirements and the textbooks to be used. Programmes need to be formally approved by the departments and the syllabus is revised annually within each department. Teachers are encouraged to hand out course outlines to students. Decisions on teaching and learning are seen as the responsibility of academics.

As a new academic in academia with some knowledge of curriculum, I found this 'freedom' a bit overwhelming. Was it my personal responsibility to make decisions regarding what to teach my students? How was I to go about making those decisions and should I do so on my own? How were other academics managing the task?

Becoming an academic developer

My second source of interest in the curriculum at the University was my affiliation with the then newly established Centre for Teaching, as the director of the board as well as a part of the staff. The Centre was originally established as a means to enhance distance education but is now in charge of "assisting teachers in developing their ways of teaching" (Háskóli Íslands, 2005c). My affiliation with the Centre has affected me both personally and professionally. It has in a way provided me with an academic identity, opened up an area for me to enact my interest in teaching and learning and given me valuable insight into the possibilities and obstacles of curriculum change.

Since the establishment of the Centre the staff has searched for ways to enhance teaching that take into account the complexity of the curriculum context and is not focused only on simple solutions such as having teachers attend short educational courses (Malcolm and Zukas, 2000a). Yet in my work at the Centre, I have often found it hard to translate the significance of critical or reflective thinking of higher education curriculum (its social structure and purpose, ideology and epistemology) into my pedagogical courses and undertaking. I find teaching and curriculum planning viewed as a fragmented and technical endeavour that can be 'fixed' if it is not functioning. Not many academics seek assistance at the Centre and if and when they do, they come searching for short-term, how-to solutions to teaching. While I submit to those wishes I have the urge to explore, understand and hopefully shed some light on the complexity of the curriculum process.

1.3 The importance of the curriculum in higher education

In comparison with research and theories on the curriculum at the compulsory level (Kelly, 2004), the higher education curriculum has received very little attention. Different from curriculum at the compulsory and secondary school level, the higher education curriculum is not prescribed as national curriculum and is not as accessible for empirical investigation. In the policy papers on higher education in Iceland, referred to later in this chapter, there is little mention of the curriculum. This official lack of interest in the higher education curriculum is not local. Barnett and Coate (2005) argue when stating that the idea of curriculum has neither been a subject of

higher education debate and policy formulation nor its practices within the United Kingdom. At times when significant national and institutional efforts have been made to drive through curriculum change in the name of efficiency and economy, there has not been any significant debate about curriculum within the context of higher education. In this discourse the idea of the curriculum is quite narrow and students are only minimally implicated in the dominant conception of curricula (p. 24). At times where higher education is being critically discussed as a social, political and economic institution and its role debated, the idea of the curriculum should be central (Barnett, 1990; Barnett & Griffin, 1997; Gellert, 1999; Kogan *et al.*, 2000; Scott, 1995).

The idea of the curriculum is nevertheless to some extent intertwined in the current debates, discussion and research on different aspects within higher education (Tight, 2003). Universities all over the world are facing the implementation of benchmarks and quality specifications where it is assumed that learning outcomes can be made explicit and measured (Morley, 2003). This can be felt at the University where the implementation of the Bologna agreement has been recently incorporated into the structure and organisation of the University (Kristinsson, 2003, 2005). The impact of the influence of the implementation of benchmarks and standards on the curriculum is not well known. Researchers like Karseth (2005) suggest that they may create new pedagogic regimes in higher education, while others such as Ensor (2004a) find that they are met with contesting disciplinary discourses. Barnett and Coate (2005) claim that in the higher education discourse the very idea of 'curriculum' is unstable, its boundaries uncertain and that it has been both silenced and neglected. They suggest that the absence of the curriculum in the higher education discourse is 'indicative of systematic interest at work for which the term curriculum would pose difficulties' (p. 16) and state that the common conception of the curriculum is both narrow and technical. This conception of the curriculum is, according to Malcom and Zukas, also echoed within the higher education pedagogy that is boisterous at present but often presented devoid of its cultural and social context (Malcolm and Zukas, 2001).

It is my belief that the curriculum is an under-researched phenomenon that plays a central role in the formation as well as the function of the university and the foundation of the students' experience. I share this idea with Conrad and Haworth

(1990) who see the role of the curriculum in higher education as the nucleus of the university, claiming that:

The curriculum forms the nucleus of colleges and universities. As a vehicle for organizing teaching and learning, the curriculum provides the major domain for academic decision-making, expresses institutional purposes and values, and serves as the primary touchstone in the professional life of students, faculty and administrators (Conrad and Haworth, 1990, p. 2).

Given such importance of the curriculum in higher education, only a small amount of research and writing is found on the subject in general. Possibly the most thorough overview of this area for research was carried out by Squires (1987; 1990) who stressed the need for knowledge of the curriculum stating that: “Unless we know what it is we are producing, for whom and in what context, we are unlikely to be able to manage it effectively” (Squires, 1990). Greater interest can be found more recently in the work of scholars like Barnett and Coate (2005) who have expressed the need to reflect upon and question the university’s curriculum in an era where universities are being transformed because of disciplinary changes, management and quality requirements and asked to prepare their students for times of uncertainty. Not only is the curriculum the core of the academic life of the university, it is central to addressing essential questions of the purpose, role and direction of higher education in general as stated by Barnett and Coate (2005):

‘Curriculum’ is, or should be, one of the major terms in the language of higher education. Through curricula, ideas of higher education are put into action. Through curricula, too, values, beliefs and principles in relations to learning, understanding, knowledge, disciplines, individuality and society are realized (p. 26).

As can be seen from the above discussion, the definition of the curriculum used in this research is a broad one. The curriculum is not only seen as encompassing the curriculum knowledge of different disciplines and the instructional or educational experiences created to help students to acquire academic knowledge, but curriculum also refers to the larger and often tacit means of teaching and learning. Given the importance of the curriculum, its absence or low value within the higher educational discourse needs to be addressed.

1.4 The purpose and goal of the research

As a university teacher I find curriculum planning and development to be an important and powerful role. Working as an academic developer has further strengthened my belief that curriculum development is a serious issue that does not receive the interest and reflective thought it deserves in the light of its importance. In order to do justice to my students and to work with university teachers in enhancing their teaching, I feel a need to understand how teachers understand the curriculum and their role in constructing the curriculum for their students. The goal of my study is to understand university teachers' conceptions of the curriculum, how they think about the curriculum and make curriculum plans for their students. My purpose is to explore how teachers' curriculum conceptions are created and what influences their curriculum thinking. My research interest is both theoretical and practical.

I believe my search, if fruitful, will add to the understanding of curriculum development in higher education, a relatively new field. But I also hope that such understanding will make curriculum planning and development a more reflective process for the benefit of teaching and learning at the University.

1.5 The University of Iceland

My research is located within the University of Iceland which provides the institutional and cultural context of the teachers participating in the project. To understand the setting and the context a short overview of the history of the University will be provided but the main focus of this discussion will be on the present legal structure and conditions that can be seen as directly or indirectly influencing and affecting curriculum development within the institution.

1.5.1 Brief overview of the history of the University of Iceland

The University of Iceland was established in 1911 as part of the Icelandic nation's struggle towards independence from Denmark. The new university combined the previous theology school established in Iceland 1847, a medical school inaugurated in 1876 and a law school established 1908. To the faculties of divinity, law and medicine, a new faculty of philosophy was added. In addition to striving for independence, the need to educate governmental professionals within a growing

society was evident in the increasing number of professional disciplines that were gradually added to the University's curriculum (Jónsson, 1961).

From its establishment until 1970, the University was mainly a professional school for officials but around 1970 the establishment of faculties of natural and social sciences marked the beginning of a curriculum shift towards 'scientific education' within the University and attempts were made to make all disciplines more academic. Skúlason (cited in Jónsson, 1961) refers to this era as the time of the Teaching University, characterised by growth in attendance and addition of new lines of study to the curriculum where more disciplines were offered at the undergraduate level and more students were prepared for diverse graduate studies abroad and varied vocational fields. During this period, formal baccalaureate degrees were established and the undergraduate curriculum in different disciplines was formalised. During the 20th century, it was quite natural for Icelandic university students to seek undergraduate education abroad in various fields not provided for within the University of Iceland (Jónasson, 2004). Graduate studies were almost nonexistent within the national system.

From 1995 the University has been striving to become an international research university by emphasising academic research and establishing graduate and research programmes. Jónasson (2004) has explored the rhetorical discussion on higher education from 1970 and has found it to be divided between two strands: one emphasising the strengthening of professional education and the other stressing the need to build up post-graduate or research education in Iceland. These two aspects reflect the turmoil at the heart of the University's attempts to define its role in society. The research orientation is reflected in the University's policy statements from 2002 (Háskóli Íslands, 2002) and a more recent one from 2006 (Háskóli Íslands, 2006b). Both those mission statements portray the University's aim to become a leading research university, with a strong focus on multiple research activities in cooperation with other establishments of society and a goal to provide more diverse and international education.

In the 2006 mission statement, created with the active participation of staff in 2005-2006 and published as a policy statement that year, the University further stresses its research focus, aiming to be among the 100 best universities in the world and to both

strengthen academic research activities and increase the number of graduates at master's and doctoral levels (Háskóli Íslands, 2006b). This mission is one of the bases of a new contract on teaching and research between the University and the Ministry of Education (Menntamálaráðuneytið, 2007).

1.5.2 New landscape of higher education in Iceland

As has been the case in the western world, the decades of the 20th century have been a period of significant change in higher education in Iceland. The relationship between higher education and the state and society has changed, along with the overall structure, governance and administration of higher education, its size as well as its resources. Like other institutions, the University of Iceland is facing *supercomplexity* (Barnett, 1997). Current changes in western universities, which are attributed to global and other international economic, social and cultural developments, are referred to in a number of different ways by higher education researchers and writers such as Tight (2003) who names them the 'grand' issues, referring to topics such as 'diversification', 'entrepreneurialism', 'globalisation', 'internationalisation', 'managerialism', 'marketization', 'quality control' and 'massification'. These 'grand issues' have been felt at the level of higher education in Iceland and there has been some reaction (see for example Hansen (2005) on development and diversification of the higher education system; Jónasson (1995, 1999, 2004 and 2005) on the expansion and growth of the Icelandic higher education system, massification, academic drift and credentialism; and Vilhjálmsson (2005) on quality control).

From 1911 until 1971, the University was the only university in Iceland but in the last three decades university education in Iceland has grown very rapidly, moving from the elite stage to the mass education stage. Rapid expansion of higher education has occurred where new higher education institutions with a more specialised focus have emerged and two multidisciplinary universities have been established (one public and the other with private status). During this period the State was trying to capture the changes by creating a new legal framework for the system. A strong indicator of the State's attempts to react and gain control over the dispersed higher education field was the setting of the 1997 Act (Lög um háskóla nr. 136/1997). The 1997 Act enforced significant changes in the definition, organisation and governance

of higher education institutions in Iceland. The government act adopted a new legal structure defining the term ‘university’, increasing the independence of individual institutions at the formal level, basing finance on special service contracts regarding teaching and research and demanding procedures for both internal and external quality control. The administrative structure has also been changed, weakening the control of the academic faculties on the university boards but strengthening the state representatives, rectors and the authority of the deans (Jónasson, 2004).

With the 1997 Act attempts were made to define the term ‘university’ (in Icelandic ‘*háskóli*’), in a rather inclusive definition that can be used by any institution regardless of whether it engaged in research or not and independent of its scope of disciplines. In the Act, the independence of higher education institutions was also greatly increased and the universities allowed setting most internal rules themselves. Demands were made for procedures of both internal and external quality control. State universities were financed by a special service contract between the institution and the government and changes were made within the administrative structures of universities weakening the representation of the faculties on the university board but strengthening the authority of rector and deans. These changes were incorporated in new laws on the University of Iceland (Lög um Háskóla Íslands nr. 41/1999).

In a new Act on higher education in 2006, the ‘grand issues’ (Tight, 2003) were more thoroughly dealt with by the Ministry of Education (Lög um Háskóla Íslands nr. 64/2006). The Act demonstrates a new era in Icelandic higher education and strongly signals the internationalisation of the system. Being a member of the Bologna agreement (Kristinsson, 2003, 2005), the new Act is followed by the State’s publication of a National Quality Framework and an accreditation system where higher education institutions are required to seek accreditation for all disciplinary areas provided, based on a framework of regulations and conditions including descriptions of learning based on learning outcomes. Accreditation is awarded in accordance with rules based on international standards and relate to the role and aims of the university, governance or administration, qualifications of staff, organisation of teaching and research, admissions, rights and responsibilities of students, facilities for teachers and students and support services, quality control system, description of learning based on learning outcomes and financial resources. Further emphasis is

based on an institution's internal quality control and external quality evaluation of programmes and units (Lög um háskóla nr. 63/2006).

This short historical account of the development of higher education policy in Iceland demonstrates that, like other western countries, the higher education curriculum has been changing as structures, aims and goals and governance of the university is debated.

1.5.3 The University of Iceland at present

The University of Iceland, although small and located on an island in the middle of the Atlantic Ocean, is experiencing most of the political, social and cultural changes taking place in the global system of higher education where university education has grown very rapidly and moved in a relatively short time from the elite stage to mass education (Jónasson, 2003).

The University of Iceland is the largest teaching and research institute in Iceland and consists of 11 faculties and 28 departments operating under the faculties.¹ In the fall of 2006 it had a student body of 9471, taught by 755 fully employed academics and 1836 temporary staff holding 179 full positions. The University offers 286 lines of study, has an extensive undergraduate programme and an increasing number of graduate students being graduated from diverse disciplinary fields and lines of study (Háskóli Íslands, 2007a).

The University has actively participated in different Nordic, European and international higher education associations and programmes. With Iceland being a member of the European Free Trade Agreement, some of the professional degrees awarded by the University are regulated by professions and adhere to European standards. This is the case with engineering (Iðnaðarráðuneytið og Verkfræðingafélag Íslands, 1992), medical studies, architecture and pharmacology.

Since 1990, students at the University have taken part in Nordic and European student exchange programmes and all graduate programmes either require or strongly encourage their students to take part of their study at a foreign university

¹ This structure is under reconsideration and a plan of reorganisation of the faculties is in progress. By July 1st 2008 The Iceland University of Education will merge with the Univeristy becoming one of five new disciplinary 'schools'.

(Hálfdanarson, 2000; Jónasson, 2004). Such exchange programmes have also brought a number of foreign students to the University, increasing the number of courses offered in English. In 2005-2006, 320 foreign students attended the University with 225 Icelandic students from the University studying abroad (Háskóli Íslands, 2007a).

As a part of the University's research mission, a strong emphasis has been put on establishing the graduate programmes in different disciplines strengthened by new regulations, research students' funding and an upcoming administrative centre for graduate studies. In the last decade the number of graduate students has risen from 500 to 1600 with the number of doctoral students going from 36 to 190 (Háskóli Íslands, 2007a).

As required by the 1997 Act, the University has established a quality control system, including a system of student evaluation of courses. External evaluation has been carried out and different programmes, units and activities been evaluated. A common conclusion of those evaluations has been that the University is strong academically (Sigfúsdóttir, Ásgeirsdóttir, Macdonald and Feller, 2005) but suffers from underfunding. Despite financial constraints, it has been doing remarkably well but needs to react or respond to fast expansion, increasing number of students and a systematic development of graduate studies (Ríkisendurskoðun, 2005). Recommendations have suggested stronger regulations on student admission on behalf of the State. External evaluation of disciplinary programmes has been largely positive but has addressed the problem of the large number of drop-outs and suggestions have been made to adjust the credit system to ensure consistency between credits awarded and the workload of students, to set up quality control for part-time staff, the need to improve teaching skills of staff, to prioritise areas of research, find more effective administrative structure and support and pay increased attention to the teaching evaluation process (Menntamálaráðuneytið, 2006b).

In light of the steadily increasing enrolment in higher education in Iceland (Jónasson, 2004, 2005), the lack of financial support, remedied in part by a new contract between the University and the Ministry of Education and Culture (Menntamálaráðuneytið, 2007), and the nature and role debated the university (Skúlason, 2003; Vilhjálmsón, 2005) has been the subject of debate. Questions have

been asked about whose responsibility it is to make decisions about student access to higher education, how it should be financed (Hannibalsson, 2005) and how decisions should be made about what kind of disciplinary programmes to offer (Hansen, 2005).

Other global issues of concern to writers and researchers of higher education can all be felt at the University of Iceland. Those include the movement from a course to a credit system (Bocock, 1994) which has been incorporated as a part of the Bologna process (Kristinsson, 2003 and 2005) and incorporation of information technology and distance teaching (Laurillard, 2002) which has been part of the University mission for the last decade (Háskóli Íslands, 2002 and 2006b). An interest in pedagogy as a result of new ideas or emphasis on student learning (Biggs, 1999; Bowden and Marton, 1998; Entwistle, 1998; Kember, 1997; Marton and Booth, 1997; Prosser and Trigwell, 1999; Ramsden, 1992) has been clearly demonstrated in the establishment of the Centre for teaching.

1.5.4 The structure of the University and the place of curriculum decision-making

The University is a state-run university funded by the government. For most of the 20th century, detailed budgeting for the University was decided by the parliament but in 1991 the parliament decided that the University would receive block funding which could be distributed within the University. A financial committee within the University devised a distribution scheme adopting a formula used by the Swedish authorities. With the 2006 Act funds are distributed to universities through block budgets on the basis of special service agreements on research and teaching, allowing the University to distribute its resources internally at will. The basic unit for agreement with the state on teaching is the number of active students within the universities. At present there are five different cost categories of study fields (Hannibalsson, 2000). The University receives, for example, twice as much money for students in medicine and dentistry than in the humanities.

Access to university studies in Iceland has for the whole of the 20th century been open to all students who have passed the matriculation examination with the exception of some minor additional conditions. With the 1997 Act each university can determine its own entrance requirements which may differ between faculties. The government budget sets a limit to the number of students in different categories

that it is ready to pay for. The University can accept students at will but can not rely on being reimbursed if the intake exceeds the prescribed limits set by the government.

In accordance with the 2006 Act on higher education, the University needs to have all disciplinary fields provided accredited by the state, but once accredited the University can establish lines of study within the fields at will. Aside from the accreditation and financing, the Ministry of Education does not interfere with the organisation of academic matters though the minister of education appoints two representatives to the University Council.

The organisational structure of the University can be pictured as follows:

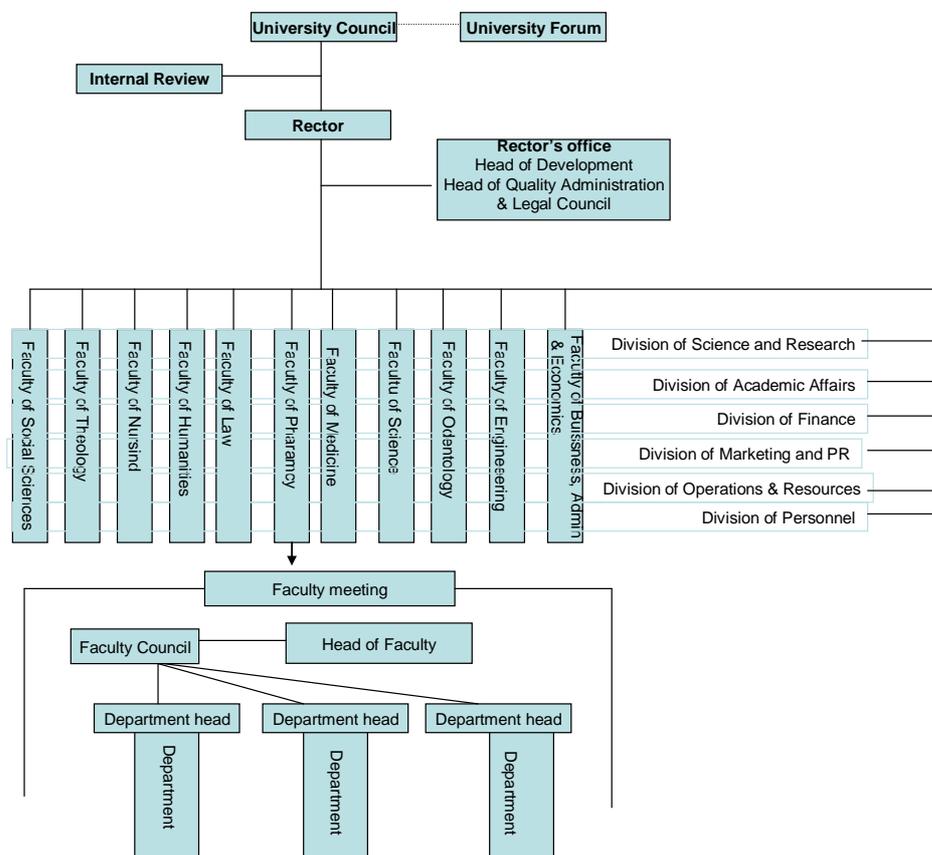


Figure 1.1: The organisational structure of the University of Iceland

Curriculum development takes place at all organisational levels of the University although the curriculum responsibility and the decisions made vary between levels.

The University Council

According to the 1999 Act on the University of Iceland and the 2006 Act on higher education, the University Council (consisting of the rector, four representatives of the faculties, two representatives of the university teachers and professors' unions, two student representatives and two members appointed by the ministry of education) holds the power of ruling with the University forum being the arena for policy formulation. The Council rarely interferes directly with curriculum decisions made within the faculties and departments but approves matters such as requirement of student admission, length of time of study and regulations regarding final assessment. The Council nevertheless approves the financial budget of the University and distributes the government resources to faculties and other units of the institute and can in that sense directly influence curriculum development.

The faculties

The faculties are the basic financial and administrative units of the University and the context in which the formal curriculum decisions rest. Within them teaching, research and administration takes place. The faculties publish their course catalogues stating the organisation of degrees awarded within the faculty, courses taught and credits awarded, the organisation and regulation of teaching and assessment, administration and ordering of department within the faculty and other rules and regulations specific for the faculty. Specific rules can refer to matters such as explicit requirements of student admission (Department of Natural Science), requirements of practical training (Department of Engineering) or permission for students to take part of their studies in different departments (Department of Social Sciences).

The faculty meeting authorises and approves all formal academic matters within the faculty. It administers the financial resources awarded by the University's council and distributes it to the departments and other units within its regime. The faculty head is appointed by the faculty and initiates and manages the faculty's mission and policy often aided by a faculty council.

Departments

The faculties are, in general, divided into different departments, each run by an appointed department head who is also a member of the Faculty Council. The department is in charge of the disciplinary areas of study, makes decisions regarding the curriculum and the organisation of teaching and assessment and appoints teachers for courses within the limits of the financial resources awarded. The department's formal curriculum decisions need to be approved and published in the faculty's course book that is published annually as a part of the University's course book. Student admission requirements can be set by the faculties but need to be approved by the Faculty Council. New programs suggested and agreed upon by departments need to be accepted by the faculty and in most cases by the Council whereas new courses only need to be permitted by the faculties.

The teachers

The teacher as a curriculum developer is the focus of this research. The professional obligations of teachers are defined in the institutional contract between the University and the university teacher organisation. Their professional obligations are defined in terms of teaching, research and administration where teaching usually makes up 51% of their duties, research 43% and administration 6% (Háskóli Íslands, 2006a). Teachers' academic freedom in research is seen as foundational and increased emphasis made to encourage academic publication and production of knowledge. The regulations stress the academic freedom of teachers in teaching as well as research, stating that:

Teachers have the freedom of teaching within the framework given by the departments. They decide themselves the curriculum of study, the treatment of the curriculum and methods of instruction. This important freedom carries with it duties and responsibility towards the disciplinary field, students and colleagues (Háskóli Íslands, 2006a).

The framework given by the departments is the general framework published in the University's regulations and specific rules and agreements made within individual departments and usually visible in the department's course catalogue. Financial resources are awarded differently according to disciplinary areas. Until the year 2000 the budget for each course was determined by credits, hours taught and type of

instruction provided. Since 2000 courses are awarded a block budget giving teachers the freedom to organise learning and teaching at will. At present teachers rarely make use of the clause of teaching freedom (Kristinsson, 2007).

Structure of the thesis

Above I have described my personal interest in the research topic. I have provided a short overview of the setting of the research, the University of Iceland and the context of higher education in Iceland at present. This account has been limited to a focus on aspects that may help the reader understand the context that teachers at the University find themselves in at present and may influence and affect their curriculum ideas and decision making.

In Chapter One I have presented the selection of the research topic and the importance of curriculum in higher education. The University has been described, providing a brief overview of its history, present landscape and governance and structure. Chapter Two offers a comprehensive discussion of the curriculum concept and the two main strands of theoretical framework the research, i.e. the theories of Basil Bernstein and the socio-cultural perspective of curriculum development and planning. In Chapter Three I explain and discuss the research design, the epistemological stance and the methods applied. The data collection is described as well as methods of analysis and ethical considerations are stressed. In the next three chapters, the findings of each of the cases are presented. In Chapter Four the findings from the Department of Mechanical and Industrial Engineering are presented followed by findings from the Department of Anthropology in Chapter Five and from the Department of Physics in Chapter Six. Each of these three chapters begins with an introduction of the participants in the study and a presentation of the formal curriculum before discussing the pedagogic discourses of the three disciplines. In Chapter Seven the central findings are highlighted and discussed. Finally in Chapter Eight the main findings of the research are summarised and the implications of these findings and the contribution of the research to the educational field discussed. Finally, there is a discussion of the strengths and weaknesses of the research followed with suggestions or recommendations for practice.

CHAPTER 2: APPROACHING THE CURRICULUM

2.1 Introduction

In this chapter the concept of curriculum and the theoretical framework I will be using in the study are discussed. In section 2.1 the curriculum concept is explored. First the focus is on the concept of curriculum, its formation, and complexity. Different research approaches are addressed and finally the research paradigm is stated. The theoretical framework and tools used to seek understanding of the curriculum and curriculum development in this study are explained in section 2.3. In section 2.3.1 the curriculum concept applied in the study is introduced. The focus then moves towards the different disciplines and in section 2.3.2 the classification of the disciplines as well as the disciplinary structure of the curriculum is discussed. Within curriculum development, university teachers are seen as holding an authoritative and powerful role and in section 2.3.3 their space and agency will be explored. Curriculum development takes place within the social context of the department and the institution and in section 2.3.4 the socio-cultural aspect of the curriculum decision making is discussed. At the end of the chapter, in section 2.3.5, the research questions will be formed.

2.2 The curriculum concept

The formation of the curriculum concept within higher education

Despite its crucial role in higher education (see Chapter 1.3), the organisation of universities has not always included a formal structure of curriculum knowledge. Giving an historical account on the curriculum concept in his book, *Learning about Education: An Unfinished Curriculum*, Hamilton (1990) describes the university curriculum in the Middle Ages where academics adhered to very vague plans. Knowledge and experience was selected without academics giving much thought about how it should be organised or taught. Academics met on the first day of the school year to decide which texts to cover, then gave lectures and students came and went as they pleased. Little by little the structure of lectures and learning became more organised and the organisation of the University of Paris became a curriculum model developed further in other universities. The curriculum concept was given

weight in the 16th century connected to the new concept of the 'system'. Curriculum thus not only stood for the regulation of teaching and learning but the systematisation of schooling (Hamilton, 1990).

In the Western world the curriculum concept became a key concept in education during times of modernisation from 1880. In the United States, progressivism (Dewey, 1915/1944) coupled with the emphasis on scientific methods focusing on effectiveness and practicality (Bobbitt, 1918), became the foundation for the formation of curriculum thinking and practice (Tyler, 1949) that has since flourished as a discipline as well as a practical endeavour (Walker, 1990).

The complexity of the curriculum concept

Curriculum, the key concept in this research, is a complex concept that can be approached from different angles. As a metaphor I like to cite my favourite story, the story of the seven blind men and the elephant (Backstein, 1992; Shah, 1967):

The Blind Men and the Elephant

In the farthest reaches of the desert there was a city in which all the people were blind. A king and his army were passing through that region, and camped outside the city. The king had with him a great elephant, which he used for heavy work and to frighten his enemies in battle. The people of the city had heard of elephants, but never had the opportunity to know one. Out rushed 6 young men, determined to discover what the elephant was like.

The first young man, in his haste, ran straight into the side of the elephant. He spread out his arms and felt the animal's broad, smooth side. He sniffed the air, and thought, 'This is an animal, my nose leaves no doubt of that, but this animal is like a wall.' He rushed back to the city to tell of his discovery.

The second young blind man, feeling through the air, grasped the elephant's trunk. The elephant was surprised by this, and snorted loudly. The young man, startled in turn, exclaimed, 'This elephant is like a snake, but it is so huge that its hot breath makes a snorting sound.' He turned to run back to the city and tell his tale.

The third young blind man walked into the elephant's tusk. He felt the hard, smooth ivory surface of the tusk, listened as it scraped through the sand, then as the elephant lifted the tusk out, he could feel its pointed tip. 'How wonderful!' he thought. 'The elephant is hard and

sharp like a spear, and yet it makes noises and smells like an animal!' Off he ran.

The fourth young blind man reached low with his hands, and found one of the elephant's legs. He reached around and hugged it, feeling its rough skin. Just then, the elephant stomped that foot, and the man let go. 'No wonder this elephant frightens the king's enemies', he thought. 'It is like a tree trunk or a mighty column, yet it bends, is very strong, and strikes the ground with great force.' Feeling a little frightened himself; he fled back to the city.

The fifth young blind man found the elephant's tail. 'I don't see what all the excitement is about', he said. 'The elephant is nothing but a frayed bit of rope.' He dropped the tail and ran after the others.

The sixth young blind man was in a hurry, not wanting to be left behind. He heard and felt the air as it was pushed by the elephant's flapping ear, then grasped the ear itself and felt its thin roughness. He laughed with delight. 'This wonderful elephant is like a living fan.' And, like the others, he was satisfied with his quick first impression and headed back to the city.

But finally, an old blind man came. He had left the city, walking in his usual slow way, content to take his time and study the elephant thoroughly. He walked all around the elephant, touching every part of it, smelling it, listening to all of its sounds. He found the elephant's mouth and fed the animal a treat, then petted it on its great trunk. Finally he returned to the city, only to find it in an uproar.

Each of the six young men had acquired followers who eagerly heard his story. But then, as the people found that there were six different contradictory descriptions, they all began to argue. The old man quietly listened to the fighting. 'It's like a wall!' 'No, it's like a snake!' 'No, it's like a spear!' 'No, it's like a tree!' 'No, it's like a rope!' 'No, it's like a fan!'

The old man turned and went home, laughing as he remembered his own foolishness as a young man. Like these, he once hastily concluded that he understood the whole of something when he had experienced only a part. He laughed again as he remembered his greater foolishness of once being unwilling to discover truth for himself, depending wholly on others' teachings. But he laughed hardest of all as he realized that he had become the only one in the city who did not know what an elephant is like.

I find this rather lengthy story one way to understand the complexity and the elusiveness of the curriculum concept. It is a concept that can be – and is – approached from numerous aspects, as different texts or discourses and for different purposes, but like the old man I am striving to find a paradigm or approach that will

allow me to capture as many parts of the elephant as necessary for understanding. Yet the elephant as a metaphor does little justice to the curriculum as it demonstrates only the complexity of a single being. The curriculum, on the other hand, is better described as an ever-changing social phenomenon where different stakeholders and various ideologies are at play.

Research approaches to the curriculum

One way of looking at the curriculum concept is from the research approaches commonly used to explore it. Posner (1998) argues that three common categories of approaches can be characterised related to the focus of research in the area of curriculum. Those approaches are the *procedural*, where the focus is on the steps that should be taken in the planning process; the *descriptive*, that concentrates on how decisions are made and steps are actually taken by curriculum planners; and the *conceptual* approach where the focus is on understanding the elements of curriculum planning and their relation to one another. Squires' work (1990), cited earlier, is a good example of the conceptual approach where he attempts to set up a framework that will allow for an analytical analysis of the curriculum concept. These categories overlap as is the case in this research where the main focus is conceptual; but partly it can be seen as descriptive as the aim is to understand the decisions made by the curriculum planners, and also procedural as the teachers' planning is to a certain degree explored.

Irrespective of different research foci, the complexity of the curriculum concept stems from its multilevel 'nature', as stated by Goodlad and associates (1984). Like the elephant, the curriculum can be touched upon from various sides. Curriculum can thus include studies at the micro level of the classroom as well as at the macro level of the institution or society. Giving a view of this broad spectrum, Goodlad and associates (1984) propose five different curricula, operating at different levels. The different curricula are the *ideal curriculum*, for which proponents are competing for power within a given society; the *formal curriculum*, such as would be found documented within universities in syllabuses and policies; the *perceived curriculum* referring to what the teachers or academics perceive the curriculum to be; the *operational curriculum* which is what we usually see as teaching, i.e. what goes on in classroom; and the *experiential curriculum* which consists of what students

experience as curriculum (Goodlad, 1984). The idea of the curriculum can thus be seen as encompassing and being understood at various levels where at each level different internal and external factors influence and shape the curriculum. A thorough model of the internal and external forces acting upon the higher education curriculum has been provided by Stark and Lattuca (Lattuca, 2004; Stark and Lattuca, 1997, 2000). In *Shaping the College Curriculum*, the authors argue that whether curriculum is understood at the course-level, the programme-level or the institutional-level, a variety of internal and external contexts and factors strongly influence the shape of what the authors refer to as ‘academic plans.’ Any academic plan (or curriculum) consists of seven elements (purposes, content, sequence, learners, instructional processes, instructional resources, and assessment/evaluation) that are or need to be addressed in the curriculum process. The model then demonstrates the influences of internal and external factors that act on the plan at different levels of the curriculum (course, programme and institutional level) (Stark and Lattuca, 1997, p. 20).

The complexity of the curriculum concept can also be seen in light of the scope of the educational practice or processes to which it refers. Marsh and Willis (2007) claim that there are three basic questions to be asked and these deal respectively with the *planned curriculum*, the *enacted curriculum*, and the *experienced curriculum*. The planned curriculum deals with the question of worthy knowledge; the enacted curriculum focuses on the process of deciding what the curriculum should be; and the experienced curriculum focuses on the curriculum as it should be experienced by the student. Using similar notions, Barnett and Coate (2005) criticising the engineering sense of a curriculum that simplifies the complexity of the concept, point out the different levels of curriculum design. They distinguish between curricula designed *in-advance* and *in-action* stressing that the curriculum is always in process (cf. Stenhouse, 1975 in Barnett and Coate, 2005), dynamic and a site of contested interpretations. Barnett and Coate demonstrate the need to look at the curriculum as a process that encompasses not only the pre-designed curriculum plans but how those plans are acted out through the pedagogy and the learner (p. 51):

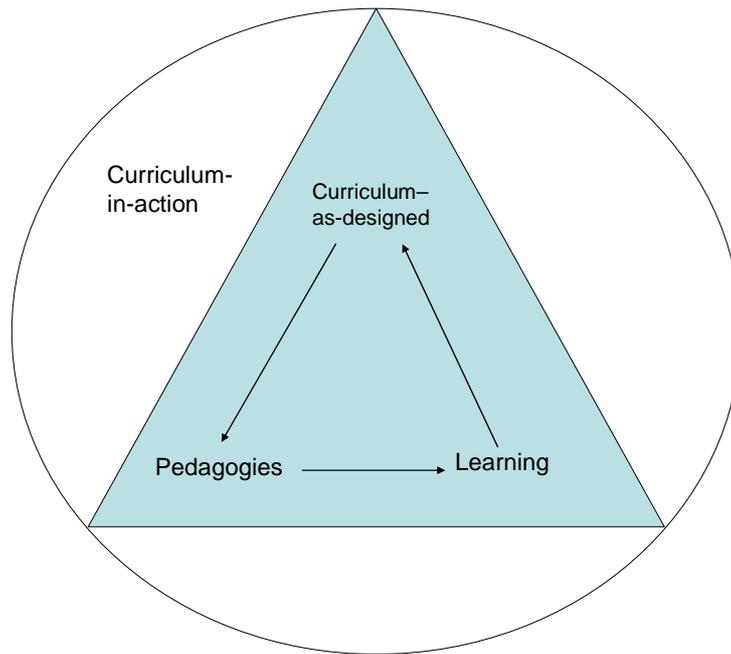


Figure 2.1: A demonstration of the Curriculum-in-action by Barnett and Coate (2005, p. 51)

The curriculum-in-action is a site of varied curriculum ecologies that stand as curriculum forces in various dynamic relationships. Other authors emphasising the process and the dynamic rather than structure of the curriculum have stressed the organic nature of the curriculum claiming that the educational experiences that take place can never be fully foreseen and planned (Eisner, 2000; Knight, 2001; Macdonald, 2003). The curriculum is thus an area where participants and spaces come together in a dynamic curriculum complexity.

An analytical, social and dynamic notion of the curriculum concept can also be found in the work of Basil Bernstein (2000). Bernstein sees formal education as embracing the aim, goals and content of a given field of knowledge, the way the knowledge is transmitted or enacted upon (the pedagogy) and how those experiences are assessed and evaluated. He states:

Formal educational knowledge can be considered to be realized through three message systems: curriculum, pedagogy and evaluation. Curriculum defines what counts as valid knowledge, pedagogy defines what counts as valid transmission of knowledge, and evaluation defines what counts as a valid realization of this knowledge on the part of the taught (Bernstein, 1971, p. 47).

With his theory of classification and framing, Bernstein (1990; 2000) extends the social context of the curriculum and sees it as the vehicle for social production but at the same time he provides tools to explore the interaction between different levels of the curriculum and the pedagogical relations taking place between teacher and learner. Bernstein's theories will be further explored in section 2.3.1.

Curriculum research paradigms

As suggested above, the curriculum concept is complex and multilayered and to establish a research approach or a research paradigm is not a light task. Like other educational research, curriculum research can be classified by distinctive paradigms. Ornstein and Hunkins (2004) claim that:

An individual's approach to curriculum reflects that persona's view of the world, including what the persona perceives as reality, the values he or she deems important, and the amount of knowledge he or she possesses (p. 2).

They then proceed to list six different approaches (texts or discourses) to the curriculum: behavioural approach, managerial approach, system approach, academic approach, humanistic approach and reconceptualist approach, where the first three can be classified as technical or scientific and the latter ones as non-technical or non-scientific (p. 2). This terminology is comparable to the well-known classification of research paradigms in social sciences derived from Thomas Kuhn (1977). On a similar note, Pinar *et al.* (1996), in an extensive overview of the curriculum theoretical field, claim that while the paradigm of the traditional curriculum field was curriculum development it has been reconceptualized in the contemporary field which is directed towards understanding curriculum in the sense of *verstehen*. The contemporary field is a complex one and Pinar has suggested that the complexity of the curriculum concept is best understood by seeing its theorizing as consisting of different texts or discourses (Pinar *et al.*, 1996).

A frequently used research distinction is between a positivistic, empirical, 'scientific' approach and hermeneutics. The former is more concerned with natural sciences, the search for universal laws and explanations through the objective study of the world. The latter is more concerned with individual understanding, subjective interpretation

and acceptance of multiple realities of the world where knowledge is best expressed by the Weberian term *verstehen* (Schwandt, 1997).

A third approach, a critical approach or paradigm, arrived at from the Frankfurter school exposes the interests associated with the different research paradigms. Critical theory is critical of social organisations that privilege some at the expense of others and believe that any research is in itself a political act. Researchers adhering to the critical approach claim that their research should be of benefit to those that are marginalised and empower them (McLaren, 1989). Qualitative researchers influenced by critical theory are interested in how social values get reproduced through pedagogical institutions (Eisner, 1997; Giroux; 1991; Weiler, 1988).

In my research, the paradigm chosen is that of understanding although my emancipatory interest as an academic developer would be better revealed by the critical paradigm. My quest is not to search for nor try to find universal laws of curriculum decision making but rather to explore and understand curriculum as a highly social complex phenomenon interwoven into the multiple realities and cultures of universities. I am critical of the current curriculum conception found within the higher education discourse which I find both too technical and narrow and void of the discussion of power and control of those who are in the position of making curriculum decisions. To do justice to the concept of curriculum and in order to understand it, I need theoretical texts or models that:

- provide me with a broad, conceptual understanding of the curriculum and its complexities taking into account the macro, mesa and micro levels of curriculum development
- help me understand and explore disciplinary differences and cultural aspects of the curriculum
- allow me to focus especially on the role university teachers play in curriculum development
- are sensitive towards the power relations that are at work within the curriculum process.

2.3 Theoretical framework

Above the need for theoretical models was stated. The most useful theoretical tool to provide a broad conceptual understanding of the curriculum I have found is Bernstein's theory of the pedagogic discourse (Bernstein, 1990; 1996; 2000). In section 2.3.1 an overview of Bernstein's ideas or theories that relate to curriculum development will be provided. The main theoretical tools used are Bernstein's sociological theories on the different fields of reproduction of knowledge as well as his concepts of *classification* and *framing*. Students' recognition and realisation rules are introduced along with the concept of *pedagogic discourse*. The pedagogic discourse is a foundational idea in this study and its formation within the different fields of knowledge and their subfields is explored in some detail.

As social reproduction, curriculum development takes place within the social context of the university and in the case of this research, within the disciplinary culture university teachers find themselves in. In section 2.3.2 the focus is on the classification of the disciplines. Here the disciplines are seen as different social constructs and Becher and Trowler's ideas as well as Bernstein's concepts of classification and framing are used to describe the disciplinary differences and their different type of curriculum codes. University teachers' conceptions of the curriculum and the role they hold within the curriculum process are of special interest in the study. In section 2.3.3 the space and agency of university teachers in the curriculum process is explored using Bernstein's concept of power and Barnett and Coate's (2005) idea of space within the curriculum. From a socio-cultural approach, curriculum development takes place within a social context. In section 2.3.4 the focus is on the dominant disciplinary community i.e. the department and Bernstein's concept of classification is applied to describe different the structural codes of different departments.

In the last section of the chapter, section 2.4 the research questions are formed.

2.3.1 Curriculum as pedagogic discourse

Introducing Bernstein

Bernstein was a critical curriculum theorist within sociology of education. His early work on language and code theory was influential but also very controversial and

tied to cultural deficit theory. Bernstein argued that much of this previous work has been taken out of context or recontextualised incorrectly (Sadovnic, 1995a, p. 29). In his later work he began his attempts to connect macro power and class relations to the micro educational processes of school. This emphasis of linking educational practices to the larger institutional, societal and historical factors in which they are embedded, has 'opened up exciting but as yet undeveloped avenues of inquiry' (Sadovnic, 2001, p. 18).

In his work, Bernstein built a single, increasingly elaborated conceptual framework offering analytical ideas and tools which make it possible to look empirically at the conceptual links between the pedagogy of the classroom and the broader social structures. Bernstein himself remained clear that this was a conventional social project. He maintained that to provide the conceptual basis for analysis that can connect 'issues of face to face construction of knowledge with issues of institutional location and structure'. The framework must connect issues of discourse with a broader sociological analysis of the state, economy and social change (Singh and Luke in Bernstein, 1996, xii).

Whereas Bernstein has focused on the theoretical framework of his ideas, his work has been used as an analytical tool in various types of research within higher education such as analysing teacher education programs (Ensor, 2004b; Neves, Morais and Afonso, 2004; O'Meara and MacDonald, 2004), university teachers' ownership of curriculum change (Kirk and Macdonald, 2001), recognition of higher education students' prior learning (Harris, 2004) and exploring differences in sociology curricula in different universities (Vitale, 2001). Bernstein noted that his body of work has evolved over the last decades as it has moved back and forth between the theoretical and the empirical work to test it, with the theoretical always preceding the empirical. A growing interest in Bernstein's work has thus become increasingly influential in empirical research and is, according to Solomon, related not only to change in the intellectual arena but also to the need for an explanatory framework and tools to analyse changes occurring in work, education and regulatory institutions (Bernstein and Solomon, 1999, p. 266).

Bernstein's complete theory of curriculum and pedagogy is complex. Here, I will present a short review of his concepts that are fundamental to my theoretical framework.

Classification and framing

Classification and framing are concepts that have been at the core of Bernstein's theory as he attempts to analyse the dominant structures of the message systems of formal educational knowledge. Classification is a structuralistic concept adopted from Durkheim but framing has arrived from symbolic interactionism. With classification Bernstein refers to the organisation of knowledge and to the relations between categories where categories can, for example, be seen as the different disciplines. Classification refers to the relationship between categories and the crucial space that isolates one category from another or one discipline from another. It is this space that determines the flow of discourse and it is, according to Bernstein, preserved with power. Classification can be strong or weak according to the degree of insulation between the categories. In the case of strong classification, there is a strong insulation between categories where each category has its unique identity, its unique voice and its own specialised rules of internal relations. In the case of weak classification, we have less specialised discourse, less specialised identities, less specialised voices. Those belonging to a discipline that has a strong classification can more easily distinguish their identity from others whereas members of a discipline with a weak classification have a more vulnerable sense of identity and more blurred boundaries. Classification, strong or weak, always carries power relations that are revealed when attempts are made to affect the isolation between categories or disciplines (Bernstein, 1999).

The concept of *framing* takes us into pedagogy. Bernstein (1971; 2000; Moore and Maton, 2001) uses the concept of framing to analyse the different forms of legitimate communication realised in any pedagogic practice. Framing refers to the nature of control over the selection of communication and its sequencing (what comes first, what comes second), the pacing of the communication and the criteria and control over the social base which makes this transmission possible. Where the framing is strong, the teacher has explicit control over the selection, sequence, pacing, criteria and social base. Where framing is weak, the learner has more *apparent* control over

the communication and its social base. Framing refers to *how* – that is the *theory of instruction*:

Framing ... refers to the range of options available to teacher and taught in the control of what is transmitted and received in the context of the pedagogical relationship. Strong framing entails reduced options; weak framing entails a range of options. *This frame refers to the degree of control teacher and pupil possesses over the selection, organisation and pacing of the knowledge transmitted and received in the pedagogical relationship* (Bernstein, 1971, p. 50).

According to Bernstein, classification and framing operate multi-directionally and independently of each other. He stresses that (as with all his concepts), they are analytical concepts not empirical, and therefore do not exist in pure form. When classification and framing values change, power and control change and resistance frequently arises.

Control establishes legitimate forms of communication appropriate to the different categories. Control carries the boundary relations of power and socialises individuals into these relationships. Thus, power constructs relations *between* and determines relations *within* given forms of interaction (Bernstein, 2000).

Bernstein distinguishes analytically between two systems of rules regulated by framing and those can vary independently of each other, i.e. their framing values can change independently. These are rules of the social order and rules of discursive order. The rules of social order refer to the hierarchical relations in pedagogic relation and to expectations of conduct, manner and character. It is in this sphere where the image of the good student lies. Where framing is strong, the student would be labelled in authoritative terms such as being conscientious or careful while an apparently weak framing would indicate the students should be expected to become creative or interactive.

Where framing is strong the rules of the instructional and regulative discourse are explicit, resulting in what Bernstein terms *visible pedagogy*. Conversely, when framing is weak the rules of the discourse are implicit and not known to the learner and the practice is most likely pedagogically invisible (Bernstein, 1996, p. 14).

The rules of the discursive order refer to the selection, sequence, pacing and criteria of knowledge. Those rules Bernstein calls *instructional discourse* and the social rules *regulative discourse*. Bernstein claims that the instructional discourse is always embedded in the regulative discourse, and the regulative discourse is the dominant discourse (Bernstein, 1990). In Bernstein's later work he stressed the union of the two discourses and the dominance of the regulative discourse claiming that:

Regulative discourse produces the order in the instructional discourse. There is no instructional discourse which is not regulated by the regulative discourse. If this is so, the whole order within pedagogic discourse is constituted by regulative discourse (Bernstein, 1996, p. 34).

The theory of instruction also belongs to the regulative discourse and contains within itself a model of the learner and of the teacher and of their relation (Bernstein, 2000, pp. 34-35). The theory of instruction also contains ideological elements and can not be seen as entirely instrumental.

Students' recognition and realisation rules

Shifting the focus onto the student's experience, Bernstein introduces the rules of recognition and realisation and links them to classification and framing. *Recognition rules* refer to the learner's ability to recognise the discursive terms of the context they are in. The context in this study is the disciplinary community. There are power issues inherent in recognition rules in that they are socially distributed, i.e. some students possess the recognition rules while others do not. The strength of classification will indicate how one context differs from another. *Realisation rules* refer to students' ability to produce appropriate text (Bernstein, 1996, pp. 16-22). As an example of this, Northedge (2003a) has provided examples of how adult students arriving at an introduction course in the university find it difficult to distinguish or realise the academic discourse from their everyday one.

Recognition rules regulate what meanings are relevant and realisation rules regulate how the meanings are to be put together to create a legitimate text. While students may have the recognition rules, they may still be unable to produce legitimate communication and texts. Different values of framing act selectively on realisation rules and the production of different texts. With very weak framing, learners never

fully acquire the realisation rules. Some learners may possess recognition rules (and so be able to distinguish the nature of the context they are in), but not the realisation rules (and so not be able to produce appropriate communication – written or oral) (Bernstein, 1996). There are strong relations between students' recognition and realisation rules and Bourdieu's (1990) concept of *habitus* as both can be used to explore how the higher education culture is more accessible to some students than others.

Pedagogic discourse

Pedagogic discourse elaborates classification and framing at the point where Bernstein moved from codes to discourses. Pedagogic discourse is concerned with 'the production, distribution and reproduction of official knowledge and how this knowledge is related to structurally determined power relations' (Sadovnic, 1995b, p. 10). The realisation of knowledge takes place through the *pedagogic device* which lies at the union of power, knowledge and consciousness (Bernstein, 1990). The pedagogic device uses internal rules (grammar) to select from the potential discourses of knowledge those parts that can be pedagogised (Bernstein, 2000, p. 27). Those internal rules are relatively stable and are not ideologically free (p. 28). The pedagogic device provides the intrinsic grammar of pedagogic discourse and this grammar works through three rules that are interrelated and hierarchically related (Davis, 1995). These rules are: *distributive rules*, *recontextualising rules* and *evaluative rules*, each operating within respective fields. Davis (1995, p. 49) defines their functions:

Distributive rules relocate the distribution of access to public sites where the unthinkable may be brought and where the thinkable can only be thought. Recontextualising rules regulate the ideological movement from fields of discursive production (intellectual, craft, expressive) into specialised creations with their own internal ordering principles as pedagogic discourses. Critical rules regulate specific pedagogic practises in specific contexts.

The set of rules, their fields and processes can be pictured in the following scheme:

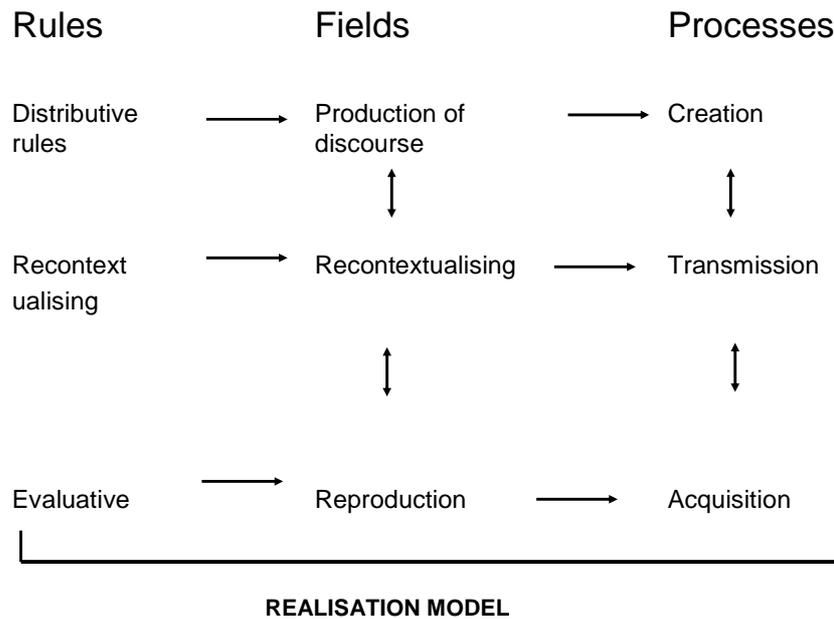


Figure 2.2: The realisation model of the pedagogic device (Bernstein, 2000, p. 37)

Distributive rules are a power-laden means to specialise, distribute and regulate forms of knowledge, meanings, consciousness and practice to social groups, mainly those in the upper reaches of the educational system (Bernstein, 1996). They are at work within the *production field* where new knowledge is created. They distinguish between two different classes of knowledge that Bernstein names the thinkable class and the unthinkable class. The major control and management of the unthinkable class is carried out by higher agencies of education, such as university teachers. Higher education is the main field of the production of the discourse (Bernstein, 2000, pp. 28-30).

Recontextualising rules constitute specific *pedagogic discourse* and are at work within the *recontextualising field*. Pedagogic discourse rests on the rules which create specialised communications through which pedagogic subjects are selected and created. According to Bernstein, the pedagogic discourse is not an actual discourse but *a reconceptualising principle* by which other discourses are appropriated and brought into a special relationship with each other, for the purpose of their selective transmission and acquisition (Bernstein, 2000, pp. 31-35). To take an example, in order to teach disciplines such as anthropology, physics or

engineering a selection has to be made. Which skills, knowledge or values should be selected for that purpose?

The recontextualisation field is comprised of two sub-fields; *the official recontextualizing field* (ORF) and the *pedagogic recontextualizing field* (PRF). The ORF includes the ‘specialized departments and sub-agencies of the State and local educational authorities together with their research and system of inspectors’ (Bernstein, 1990, p. 192). The PRF is comprised of university faculties of education, together with their research; and ‘specialized media of education, weeklies, journals, and publishing houses together with their readers and advisers’ (Bernstein, 1990, p. 192). The PRF may also ‘extend to fields not specialized in educational discourse and its practices, but which are able to exert influence both on the State and its various arrangements and/or upon special sites, agents and practices within education’ (Bernstein, 1990, p. 192). There is a constant tug of war between the ORF and the PRF over control and power as can be seen in recent times where the state has through a series of policy papers, regulations and quality requirements projected new working conditions for academics or new identities (Henkel and Kogan, 1999; Singh, 2002; Singh, Atweh and Shield, 2005).

The pedagogic discourse selects and creates specialised pedagogic subjects through its contexts and contents by two kinds of rules or discourses as has been dealt with above. The *instructional discourse* creates or is concerned with specialised skills and their relationship to each other. The *regulative discourse* is a moral one, which creates order, relations and identity. The instructional discourse is embedded in the regulative discourse, which is the dominant one (Bernstein, 2000, p. 32).

Bernstein uses the example of physics to clarify the importance or role of the regulative discourse which produces order in the instructional discourse. In the production of the discourse (for example in physics research) where physics (as knowledge) is produced it can be difficult to believe that what everyone is doing is physics (the classification of the regulative discourse is not strong). This is not the case with physics as pedagogic discourse. There we have entered the field of recontextualising and different recontextualising agents such as textbook writers define what physics is. Irrespective of the intrinsic logic which constitutes the specialised discourse and activities called physics, the recontextualising agents will

select from the totality of practices which are called physics in the field of the production of physics. The discourse (physics) is ideologically transformed as it is moved from an actual discourse (such as physics or anthropology) to an imaginary discourse (physics or anthropology as a subject of study). Pedagogic discourse thus creates imaginary subjects or disciplines.

The construct of the imaginary discipline is not derived from the logic of the actual discourse of physics. The rules for transmission are not epistemological but social facts – made by principles of selection activated by a component of the regulative discourse (that is thus dominant). The recontextualising principle is not only recontextualising the *what* of pedagogic discourse but also the *how* – that is the *theory of instruction*. The theory of instruction also belongs to the regulative discourse and contains within itself a model of the learner and of the teacher and of the relation. The model of the learner is never wholly utilitarian. It always contains ideological elements (Bernstein, 2000, p. 35).

In the process of delocating a discourse, i.e. taking a discourse from its original site to its new positioning as pedagogic discourse, a transformation takes place. In the transformation there opens up a space in which ideology can play. As the discourse moves it is ideologically transformed (Bernstein, 2000, pp. 32-33).

The evaluative rules operate within the reproduction field. They are the device at work when the pedagogic discourse (as instructional discourse embedded in the regulative discourse) is transformed into a pedagogic practice and converted into modes of common or shared classroom knowledge in interactions with students. The pedagogic or social relations of the classroom are constituted in the first instance by the social division of labour in terms of knowledge construction, dissemination and acquisition. Any social division of labour has two dimensions, horizontal and vertical. The *horizontal dimension* refers to specialised categories sharing memberships of a common set, for example, school subjects in a given course or students sharing a common status. The *vertical dimension* refers to the rank position of a category within a set and the ranking relation between sets. In terms of the management of classroom knowledge, teachers usually appropriate a higher position in the vertical or hierarchical division of labour than students (Bernstein, 1990, p. 22).

The rules and their respective fields are demonstrated in the following figure:

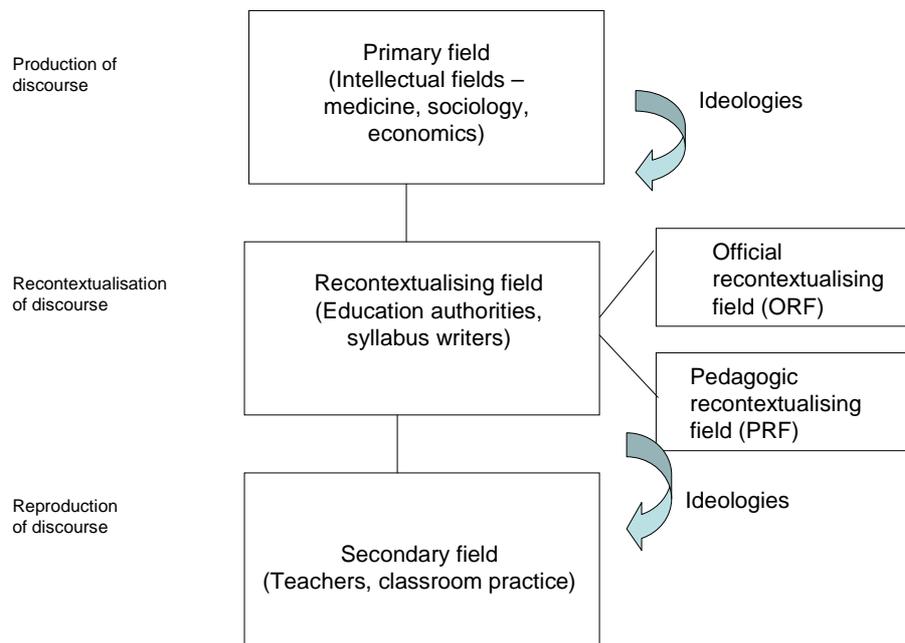


Figure 2.3: The three fields of knowledge production

In this study, Bernstein’s idea of the pedagogic discourse will be seen as capturing the curriculum concept in the broad and critical sense needed to explore university teachers’ conceptions and agency of curriculum development within their disciplines.

2.3.2 The curriculum and the different disciplines

The classification of disciplines

Assumptions about the nature and structure of knowledge are built into the language of higher education policy, the statistics of higher education, the structure of institutions, the identity of academic professions, the planning of courses and into the methods and styles of teaching and learning (Squires, 1990, p. 35). In this study, the curriculum of three different disciplines will be explored. Although the disciplines selected for study differ in terms of epistemological nature, they are here explored as social constructs. That does not exclude the importance of understanding university teachers’ ideas of the ‘nature’ of their disciplines which are important when exploring their thinking within the production field (Moore and Maton, 2001). According to Henkel and Kogan (1999) the process of curriculum decision making is characterised by conflict and contradictions and by attempts to guard the interest and

power relations within the disciplinary community. Here the disciplines are seen as the basic units for curriculum development within the University.

To explore different disciplinary communities, I find the work of Becher and Trowler (1989; 2001) helpful. In their classification of the disciplines, they use the first two of Biglan's categories (see Biglan, 1973) to group disciplines into the broad headings of hard-pure, soft-pure, hard-applied and soft-applied, each manifesting its own epistemological characteristics. They then give descriptions of the common features of the disciplines within each category (p. 36) which can be summarised in the following way:

The nature of the knowledge in the *hard-pure* disciplines, such as physics, is cumulative, atomistic, concerned with universals and quantities. It is impersonal, value-free and has clear criteria for knowledge verification. There is consensus over what are seen as significant research questions that result in discovery or explanation.

Soft-pure knowledge refers to disciplines in the humanities and pure social sciences and is reiterative, holistic and concerned with particulars and qualities. The knowledge is personal, value-laden and there is a dispute over criteria for knowledge validation and lack of consensus over significant questions to address. The result of research is understanding and interpretation.

The hard-applied disciplines are mainly technology such as mechanical engineering. The knowledge is seen as purposive, pragmatic and concerned with mastery of the physical environment. Heuristic approaches are applied; both qualitative and quantitative approaches and the criteria for judgement are purposive. Results are in products and techniques.

The soft-applied disciplines such as applied social sciences are functional, utilitarian and concerned with the enhancement of professional practice. Case studies are commonly used and results are protocols and procedures.

To explain the social structure or dimension of the disciplines, Becher and Trowler (2001) use the categories convergent-divergent as referring to the degree to which academics within a discipline have some kind of common understanding, interest and ideology that forms their common identity. By distinguishing between the

epistemological and the social dimensions, Becher and Trowler demonstrate that not all disciplines that are characterised as hard are necessarily convergent and not all soft ones divergent in character.

The purpose of Becher and Trowler's categories is twofold as it draws attention to the range and variety of academic activity and the systematic difference in the activities and it provides an analytical framework for exploring the connections between the epistemological attributes of the disciplines and the sociological properties of disciplinary communities.

Although I see Becher and Trowler's work as a useful device for my research, Becher (1989) himself has pointed out that different disciplines do not always fit into the categories and many can be seen as borderline or as belonging to more than one category (Becher, 1989, pp. 154-158). Becher states that one must thus bear in mind that the categories are *social constructions* and subject to change both within and between disciplines. He refers to Kolb saying that they 'cannot do justice to the complexity and variation of inquiry processes and knowledge structures in various disciplines but they do identify useful dimensions for describing variations' (Becher, 1989, p. 17).

Despite limitations, Becher and Trowler's framework provides a methodological way from which to select the disciplines in the study. Yet, the framework provided seems to lack the flexibility or sensitivity to capture the disciplinary differences this study sets out to explore. Another approach to explore and understand the difference between different disciplines is to use Bernstein's concept of classification and framing as applied to distinguish between different curriculum codes.

Collection and integrated curriculum codes

Looking at the curricula in any educational institution, Bernstein considers the relationship between contents an important perspective. How clear cut or blurred are the boundaries between one content and another? He distinguishes between two broad types of curriculum:

If contents stand in a closed relation to each other, that is if the contents are clearly bounded and insulated from each other, I shall call such

curriculum a collection type ... Now I want to juxtapose against the collection type, a curriculum where the various contents do not go their separate ways, but where the contents stand in an open relation to each other. I shall call such curriculum an integrated type (Bernstein, 1971, p. 48).

The collection curriculum code is where contents are closed off from each other, i.e. strongly classified. It is the traditional, academic curriculum associated with discipline and order. In *the integrated code*, contents stand in *open* relationship to each other. The nature of the open relationship is such that the contents do not splinter into separate entities but are held together by a 'relational idea'. Integration as it is used here refers 'minimally to the subordination of previously insulated subjects or courses to some relational idea', which then blurs the boundaries between the subjects (Bernstein, 1971, p. 53).

In the collection code there are tight controls over the production of new knowledge and on what new knowledge categories enter the curriculum. Teachers tend to be identified with their subjects and the level at which they teach (their hierarchical position). The teacher has maximum control over what is taught to the point where, as Atkinson (1985:151) suggests, the pedagogical encounter is primarily a private matter and the classroom organisation isolates each individual teacher. Thus while there is teacher autonomy, this is countered by strong classification, which means that curricula tend to be both rigid and rigidly adhered to.

Within the integrated code it is the 'relational idea' that is the mechanism for weakening traditional classificatory boundaries around subjects. This involves a shift 'from content closure to content openness'. This disturbance in classification of knowledge tends to lead to a 'disturbance of existing authority structures, existing specific identities, and concepts of property' (Bernstein, 1971: 59). Thus, although by definition integrated codes are weakly classified, framing may vary in strength (though will generally weaken). As the regulation of the knowledge structure becomes weaker the pedagogy becomes more standardised, teacher autonomy reduced and subject related identities weakened:

I suggest there will be a profound movement towards a common pedagogy and tendency towards a common system of evaluation. In other words, integrated codes will...probably create homogeneity in

teaching practise...will reduce the discretion of the teacher in direct relation to the strength of the integrated code (p. 60).

With the use of classification and framing different disciplinary structures and their changes can be explored.

2.3.3 University teachers as curriculum developers

In the University of Iceland, as may be the case within many institutions of higher education, decisions about the disciplinary programme are the responsibility of the department while teaching and learning on the course level is mainly seen as the responsibility of the individual teacher as a part of his or her academic freedom (see Chapter 1.5.4). In a statement signed by the rectors of all the Icelandic universities the academic freedom of academics is stressed. The freedom refers to research as well as teaching (Háskóli Íslands, 2005a):

The academic freedom of university teachers refers to his right to treat his / her subject in the way (s)he feels is reasonable with academic or disciplinary demands. It includes the right to assess progress made by students on an academic basis in accordance with the policy that a faculty or university institution has agreed upon.

In the study, the university teachers are seen as the most influential and powerful agents in the curriculum development holding the formal as well as the academic responsibility for constructing the curriculum for their students (Barnett and Coate, 2005, Háskóli Íslands, 2005a).

As has been indicated above, the curriculum as intended is not necessarily a good indicator of what actually takes place in action. Focusing the research on exploring and understanding teachers' curriculum ideas and intentions may not only be far from giving insight into the curriculum experience of the students; it does not necessarily provide much understanding of how teachers put their curriculum ideas into action (Argrys and Shön, 1974). Yet, given their position and power, teachers' curriculum conceptions can be understood as part of their professional theories (Handal and Lauvås, 1990) and as such foundational for their efforts to act on their beliefs through their practices either implicitly or explicitly (Jackson, 1994; Schön, 1987).

Within the higher education discourse, there is considerable research on university teachers, their conceptions of teaching and learning (Kember, 1997; Prosser and Trigwell, 1999) and educational beliefs and orientations (Entwistle, Skinner, Entwistle and Orr, 2000). University teachers' curriculum ideas have been found to differ in regard to their level of instruction (Samuelowicz and Bain, 2001) and their academic ideas on the relationship between research and teaching (Brew, 1999).

In an attempt to understand what influences teachers' beliefs, researchers have explored if teachers' different beliefs and intentions are influenced by their institution or other external forces (Cottrell and Jones, 2003), the departmental climate (Hativa, 1993), their experience of teaching (Åkerlind, 2004), their formal training in teaching (Entwistle and Walker, 2000) or the academic discipline (Norton, Richardson, Hartley and Mayes, 2005). Recent work seems to indicate that university teachers' 'way of thinking about teaching' is highly complicated, built up mostly by their experience of planning courses and teaching (Entwistle, 2003).

Much research, although controversial, indicates that the conceptions held by university teachers are strongly influenced by the discipline of which they are a part. In this way, research carried out by Dressel and Marucs (1982) and Phenix (1964) asserted that course planning is closely related to assumptions that are embedded in the disciplinary conceptions of the university teachers and educational beliefs into which they have been socialised. Similar results were found by Stark *et al.* (1997) in a national survey of introductory course planning in the United States where they found teachers' disciplinary socialisation and their current beliefs about their disciplinary fields were the main influence on how they plan courses and teach them. Disciplinary ideas have been found to be influential in how university teachers plan their courses (Jackson, 1994; Stark & Lattuca, 1997, 2000), validate knowledge within their discipline (Donald, 1995), conceptualise the topic to be taught (Hativa, 1995), behave in teaching (Murray & Renaud, 1995) and the emphasis they set in instructional goals (Smart & Ethington, 1995). Norton *et al.* (2004) found disciplinary influence on teachers' beliefs and intentions to be stronger than the amount of teaching experience and the influence of the institution.

From the standpoint of socio-cultural theories, university teachers are not only seen as distinctive and embedded in their disciplinary cultures. Their reproductive task is

to participate in the socialization of newcomers or their students into the community they themselves have once been enculturated into. In terms of pedagogy and curriculum this means that their task is not only to select and teach the skills of the discipline but to enculturate their students into the cultural discourse. This enculturation into the discipline refers to what many scholars see as the hidden curriculum (Margolis, 2001; Nespors, 1994) or the moral order of the discipline (Ylijoki, 2000) and is explained in the following way by McLaren (1989):

The hidden curriculum deals with the tacit ways in which knowledge and behaviour get constructed, outside the usual course materials and formally scheduled lessons. It is part of the bureaucratic and managerial 'press' of the school – the combined forces by which students are induced to comply with the dominant ideologies and social practices related to authority, behaviour and morality (pp. 183-184)

Through the pedagogic discourse of the discipline the students are encultured into the disciplinary knowledge, skills and culture. The enculturation takes place in a disciplinary context (Costello, 2001) and can be detected in the way disciplinary communities produce and organise space and time for students and move them across places within and outside the communities (Nespors, 1994) or in the enculturation of the student through dissertation advising (Acker, 2001). Strong classification and framing of the pedagogic context makes it easier for students to apply the appropriate recognition and realisation rules which in turn represent their movement from a peripheral to a more central position in the cultural discourse of the discipline (Northedge, 2003a, 2003b), creating their disciplinary identities (Tonso, 2001).

Teachers' power, space and agency in the curriculum process

'Control of the school curriculum is an exercise in power' claims Hewitt (2006, p. 39). In their work, Barnett and Coate (2005) use the idea of 'space' within curriculum design where they explain teachers' agency in the curriculum process as the permission to intervene in spaces that are the students' (p. 147). According to Bernstein, the nature of social interaction that characterises teaching-learning contexts at the micro level of the classroom is a consequence of power and control relations between subjects, discourses and pedagogic spaces. Classification (power) and framing (control) are the conceptual tools used to characterise the how of

pedagogic practice both in terms of regulating students and instructionally. In a way, Barnett and Coate as well as Bernstein refer to power and control as the permission to invade and control student spaces and the mode of that invasion. In this study the focus is not only on teachers' authority or agency towards their students within the curriculum but also on the different sense of authority teachers may experience within their disciplinary context. The contribution of this study will be the exploration of university teachers' sense of authority within and between different disciplines.

From a socio-cultural point of view, the agency and thus the power to make curriculum decisions is not located solely in the hands of individual teacher but is rather embedded within the cultural context, i.e. the department. Foucault's idea of power as circulating rather than being located in the hands of individual teachers seem to capture the situation of curriculum decision making quite well:

Power must be analysed as something which circulates, or rather as something which only functions in the form of a chain. It is never localised here or there, never in anybody's hands, never appropriated as a commodity or a piece of wealth. Power is employed and exercised through a net-like organisation. And not only do individuals circulate between the threads, they are always in the position of simultaneously undergoing and exercising this power. They are not only its inert or consenting target; they are always also the elements of its articulation. In other words, individuals are the vehicles of power, not its point of application. The individual which power has constituted is at the same time its vehicle (1980: p. 98).

Bernstein (1971) notes that both a discipline's classification and its framing essentially reflect power relationships. He states that the disciplines that are highly classified, strongly framed and have a strong collection code are those in which academics are empowered. For Bernstein this is a social characteristic, not an epistemological one, and as such due to change in power struggles within institutions and communities.

The focus of this research is on university teachers' conceptions of the curriculum. In this sense the epistemological foundation of the study is constructivism where the teacher is seen as a constructivist, actively constructing relevant meanings in the curriculum context (Yaxley, 1991). Methodologically, an understanding of the curriculum practices and development will mainly be sought by focusing on the ideas

and thinking of individual about the curriculum. Yet, simultaneously, curriculum development is seen as a social process that is highly contextualised.

2.3.4 The socio-cultural context of curriculum development

Arriving from anthropology, socio-cultural theories within education have their intellectual origins in the school of psychology developed by Vygotsky (1981) and his colleagues who argue that to understand the individual, one must also understand the social context in which the individual exists (Lave & Wenger, 1991; Wertch, del Rio & Alvarez, 1995). Socio-cultural theories focus on the structures and interrelations within a community of practice providing a multifocal approach in which the individual and the context are viewed as mutually constitutive. This theoretical or epistemological perspective allows me to study curriculum thinking and development as situated within the social practices of a specific department, discipline and institution in a particular historical and cultural moment in time and space (Henkel, 2000; Lattuca, 2002; Valimaa, 1998).

My study focuses on curriculum development within the University of Iceland. Several attempts have been made to understand and describe the complex system of the university as an organisation (Bergquist, 1992; Land, 2004). Becher and Kogan (1992), looking at the structure, process and culture in higher education and taking into account disciplinary differences, put forward a model of the university. The model's helpfulness is found in the way the university is seen as consisting of four different levels (the individual, the basic unit, the institution and the central authority) where two different modes are at work, i.e. the normative mode that has to do with the norms, the values and the ideologies; and the operational mode that refers to what one feels obliged to do at different levels.

Becher and Barnett (1999), looking at the curriculum changes that have been introduced in universities in the UK, suggest the use of a framework that distinguishes between subject-specific and cross-subject development on one hand and between intrinsic and extrinsic factors on the other. Their conclusion is that curriculum change is determined by the type of institution it takes place in (the institutional context), whether it concerns science or humanities (the classification

and framing); the purity of the discipline in question (the power relations in the classification), and the market position of the courses.

The two models described above stress the need to look at changes within the universities, those being within the curriculum or not, from a multifocal approach in an attempt to capture such changes within the complicated organisational structures and modes of the institution.

Research on curriculum as an organisational endeavour in times of change has been one of the most popular areas of research in higher education (Henkel & Little, 1999; Trowler, 2001). In research at this level, authors look at changes in higher education policy and how changes in governance affect the autonomy of higher education institutions and their staff at all levels. Higher education systems are often compared in order to map out global trends and local specialities (see for example Gellert, 1999; Husén, 1996; Kogan, 1997; Kogan *et al.*, 2000). A good example of such endeavour is extensive research by Henkel (1999, 2000; 2005) as a part of a three country study of higher education reforms, which examined the policies and the policy process at the macro level. The research focused on the effects policy changes had on the values and working conditions of academics as well as their academic identities in three key roles of the academic profession, researcher, teacher and manager. This empirical research gives good insight into the effects changes in governance and structure have on working conditions and identities.

The above research indicates that universities are complex and multiform institutions, influenced by multidimensional internal and external forces and far from being stable and comparable units. Although the focus of the study is on curriculum development, such development is highly influenced by the university's organisational structure, stability and potential for change. Once again, Bernstein's ideas of classification and framing can be used to explore the institutional structures of universities and departments.

Disciplinary and departmental communities and identities

Social theories of identity influenced by symbolic interactionism see individuals as both distinctive and embedded. Identities are first and foremost shaped and

reinforced in strong and stable communities and the social processes generated within them. One function of such a community is that it provides the language in which individuals understand themselves and interpret their world. Newcomers are initiated into a language and ongoing conversations with people forming the web of relationships that make up the community. Through such conversations individuals not only learn a language, but a way of understanding the world. They are also introduced to the myths through which deeply held values and beliefs of the community are expressed (Becher & Trowler, 2001; Henkel, 2005).

Within higher education, knowledge fields or the disciplines are the dominant factors in forming the identities of academics and the structure of the curricula (Barnett, Perry & Coate, 2001). A growing number of studies on disciplinary cultures and identities have revealed the power of knowledge fields in shaping academic life and influencing the curricula. For most university teachers the primary loyalty is to the discipline and their relationship within the institution is framed through the deep, underlying epistemological structures of the knowledge field (Barnett *et al.*, 2001). For university teachers, the disciplines are ways of being in the world and to become a member of a disciplinary community means to take up a cultural frame that defines a great part of one's life (Clark, 1983). Geertz (1983) in his classic work on higher education also explicitly links disciplinary cultures to the theme of identity and suggests that those who recruit to different academic disciplines 'enter different cultural houses, there to share beliefs about theory, methodology, techniques and problems' (p. 76).

In this research the disciplinary community is seen as the *primary cultural context* within which curriculum planning takes place. The disciplinary community is what Becher & Kogan (1992) refer to as the *basic unit*:

By basic units we mean the smallest component elements which have a corporate life of their own. Their identifying characteristics would normally include an administrative existence (a designated head or chairman, a separately accounted budget); a physical existence (an identifiable set of premises); and an academic existence (a range of undergraduate training programmes, usually some provision for graduate work and sometimes a collective research activity) (p. 86).

In the case of curriculum development the basic units of teachers in this research is their department. As demonstrated in Chapter One, the organisational structure of the University is based on faculties that are then divided into departments. The departments at the University consist of one or more disciplinary fields of study. In the case of this study, two of the disciplines selected for participation are the only disciplinary area within their departments. In the case of anthropology, the discipline shares a department with Folkloristics, which is an independent unit of study and very loosely coupled to anthropology. So in the study, the disciplinary community will be seen as identical to the departmental one.

The department is the cultural context that is most influential for teachers' curriculum thinking and planning both in terms of disciplinary ideas as well as institutional responsibility. Departmental culture has been less researched than institutional and disciplinary cultures but cultural studies focusing on the values held within departments see them as a cultural unit simultaneously belonging to an institution and a discipline. The forces, internal and external, from the institution and the discipline influence the department but differently, depending on such issues as the status of the discipline within the institution. Conflicts can also occur when traditional values of the disciplines differ from the local institutional values. Clark (1984) and Lee (2007) found that both the institution and the discipline shape the academic department but neither the discipline nor the institution accounts for the departmental culture and their influence depends on which aspects of the culture were being explored (Lee, 2007).

The community's institutional structure and change

Like all other communities or categories in Bernstein's terms, departments and universities are not stable units. Their stability relies upon the strength of the classification where classification and framing create different codes that drive the structuring of institutions. The classification reflects power relations and such relations are bound to change. Local and global changes strengthen and weaken classification creating new power relations and affecting the working conditions of university teachers (Bernstein, 2000). The institution's stability towards change depends in part on the type of code characterising its structure. Bernstein

distinguishes between two types of institutional structural codes, collection code and integrated code.

Where *collection curriculum code* drives the structuring of institutions, we see clearly demarcated and segmented subject frames for teachers and an oligarchic management structure. Junior staff tends to operate and interact mainly vertically within their subject and departmental hierarchy. This created special identities through strong socialisation into strong subject loyalties. Because of the specificity of identities, there tend to be ‘weak relations between staff with respect to pedagogic discourse’ (Bernstein, 1996, p.25). On the other hand, these strong internal boundaries permit the co-existence of diverse ideological affiliations (ibid 10).

In the *integrated curriculum mode* the structuring of institutions becomes more visible and vulnerable. Boundaries between inside and outside become more permeable because communications flowing into the institution are less tightly framed and controlled. Internally, new forms of knowledge organisation require greater horizontal communication. Staffs from different specialities need to co-operate and communicate with shared tasks. Differences need to be integrated and networked rather than be a source of specialisation and separateness. The different type of institutions can be pictured as follows (Bernstein, 1996, p.10):

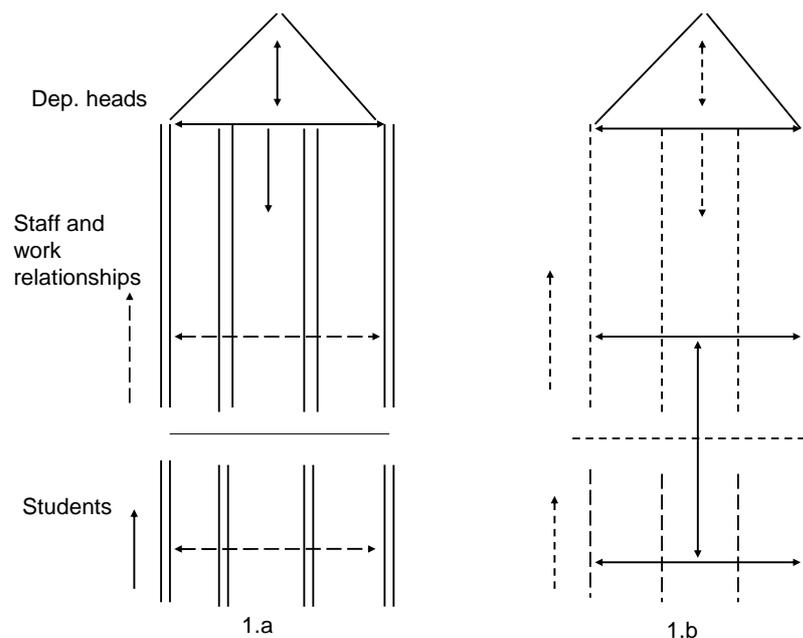


Figure 2.4: Collection and integrated type institutions (from Bernstein, 2000, p. 10).

Institution 1.a. is an example of a collection code with a strong classification between subjects and a hierarchical structure. Collaboration between teachers and within the student group is weak and there is a clear distinction between teachers and learners. There is strong classification between disciplinary knowledge and the common sense knowledge outside the subjects.

1.b. is an example of an integrated code type institution. Classification between subjects and between students and teachers is weak opening up possibilities for new kinds of communication and cooperation.

The above discussion of Bernstein's two different types of institution has a strong bearing on the possibilities of curriculum development and change. According to researcher on school development (Fullan, 2001; Fullan & Hargreaves, 1991; Gosling & D'Andrea, 2001), the collection type institution does not facilitate collaboration between staff in curriculum decision making thus limiting the possibilities of educational development.

Is there a disciplinary pedagogic discourse?

While attempts have been made to analyse the epistemological and other characteristics of the disciplines themselves, and their impact on people and structures in higher education, this type of analysis has rarely been applied directly to pedagogy and curriculum development (Malcolm & Zukas, 2000a). Rust (1999), in a preface to conference proceedings from *Improving Student Learning through the Disciplines*, states that there has been little attempt made to identify the different disciplinary pedagogies. He then asks the following questions:

Are they really different or simply perceived to be different? If they are different do they have to be because of the different nature of the discipline or are these differences simply historical and/or cultural? If the former, how can we explain the fact that the same disciplines may be taught in very different ways in different countries? What exactly are these different pedagogies? Are some more successful than others? Could some disciplines benefit from borrowing and adapting methods used in others?

The above research seems to indicate that it may be possible to identify different disciplinary pedagogies or that this pedagogic discourse is discipline and context

specific although results are not consistent. Trowler (1998) warns that there is a reason to be aware of an epistemological essentialism paradigm which he claims is all too often reflected in the work of researchers studying higher education and its curriculum. Squires (1992, p. 202) and Lattuca and Stark (1994, p. 403) point out the need to take into account the multi-dimensional nature of the disciplines and stress that the disciplines are socially and historically situated and can have their organisational saga (Merton *et al.*, 2004).

Like the above authors, Bernstein (1971; 1990) stresses that the curriculum structure is conditioned by social structures and the distribution of power. The structure is not derived from the inner logic of the discipline but from the *inner grammar* of the pedagogic principle of the instructional and the regulative discourse. This means that the curriculum and instruction (or the recontextualisation) of different disciplines is regulated by a device that is both disciplinary specific with regard to the valid knowledge to be taught and the way this knowledge is transmitted and realised, i.e. the theory of instruction. The regulative discourse, Bernstein claims, is influenced strongly by inner logic of the discipline where the different knowledge structures within disciplines (hierarchical–integrated code, and horizontal-collection code) give rise to different knowledge structures within the curricula. At the same time the regulative discourse seems to be contextualized and influenced by the different communities university teachers find themselves in (Merton *et al.*, 2004; Valimaa, 1998; Vitale, 2001). Finally, the pedagogic discourse is not stable but changing because of the changes in the power relations within and between those communities.

2.4 Summary

In the above review an attempt has been made to look at the curriculum concept and to situate that understanding within a socio-cultural framework. In that framework, the curriculum is understood as the process of recontextualising knowledge as a pedagogic discourse. Among those who have the responsibility and power to participate in the recontextualisation are university teachers.

The pedagogic discourse is both regulative and instructional, i.e. the curriculum encompasses both the ideologies (the language, the act of being) of the communities and the ideas and practices of instructions that are seen necessary in order for

students to become members of the community. Research on the disciplinary influence indicates that the pedagogic discourse is discipline specific but that it is highly based on the context and power relations within that context.

2.5 Research questions formed

As I stated at the beginning of this thesis, the aim of my research is to understand how university teachers go about making decisions about the curriculum and how their ideas about the curriculum affect the way they understand teaching and learning. I want to understand how university teachers in different disciplinary fields and departments make curriculum decisions and to see if their perceptions of knowledge or discipline are reflected in their curriculum planning. And I would like to understand which factors, internal or institutional, are perceived by teachers as important for curriculum development.

Very little previous research has been conducted to explore curriculum development procedures and conceptions within higher education and our knowledge of how university teachers perceive curriculum development and their role and responsibility therein is lacking.

As a result of my research interests (see Chapter 1) and the above theoretical discussion, I set out on this study with two research questions:

I What conceptions do teachers have of the pedagogic discourse of the three disciplines explored in the study (i.e. mechanical and industrial engineering, anthropology and physics)?

This question was further developed through the use of the theoretical framework provided by Bernstein where he has explained the existence and relationship of the regulative discourse and the instructional discourse of the pedagogic discourse:

Ia How do teachers at the University of Iceland experience the regulative discourse of their disciplines? What is the 'moral order' within the disciplines, what are their aims and goals and what are the student/teacher disciplinary identities?

Ib What conceptions do teachers have of the instructional discourse of their disciplines? What is the pedagogic practice of the disciplines and how is that seen as being related to the regulative discourse?

But I also argued that in light of socio-cultural theories I needed to explore the social context of the curricular discourse. In particular I was interested from a critical standpoint to understand how the teachers regarded their space and agency in making curriculum decisions and the second research questions is as follows:

II How do teachers in different disciplines experience their space (and agency) in regards to curriculum decisions making and development?

CHAPTER 3: RESEARCH DESIGN AND METHODS

3.1 Introduction

In this chapter the research process is explained. The theoretical framework for this study is socio-cultural and critical, where the aim is to explore how university teachers understand and put into practice their curriculum ideas. To reach understanding, the study is framed within an interpretive theoretical perspective using qualitative inquiry for exploration.

The study was conducted in the years 2002-2007. Interviews were conducted with university teachers in three departments of the University of Iceland, the Department of Mechanical and Industrial Engineering, the Department of Anthropology and the Department of Physics. The research is a case study where the focus is on exploring academics' understanding of the curriculum decision process. The main case study is the department of mechanical and industrial engineering but two other disciplines, i.e. anthropology and physics, provide a comparative perspective and thus a more holistic picture of curriculum development. In this chapter an overview of the research design, data collection techniques and analysis is provided and ethical challenges are discussed.

3.2 The research paradigm

This study is framed within socio-cultural and critical theoretical framework, emphasising interpretive and phenomenological perspectives. From a social cultural perspective, curriculum development takes place within a social context where the individual and the context are viewed as mutually constitutive. In this way curriculum thinking and development will be studied as situated within a social context in time and space (Lave and Wenger, 1991; Vygotsky, 1981, Wertch, del Rio & Alvarex, 1995). The study also has a critical substantive approach (Agger, 1991) as the aim is to pursue curriculum development from political and ideological aspects that are commonly kept tacit and hidden in the higher education discourse. Rather than approaching curriculum decision making as a technical act, it will be explored as an act of power and agency where contesting curriculum ideologies within

departments and between departments and the significant context of the departments need to be understood.

The phenomenological philosophy assumes that the important reality is what people perceive and thus most qualitative research reflects some type of phenomenology (Creswell, 2005; Schwandt, 2001). Phenomenological researchers attempt to understand social phenomena from the point of view of the actors. In this study, attempts will be made to understand how the actors, in this case university teachers, understand and conceptualise their ideas on curriculum, teaching and learning within the cultural context of their discipline, department and organisational context of the institution.

The research paradigm used in this study is also referred to as the interpretive paradigm (Crotty, 1998). The interpretive paradigm or approach to curriculum planning and development seeks understanding and meaning. It treats the social world as a subject, encouraging it to speak for itself. The approach holds that human actors and social constructs (such as curriculum) cannot be interpreted in the same way as natural objects and aims to promote understanding of phenomena from the point of view of the participants (Crotty, 1998). Tribe (2001) uses the concept of the alternative paradigm – where the idea of a single objective reality which exists independently of the researcher is replaced by a fustier world of multiple realities and the significance of subjectivity in forming these multiple realities is recognised by the researcher.

The research is based on qualitative methods where data is gathered by methods of interviews, observations and text analysis (Bogdan & Biklen, 1998). Qualitative methods share certain characteristics. The research is naturalistic, i.e. takes place and describes the lived everyday world and involves the use of multiple sources of information and approaches to build up a complex, holistic picture. The data is descriptive and most often analyzed inductively and the focus is on the participants' perspective and meaning (Bogdan & Biklen, 1998; Creswell, 2005).

I have chosen qualitative methodology as a way of studying curriculum development in higher education because I find it an area where little is yet known and there is a need to explore the topic in depth. From the point of cultural theories I assume that

the phenomenon, curriculum development, is both context-bound and complex and in order to capture this complexity best approached by qualitative methods.

Figure 3.1 demonstrates the links between the epistemological and theoretical perspectives and the methodology and methods applied in the study.

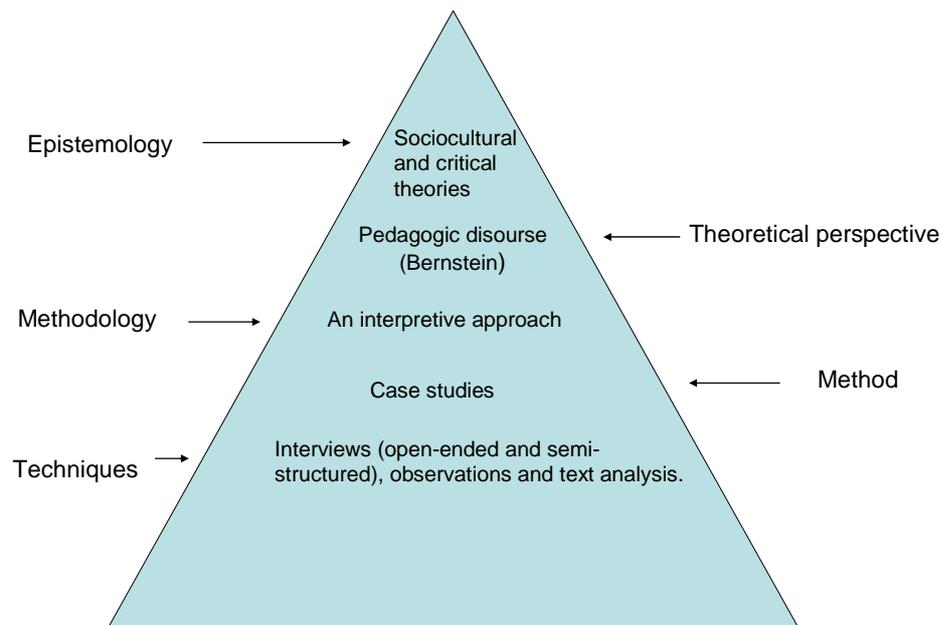


Figure 3.1: A model of epistemological and theoretical foundations of the study

3.3 Research methods

3.3.1 Qualitative methods

As explored in previous chapters, the focus in the study is on curriculum development in the University where university teachers are seen as holding a powerful, central role. The teachers are part of a social context of which the discipline has been found to be very influential for their identity. Within the University, the three disciplines selected for the study, are located in disciplinary departments where the formal responsibility for curriculum rests.

To capture the curriculum development within a department, the study is placed within two of five commonly described traditions of qualitative inquiry (Bogdan & Biklen, 1998; Creswell, 1998; Denzin & Lincoln, 1998). For a start, the study has a phenomenological mode that ‘attempts to understand the meaning of events and

interactions to ordinary people in particular situations' (Bogdan & Biklen, 1998, p. 23). In the study I am striving to understand the meaning the participants, the university teachers, make of the curriculum by asking them to describe their everyday experiences at the same time bracketing my own preconceptions of the phenomena (Creswell, 1998). The second phenomenological approach or tradition of inquiry applied here is the case study.

3.3.2 The case study method

The case study is not seen as a research strategy by all. Wolcott, for example, claims it is better regarded as a form of reporting a study than a method of research (Wolcott, 2001). Others see it as a fruitful method in search of questions relating to how and why, so the method can be seen as useful when studying a specific phenomenon (Gillham, 2000; Schwandt, 1997).

A case study may focus upon an activity involving individuals rather than a group per se (Stake, 1995) where the researcher searches for shared patterns of behaviour exhibited by the group. The case study can also be seen as a procedure of inquiry, an in-depth exploration of a bounded system of activity or individuals based on extensive data collection (Creswell, 1998). It is an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and where multiple sources of evidence are used (Yin, 1989, p. 23). In this study the case study approach is used to explore and understand the process of curriculum thinking and development of selected individuals within their department within the University of Iceland.

The study is a collective case study or a multiple instrumental case study (Stake, 1995, 2006) where I originally selected the Department of Mechanical and Industrial Engineering as a main case of study and two other cases or departments, the Department of Anthropology and the Department of Physics, were selected as means of providing further or deeper understanding the curriculum process rather than to increase the generalizable nature of the study (Creswell, 1998). Nevertheless, each department unfolded as a unique and interesting case while comparison between cases provided a basis for discussion of major curriculum elements and development

within the University. To capture both aspects, and to give readers the opportunity to ‘experience’ each case, the data analysis is organised discipline-by-discipline allowing the uniqueness of each department to unfold whereas common themes are explored and discussed in Chapter Seven.

3.3.3 Participants in the study

Selecting cases of study

The selection of the cases for my case study is best described as theoretical or concept sampling (Creswell, 2005) as it is partly based on theoretical ideas on the foundations of knowledge as constructed within the disciplines in regards to goals, structures and epistemological differences. Using Becher and Trowler’s (2001) framework and model of the characteristics of different disciplines, I wanted to locate my cases in all of the four categories of hard pure, hard applied, soft pure and soft applied disciplines. I am working in a field categorised as soft applied (teacher education), so I felt that starting with disciplines categorised as hard as a main case of study would be beneficial and give me a better opportunity to distance myself. I had in general very little knowledge of those disciplines so I was hoping my preconceptions would be less or at least more easily revealed than if I had chosen disciplines closer to my own. Very few teachers from the hard disciplines had attended the courses and in-service provided by the Centre for Teaching. Finally, in selecting a hard discipline as a main case of study, I hoped to be able to use my own experience as a university teacher within the soft disciplines as a contesting example to some degree.

Choosing a discipline within the hard field took a great deal of consideration and my choice of the unit of mechanical and industrial engineering requires some explanation. First, with a staff of ten, I felt that this unit was of a size that made it a reasonably good community for a case. Secondly, I wanted a unit that included both male and female teachers which not many of the hard field disciplines had at the time. Although this research is not grounded within feminist theories, strong feminist critique of the academic disciplines ever since the 1970’s (see in Pinar, 1996) and influential work of feminist curriculum theorists within the curriculum field (e.g. Ellsworth, 1993; Grumet; 1979; Wallenstein, 1979) illuminate the need for gender awareness within educational research. Thirdly, I had heard ‘rumours’ that the unit

was progressive in regards to teaching, leading me to hope that the teachers would be willing to participate in my research. Finally, I had since the fall of 2002 through lunchtime runs become acquainted with teachers from the Department of Mechanical and Industrial Engineering. On our weekly runs we had at times discussed teaching and learning and I hoped that these informal acquaintances would provide me with an easy entry into their department.

Selecting the other two disciplines I again used Becher and Trowler's (2001) framework and model of the characteristics of different disciplines. Selecting a soft discipline turned out to be the most challenging as it was a field closest to my own. After some examination I selected the Department of Anthropology. This is a unit that is of similar size to the Department of Mechanical and Industrial Engineering but consisted of a larger number of female teachers. Finally, I selected the Department of Physics as a field that was truly within the category of being a hard-pure discipline and it had an interesting curriculum relationship with the Department of Mechanical and Industrial Engineering through service teaching².

Selecting participants within cases

Whereas I selected the cases in my study by theoretical sampling, the participants interviewed within the cases were selected by snowball sampling and confirming sampling (Strauss & Corbin, 1998). Qualitative inquiry typically focuses in depth on relatively small samples that are selected purposefully.

The first interviews in each department were conducted with the department heads that were then asked to point out other participants within the department that they thought would provide me with the most varied or contesting views on the curriculum and asked to rationalise their selection. In all cases, the department heads could easily categorise the department's teachers and in doing so, provided the first insight into the controversial curriculum issues within the departmental community. The department heads all identified different categories of teachers within their department, with many categories running parallel. Although this categorisation gave me an idea of important aspects of the department and its culture, the categorisation

² Service teaching refers to the practice where required courses within a curriculum programme are located and provided by a different department that will then receive the student credits for that particular course.

was contested and contradicted as the study progressed. In selecting the participants I also had in mind other criteria such as their teaching experiences within the university and their levels of teaching (in undergraduate as well as in graduate programs).

In the case of the Department of Mechanical and Industrial Engineering, observations also provided a useful insight into teachers' curriculum ideas. Selected participants were then further asked to point out colleagues they thought would provide different insight or understanding into the curriculum development within the department.

3.4 Collecting data

As stated above, a research method is a particular way or developed routine for approaching a research question or questions. In this study multiple data were generated by interviews, observations and text analysis.

3.4.1 Interviews

Open-ended interviews

In the study, two types of interviews were conducted, half-opened and semi-structured. In general half open, in-depth interviews were used to explore university teachers' conceptions of curriculum ideas. According to Patton (2002) there are three basic approaches to collecting data through open-ended interviews; the informal conversational interviews, the general interview guide approach and the standardised open-ended interview. I decided to design an interview protocol to list the issues I wanted especially to explore. After each interview I reassessed the protocol, making necessary changes provided by new understanding or insight either from the participants. This way I could follow up particular issues with constant comparative process strategies (Strauss & Corbin, 1998). Despite the interview protocol, the interviews were conducted in a conversational manner and the teachers encouraged to tell their story at the pace and structure they found important. Two examples of the interview protocols are provided in Appendix 1, one from 2002 and the other from 2006. Within the departments of anthropology and physics, the interview protocol had become more refined and an element of constant comparison was stronger.

Those interviews, especially in physics, were much more structured than the ones conducted within engineering.

Open-ended interviews were conducted with fifteen university teachers, seven from the Department of Mechanical and Industrial Engineering, four from the Department of Anthropology and the Department of Physics each. Six participants were interviewed more than once and two participants from the Department of Anthropology were interviewed together.

Semi-structured interviews: Discussing selected courses

After spending some time analysing and trying to construct meaning from the interviews with the participants from the Department of Mechanical and Industrial Engineering, I felt I had a good sense of their general ideas on curriculum planning and development. I did, however, feel that the previous interviews had in some sense been too general. My questions seemed to have elicited teachers' general educational and curricular ideas without capturing the contextual aspect that I now felt was essential to understand curriculum development within the disciplinary context. I decided to interview the same teachers again but now using focused semi-structured interviews in the sense that I asked the teachers to select a specific course or courses to discuss. The interviews focused on teachers' reasons for selecting the courses for discussions, their conceptions of the curriculum of that course and how curriculum ideas are carried out in plans and actions. The teachers' course selection criteria varied, some selected courses they felt were 'troublesome' while others those that were seen as 'favourite'. Such interviews were conducted with four participants in within the Department of Mechanical and Industrial Engineering. An example of the interview protocol for the semi-focuses interviews is provided in Appendix 2.

Semi-structured interviews: Discussing the policy mission

At the end of the study, all departments had actively participated in the construction of the University's new policy mission. In the process, departments as well as faculties were required to discuss and compose their part of the policy mission stating their strength, weaknesses and future development with regards to research and teaching.

As a confirmation of my analysis I decided to conduct interviews with the three department heads where the focus was on the department's policy mission in regards to the curriculum. Although the starting point in each interview was the policy mission, the department heads were free to explore whatever issue they found important.

All the interviews in the study except one were conducted at teachers' offices at a time of their convenience and focused on curriculum planning procedures, conceptions of the discipline, relations between disciplinary ideas and the planning of teaching and learning. One interview took place in my office for reasons of convenience. The interviews took approximately one to two hours each. They were tape-recorded after each participant had given permission for that procedure and later transcribed.

Clarification interviews

During the last part of the study, four interviews were conducted for clarification and confirmation. A structured interview was conducted with the director of academic affairs and three electronic e-mail interviews were conducted, two with participants from engineering and physics each and one with the office manager of the Faculty of Engineering.

3.4.2 Observations

In the study I observed eight meetings, five departmental meetings within the Department of Mechanical and Industrial Engineering and one within the Faculty of Engineering, one within the Department of Anthropology and one within the Faculty of Science.

Observations were mainly used as a source of data within the Department of Mechanical and Industrial Engineering where I observed five staff meetings and one faculty meeting. In the meetings the main topic for discussion was the curriculum, the organisation of courses and teaching and learning. The observations and the field notes taken gave me insight into the curriculum planning process and what curricular issues were seen as relevant and problematic within the department. The

observations also gave me an opportunity to get to know the teachers within the department and listen to their different voices in the curriculum discussions.

I conducted two other observations, one within the Department of Anthropology at a departmental meeting on teaching and learning and the other at the Faculty of Science where curriculum and teaching were the topics of discussion.

3.4.3 Text analysis

In the study various kinds of written documents were used and analysed. Some of the documents were used to shed light on the different levels of curriculum development and to gain understanding of the context within which curriculum development takes place. In other instances written documents such as curriculum course plans are used to further understand and gain information on the curriculum planning of individual teachers.

The curriculum texts collected and analysed can be categorised in the following way:

- Documents on social-political level. These included legal documents such as laws and regulations regarding the University or the higher education system.
- Documents at the institutional level. Those include documents such as committee papers, rectors' speeches, institutional policies and documents, but also statistical and historical data about the university.
- Documents on the disciplinary or departmental level. Those include documents collected and analysed to understand the disciplines of study. Included were documents like reports on quality evaluations of the department, texts on the history of the department, reports of meetings held within the department, the official website of the departments and information about the departments published in the University's annual course syllabus. In 2006 a policy mission was created with an active participation at all levels of the University. The policy documents created by the three departments were collected and discussed with department heads.

- Documents from university teachers. Those include documents collected from the teachers interviewed referring mainly to course syllabuses, assignments, assessment protocols, overheads and support material available to students.
- Other documents collected to understand the discourses of interest such as public discussion of academics on the University’s mailing list.

3.4.4 Overview of interviews and observations

Table 3.1: An overview of interviews and observations

Department of industrial- and mechanical engineering	<ul style="list-style-type: none"> • Open-ended interviews with 7 teachers • Focused interviews with 4 teachers • Five observations (staff meetings with focus on curriculum and teaching) • One observation at a meeting within the faculty • Two e-mail conformational interviews (faculty head and faculty office manager)
Department of anthropology	<ul style="list-style-type: none"> • Six open-ended interviews with 4 academics • One observation (staff meeting discussing good teaching)
Department of physics	<ul style="list-style-type: none"> • Open-ended interviews with 4 teachers • Observation – Faculty of Science – a seminar on good teaching • One confirmatory e-mail interview
Other	<ul style="list-style-type: none"> • Focused interview with head of academic division

3.5 Data analysis and interpretation

Mixed methods of analysis

To analyse and make sense of the data, I used different or mixed methods of analysis. Data analysis is a systematic search for meaning and a method to process data so the findings from studies can be communicated to others. Analysis also means that the researcher organises and interrogates the data in order to see patterns, find relationships and develop explanations (Lofland & Lofland, 1995). Analysing takes three main forms, that of description, evaluation and explanation. Within qualitative

methodology, analysis is seen as the researcher's way of ordering the data. Different procedures and routines are advocated but the creativity and imaginative modes are also encouraged (Lofland & Lofland, 1995).

First and foremost I followed phenomenological methods of data analysis such as looking for common themes and clusters of meaning and by writing descriptions (Creswell, 1998). As the main volume of data was generated through interviews with the teachers, I used different methods of discourse analysis to understand the ways meanings were constructed and reproduced (Kvale, 1996).

Although I did not make use of the specific and rigorous procedures of data analysis of grounded theory, the approach was used in the theoretical selection of cases and sampling within cases as well as in the emerging design of study where data was analysed. The preliminary findings were analysed to look for unexplained events and actions and missing information. Constant comparison was exercised to look for potential categories of meaning in the data in an attempt to construct a theory or a picture of curriculum development (Creswell, 1998; Strauss & Corbin, 1998).

Data analysing procedures

In the study I collected approximately 1000 pages of data as transcribed interviews and field notes from my observations. I constructed a data record after each interview and observation where I transcribed the interviews and wrote down my field notes and memos. Some interviews were transcribed by assistants that were then given a clear protocol to increase the validity. After transcribing interviews, I listened to them again, comparing the typed text and making necessary corrections. After each interview or observation I wrote a reflective diary or memo trying to capture new insights and understanding.

The transcripts were analysed in several ways. The first step was a preliminary exploratory analysis where each interview and field notes were read and reread to gain a general sense of the data. This usually provided the first steps in coding of the analysis. I decided to code the data by hand, beginning with open codes before moving to more focused ones, looking for patterns. In the process of analysing the data I applied varied techniques of analysing and playing with my data to construct

meaning and find contradictions and common threads. I looked for patterns and themes within and between interview data, made metaphors, looked for relations between variables and categories, made graphs and pictures. I made descriptions of the interview data of individual teachers and departments. Along the analysis I wrote and gave papers at conferences on different themes and aspects of the study (Geirsdóttir, 2003, 2004a, 2004b, 2005, 2006, 2007a, 2007b). Those papers became helpful tools for thinking and provided a fruitful dialogue with other researchers. Those publications were also introduced to the participants as a method of informal member checking or verification (Strauss & Corbin, 1998).

In the final phase of the analysis I tried to build a train of evidence from all my previous analysis, choosing the central categories and moving the analysis to a more conceptual level without losing contact with my data by going back to the original transcriptions and memos.

During the time spent on data collection I simultaneously collected and analysed different texts and developed a more thorough understanding of the theories I had chosen to underpin my study.

Data analysis and the use of theoretical tools

In the phenomenological approach and the grounded theory mode, the theory is expected to emerge from the data. However, neither did I enter the study in theoretical vacuum nor did I have a strong theoretical framework to support my study to begin with. As the study progressed, I found my theoretical conception of the curriculum concept to be inadequate and too fragmented to capture the complex reality my participants were describing. In Bernstein's theories I finally found the analytical tools I felt I needed to create a framework that would allow me to make sense of the complex curriculum phenomena. Constructing the theoretical framework was a hard learning process that emerged slowly as the study progressed. It was a learning process where the theoretical tools, the data and the analysis seem to challenge and support each other in a reciprocal relationship. Interviews and observation of university teachers in different cases were used to further explore and understand the theoretical framework. In this sense I used both deductive and inductive research methods '...moving from ideas to data as well as from data to

idea' (Hammersley, 1992, p. 168). The process of the study can best be described as a 'zigzag' between generated data and analysis with the additional influence of the theoretical framework.

As discussed in Chapter Two, Bernstein's theories are conceptual and analytical and have not been much applied or confirmed in empirical studies of the curriculum at the higher education level (see though Chapter 2.3.1). My aim was neither to simply apply a theory to my data nor to validate Bernstein's theory. Rather, the study has been a process of comparing theoretical concepts and their relationships against my data (Strauss & Corbin, 1998). Bernstein's major ideas and concepts hold great explanatory power that I have been able to put in use in organising and making meaning of the data and they have provided me with a language to describe the complexity of the curriculum development.

Writing in English

From early on in the study, I decided to write my dissertation in English. This was to enable communication with the international research community within the field and to encourage an external audit of my work. All interviews and field notes were typed and analysed in Icelandic although some parts of the analysis were written and introduced in English at conferences abroad (Geirsdóttir, 2004c). At the same time the lack of theoretical concepts in my native language made it challenging to discuss my work with Icelandic colleagues and auditors.

Doing the study within another language complicated both my thinking and writing process and had direct ethical implications. The process of transcribing interviews opens up possibilities of misunderstanding and interpretation (Kvale, 1996, pp. 172-73) that is further increased by translating the word of the participants from one language to another. In order to establish the validity of my analysis and interpretation, the quotes used in the description and discussion of cases are provided in Icelandic and English in Appendix 3 of the thesis.

3.6 Ethical considerations

In Kvale's book *InterView* (1996), the author discusses various ethical issues in interview research and stresses that such issues arise throughout the entire research

process. Like other researchers, I faced diverse ethical issues and dilemma doing the study.

3.6.1 Confidentiality

In all research it is ethically important that the researcher has received the participants' permission for participation and provided them a clear description of the nature of the research and the consequences of participation (Bogdan & Biklen, 1998, p. 43).

Gaining access

Data generation started as a part of coursework in qualitative methods in the fall of 2002. Formal permission for the study was sought from the Data Protection Authority as required by the Act no. 77/2000 and approved.

In the three cases, I contacted the sitting head of department, briefly introduced the study and asked for permission to introduce it further to the department at the next department meeting. In the cases of mechanical and industrial engineering and anthropology, the department discussed the study after my introduction and formally agreed to participate. In the case of physics the study was only introduced to the department head and approval sought by individual participants.

The smallness of the community

Due to the small size of the community within the University, it was impossible for me to ensure full confidentiality although the names of all participants have been changed. I considered the possibility of changing identifiable facts such as the disciplines of study and gender of the participants but found that it would interfere with important aspects of the study. I discussed this dilemma with the participants at the beginning of each interview but also ensured them that the focus of the study was not on individual teachers but the curriculum development within the department. Most of the participants did not feel that the study would touch on issues that were sensitive to them as persons and one stated a wish to keep his own name, which I declined. Nevertheless, as the study progressed, sensitive and personal issues were raised and one of the participants voiced distress over identification.

3.6.2 Connections to participants

The split subject

In designing the study I was faced with the ethical issues of doing research in my own home turf and how that could possibly affect my status as a researcher, my connection to the participants and the trustworthiness of the study. I wanted to understand this messy reality, but at the same time needed to accept that my knowledge of it is anchored in space, borders, place, time and context (Haraway, 2004). I could see the University as a busy community within which my participants create, construct and live their academic lives, but since I am a part of that community I needed to make use of the idea of the *split subject*, i.e. to be a part of the academia and at the same time being critical of it – reporting from a part-like reality (Brewster, 2005). As a university teacher, I share the community of the University with the participants and in the case of the Department of Anthropology, the same faculty. Yet, within the departmental cultures I was a stranger. I had no knowledge of the disciplinary structures and at times found it difficult to understand the language and concepts being used by teachers planning and discussing the curriculum.

The expert of good teaching

Being a member of the University's community both helped and hindered me in the study. I am fairly sure that it provided me an easy access to departments and individuals and allowed me to enter the study with the status of trustworthy researcher and as 'one of us'. This status seemed not to be effected by the ambivalent attitude of some of the participants belonging to the hard disciplines towards social science research methods. But this meant that as a situated knower (Haraway, 2004) I had a strong prescribed identity with the participants (Brewster, 2005). In the interviews and during the observations of meetings I was often confronted with the participants' idea of me as an expert of good teaching – a logical reaction in regards to my public status and affiliation with the Centre of Teaching. Even after explaining imaginative ways of structuring their courses, clever methods of reaching their students, innovative methods of learning and teaching, many of my interviewees at some point in the interviews apologetically explained their lack of expertise in teaching and at times asking for my advice. I found this a difficult problem to

conquer but tried to remain self reflective towards it. During interviews, I tried to move away from requests for advice but would instead suggest further discussions after the formal interview, an offer which some of the participants made use of.

Gender issues

While I think I have been rather conscious about my identity as an expert in teaching in my field work, my gender identity in the role of researcher was not as clear to me. Although my research is not based on feminist theories it became clear that in the way I react to the participants in my study and how they react to me is affected by my gender.

My field of study is located within three different disciplines of the University of Iceland (mechanical engineering, physics and anthropology) and two of them are highly male dominated. In the disciplines of mechanical engineering there is only one female academic and none within the Department of Physics. The situation is different within the Department of Anthropology, where the number of female academics outnumbers the male ones. In my memos I critically reflected upon my own gender biases:

From my memos nr. 16 written 15th of February 2005:

...The other thing is that I seem to talk differently to the women than the men. In my field notes I describe them differently and for example in the two interviews with the women academics in anthropology I refer to their clothes and how they dress – which I never do in my interviews with the men. We also talk about different subjects than the men – two of the three women have recently experienced becoming mothers for the first time and in the interviews we dwell on feelings much more than in those I do with the men.

So not only did I touch upon different topics in the interviews with women but I also seemed to show more empathy for those participants. The females I interview clearly react to me as a female and one of them at least openly expects me to understand her better because of my gender:

From my field-notes – interview with Lara 22. 10.2002, p.66:

...wondering about my interaction with Lara and how she experiences our relationship. She seems to **expect** me to understand her. Twice in the

interview she claims that I understand her because I am a woman (and that I am a woman that understands this – that **kind** of woman).

The gender also seemed to influence which artefacts were introduced to me by the participants. In an interview with a male teacher, studying projects made by students, he admitted that he had decided to show me projects made by female students rather than males as he felt those would be more interesting to me and I would understand them better.

Benefits

Many of the participants welcomed the opportunity to discuss their teaching and curriculum development and found them to be a positive experience. They would claim that there were rarely opportunities to discuss issues of teaching and learning and found it ‘refreshing’ and ‘a necessary kick’, ‘forcing you to think about those issues’.

For me, the study has formal benefits of providing me with a degree. The willingness and generosity of the participants to share their curriculum ideas has also provided me valuable insight and understanding that will not only be beneficial in my future work within the University but has had personal relevance for me as a member of that community.

3.6.3 Trustworthiness of the study

How can we and others judge the merit of our investigations, ask Strauss & Corbin (1998, p. 265), and they describe how many qualitative researchers maintain that the standards used to study quantitative research are inappropriate for judging the merits of qualitative research. Others, such as Lincoln and Guba (1985) (cited in Creswell, 1998), trying to move from the positivistic use of verification standards suggest the use of the verification terms ‘credibility’, ‘transferability’, ‘dependability’ and ‘conformability’ to establish a research’s ‘trustworthiness’ (Creswell, 1998). According to Glaser and Strauss (1967), the credibility of research ensures that the theoretical framework generated is truly based on the data of the study; the usefulness of the study is reflected in its being able to help explain a phenomenon and its trustworthiness in the extent to which we can believe the research findings (Glaser & Strauss, 1967).

For most researchers, validity is seen as a fit between what they record as data and what actually occurs in the setting under study (Creswell, 2005). This 'fit' is problematic in a study that is based on philosophical beliefs of multiple realities constructed by participants and sought by a researcher who is both biased and a part of the reality being studied. To ensure reliability the examination of trustworthiness and validity is crucial.

Kvale speaks of validity as 'quality of craftsmanship' where the researcher rigorously checks, questions and theorizes the knowledge produced (Kvale, 1996, pp. 241-245). How can the quality of the study be assessed? Howe and Eisnehart (cited in Creswell, 1998, p. 195) suggest that the question of the quality of a research rests within its contribution to our understanding of important educational questions. I hope I have made clear claims to the importance of the questions posed in this study. They further suggest five standards to be applied to all research. First, they assess the study in terms of whether data collection and analysis is driven by the research questions; second, how competently the data collection and analysis techniques are applied in a technical sense; third, if researcher's assumptions are made explicit; fourth, whether the study has overall warrant such as being robust or uses respected theoretical explanations; and finally they claim the study must have 'value' in informing and improving practice.

In this study, several measures have been taken in attempt to achieve trustworthiness. Following Creswell's verifications procedures, suggested within the literature on qualitative research, the validity of the study has been verified by triangulation whereas I used different methods of data collection and different data sources and by selecting different cases for study. Various methods of data analysis have also been applied. Both in collecting data and in the process of analysis and interpretation, negative and contradicting cases and incidences were sought and followed up by confirmation interviews.

I have sought peer debriefing in research seminars as a part of my study and by presenting and writing papers on selected parts of the study. Member checks have been solicited informally and non-systematically by making the participants aware of written analysis and papers and encouraging them to response. Only few have used that opportunity. At the final stage of the research one participant within each

discipline was asked to read and react to the analysis of their disciplines and their suggestions and comments taken into account.

I have attempted to correct for my personal bias by explaining interest in the research topic and its relations to my professional interest. I have also critically probed the research procedures and analysis for biases and subjectivity due to my being a member of the community of study and my role within that community.

The transferability of the study or the generalizable nature is one of the criteria for quality in case studies but it depends largely on the case selected and studied (Patton, 2002). Although the cases and the participants within cases were selected to represent different disciplinary areas and different stand-points towards the issue of study, the sample size is small. Each individual in the study was unique and the contextual community of the participants in the study very specific in regards to culture and time. Because of the similarities between the cases and repeated references to both local and global influences there is good reason to believe that the study has considerable external validity within the Icelandic setting as well as globally. The same holds for the differences found between departments and individuals: there is good reason to believe that the kind of differences described are, in general terms, informative for differences in different settings. Thus I am confident that my results have general relevance to the discussion of the intricacies of university teachers' curriculum decisions and development.

I will not claim that the findings of the study have explanatory power beyond the case it is arrived from (Strauss & Corbin, 1998), but I am confident that a trustworthy account of the case and the research procedures and methods used for analysis will lead to more insight and understanding of curriculum development within higher education. In such a way the findings of this study will reflect issues and strategies of curriculum development that are applicable and adaptable within other departments and institutions in higher education and provide aspects of understanding that will be worthwhile and useful.

CHAPTER 4: THE DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

4.1 Introduction

My main case of study is the Department of Mechanical and Industrial Engineering. As stated earlier (see Chapter 3.3.3), the department was selected as an example of a 'hard' applied field.

After contacting the department head and being introduced to the members of the department at a staff meeting in the beginning of October 2002, I followed up with observations and started my interviews with the teachers, the last one taken in January 2004. After studying other disciplines, physics and anthropology, I found the need to go back to the department for extra interviews and observation to further clarify my understanding.

The aim of my study was to understand the characteristics of the pedagogic discourse of the three different disciplines, i.e. to explore teachers' conceptions of its regulative discourse and its instructional discourse and further, their conception of the development of the discourse and their part in that curriculum development. As the Department of Mechanical and Industrial Engineering is my main focus of study, my challenge is to tease out those aspects and information that will help the reader understand the complexity of the curriculum development and decision making within the department.

In the following chapter the pedagogic discourse of mechanical and industrial engineering will be explored in three different sections. The first part of the chapter, section 4.2, takes off with a brief history of the department and descriptions of students and staff. I then give account of the participants in the study within the department and their background. Finally, the characteristics of the culture of the department are discussed.

In section 4.3 the curriculum of mechanical and industrial engineering will be described in terms of Bernstein's ideas of knowledge structures and classification and framing.

The pedagogic discourse of mechanical and industrial engineering is the topic of section 4.3 of the chapter. First the regulative discourse of the programme is explored as it appears in teachers' conceptions of the essence of the curriculum, the ideological curriculum debates taking place and in students' and teachers' identities. The focus then moves to the instructional discourse, the appearance of which is traced through different types of courses within the programme as well as within the assessment methods applied.

The final section of the chapter, section 4.5, explores the curriculum development within the discipline. Teachers' agency will be demonstrated as well as the internal and external forces affecting their agency in the curriculum process.

4.2 Location in time and space

4.2.1 A brief history of the mechanical and engineering programme

The Department of Mechanical and Industrial Engineering is one of four within the Faculty of Engineering. It was formally established in 1972 when Helgi, now the senior member of staff, was asked to come home from abroad to establish a programme within this area. Three engineering programs had already been established within the faculty and student numbers were increasing. A strong need was felt for expertise in the field and now a well educated candidate was available for a new post:

So when I arrive [in Iceland] on the 17th of September 1972, I still didn't know if I had the position or not ... So I called [the head of the faculty]. This was on a Sunday as far as I remember and he said: Come right away tomorrow. You have already missed one week of teaching. And I just started teaching thermodynamics (25:5-6)³.

Helgi's task upon his arrival in 1972 was not only to plan and teach all the courses within the programme but also to create a new Icelandic disciplinary vocabulary:

So the greatest problem to begin with was to translate an international language [of mechanical engineering] into Icelandic. Those are international concepts that we use in the discipline in other places, in the Nordic countries as well as in English speaking countries (25: 7).

³ The references system used in the thesis is as follows: Quotes are first given the number of the field note they arrive from and then the page number of their appearance in the typed transcript of the interview or observation.

In 1970, all engineering programs within the faculty became a 4 year 120 credit system similar to other universities in Europe. This also applied to mechanical and industrial engineering from its establishment in 1972. Students graduating from the programme were awarded the professional title of engineer. In 1989, a 30 credit programme of advanced studies following the final degree was established. In 1994 the final degree was changed into a 'Candidatus Scientiarum' in engineering' (Cand. Scient.). In 1997 regulations were once again changed and instead of the 4 year programme a full two cycle system was adopted, consisting of a 3 year (90 credits) BS undergraduate level and a 2 year (60 credits) master's level (32:3). To fulfil the requirement of the Ministry of Industry, a master's degree was now needed to be awarded the professional title of engineer. The incentive for those changes was to align the programme more to developments in Europe. For a while students could add a fourth year to their studies, an option used by those wanting to prepare for or facilitate their further studies in master's programs abroad. The master's programme was formally established in 1989, with the first students graduating in 1991(31:3).

From the very beginning of its establishment, the programme was meant to enable students to attend different universities for their master's programme. To ensure easy access, the programme was kept broad and too much specialisation was avoided:

We decided from the very start that the programme would have to be so broad that they [the students] would be able to enter every school possible. That was our goal (25:25).

Despite the establishment of the master's programme, this broad aspect is still seen as important within the department and as a possible explanation of the programme's popularity among students that are said to like having greater options of courses to select from. Another informant claims the programme's popularity is rather related to the students' lively social life (31: 2).

4.2.2 Students and staff

In 1975, 19 students entered the department's programme. The number of students has slowly increased through the years, the highest number being reached in 2005 when 117 students were admitted to the programme. In 2004, 316 students attended the programme, 261 at the undergraduate level, 52 at the master's level and 3 at the PhD level. Out of the 316 students, 206 were male and 110 female. Compared to

other departments within the faculty, the Department of Mechanical and Industrial Engineering has a larger number of students entering the programme, has a much better ratio of students graduating from the programme and the ratio between male and female students is only more equal in the Department of Environmental and Construction Engineering (Háskóli Íslands, 2007c) This is also emphasised in departmental meetings where the status, both financial and in student numbers, is seen as good.

In the fall of 2006 the department had a staff of 14, with two and a half newly added posts. The new posts were provided to replace staff who had left as one of the teachers has retired but is working on special tasks; another has taken up a post in administration and the third one has a leave of absence and is working within a private consulting company.

4.2.3 Participants in the study

Besides observing departmental meetings which all members of the department participated in, I conducted interviews with seven members of staff and more than one with four of them. The participants in the interviews were *Albert, Gunnar, Helgi, Ingvar, Johann, Lara* and *Thorvald*.

The participant with the longest experience within the department had the task of establishing the programme in 1972. Other participants' experience within the department varies from 7 years to more than 20. Three of the participants received their undergraduate education within the University moving to further their education to Norway (1), Denmark (2) and Germany (1) while three received their degrees abroad (Denmark and US). The teachers' experience of teaching within the department ranges from 6 to 36 years and many were part time teachers before they were awarded formal positions. All except two of the seven participants spent some time working as engineers in the field. Those two worked as researchers before becoming members of the department. As can be seen from this account, the participants within the department differ in regards to their educational background, their teaching experience as well as their experience in the field.

4.2.4 The characteristics of the department

The department is located in one of the buildings of the Natural Sciences. The building was designed by the architect Ulrich Arthursson and the department moved in 1976. On the second floor the offices of the teachers are located on the left side of a hallway and on the right side one finds the lecture halls and the classrooms. When I started my study, the two female teachers had offices in a small annex next to the building and humorously but with a strong hint of irony referred to it as the Women's Shelter. Lara did not like the location and felt it cut her off from the community of others but explained the location of the women there as a result of them being the newest members of staff. She was later provided with office space on the 2nd floor. At the end of the hall is the coffee lounge, which serves as a central meeting point for teachers of the faculty and a place for social gatherings as well. It is a bright room with a small kitchenette and a grand piano that seems oddly out of place, but I later found out it is sometimes played by musical members of the faculty. In the lounge, teachers take a break from their work and gather for informal discussions as well as more formal meetings.

The first and second year students attend their classes in various locations on the University's campus while the classrooms on the 2nd floor are dedicated to 3rd year and master's level students. The students are provided with classrooms for work and are also allowed to keep their computers and personal belongings there. Master's level students have their work areas in an annex close to the building and students also make good use of the hallways where they can often be seen sitting in groups, working on their problems. The teachers leave their office doors open at all times to indicate their presence and stress that at all time students and colleagues can drop in for discussions.

The structure of the building seems to me to be highly supportive of the instructional discourse of the department and I made several attempts to find out if the architect had had such a pedagogic model in mind in his design. The participants, being technically minded, believe that the reason for the model is simply structural and practical.



Figure 4.1: The hallway on the 2nd floor of VR2

The teachers in the department share a very strong notion of cultural identity. In interviews they often refer to ‘us’ and ‘the others’, the ‘the others’ most often being the other departments within the faculty. An exception to this is when the policy of the University or other institutional issues are discussed, when ‘we’ refers to the faculty rather than the department. This is consistent with changing identities discussed by Valimaa in his study of Finnish universities (Valimaa, 1998). What makes the department ‘special’ is partly the practical nature and vision of the discipline but also what the teachers see as their way of communicating and being. Belonging to a community that stresses ‘openness’, cooperation and ‘friendship’ is an important part of wellbeing in the workplace as Lara comments on:

I am a member of staff; I am not only here to serve them. I also have to feel good in my job. I have to be here and this is my environment (4:57).

This is especially important as the University is otherwise seen by her to be lacking in their staff policy.

Within the department the members pride themselves in their lack of rivalry claiming that their ambitions are related to the department as a whole and not competing against each other:

I just don’t think we have such great ambitions for ourselves. More that we want to stick together ... even though we don’t work together we do respect each other’s successes (25:29).

The way of being within the department seems highly masculine and almost ‘muskateerian’ – one for all and all for one. The members claim that they are known for being frank and stating their opinions openly but even heated arguments are carried out in the assurance that they will not be perceived as personal and no one will hold a grudge against one later:

I have not experienced that in our department there are any unsolved matters between colleagues ... people just talk straight out ... people spend quite a lot of time here and often meet for coffee breaks and communicate outside the department. Go hunting together and so on (9:30).

Lara does not feel intimidated by the masculine spirit. She claims it is good natured and takes an active part in making jokes, sometimes using her femininity as the source. Getting a written permit from the department head to buy highly technical laboratory equipment, she laughingly asks him if it is also usable in a well known woman’s fashion store.

The community bonds are strengthened with social activities that are seen as special and important. In the fall the teachers take off for a week-end in the country side, bringing along their partners and children. Hunting trips are referred to although not many teachers admit actually participating in them and once a year the students and teachers celebrate together. All activities are seen as significant for the morale of the department:

Going out for a weekend into the country ... with our families ... that makes a difference. It makes a difference that the last weekend this winter was a teachers’ celebration where the 3rd year students with the master’s students take care of buying food and a hall is rented and we do some show. And they have some show making jokes about us. This means everything! (4: 57).

Although social activities and open communication are seen as binding the department together, the explanation for its closeness is just as likely to stem from the relations between the department members. Most of them are former students within the department, having been taught by the elder teachers and brought up by their colleagues in the department. Such relations may be a point of external criticism, but the teachers in the department don’t experience it as a negative point:

We are a bit cocky about our department ... some teachers in other departments might claim it is too much of a community of buddies ... and it might be true that it possibly refrains us from being critical enough towards each other ... but from a human point of view ... it is quite a cosy place of work (9:30).

In Bernstein's terms, the departmental community can best be described as integrated type where the classification between subjects, between teachers and between teachers and students is weak. This kind of community structure opens up possibilities for communication and cooperation (Bernstein, 1996). Whereas the department's meetings are the only formal forum to discuss curriculum development, discussions regarding pedagogical practice take place at a more personal and unstructured level. Despite the openness of the community cooperation is framed by the disciplinary area the teachers teach:

Because of the smallness here, I actually have had only one [teacher] to talk to. Because when I start talking to others here in the department I am discussing a totally different course. This [field] is so special that one should first and foremost be teaching or talking to one's colleague in that field (9:21).

It is quite common within the department for such colleagues (i.e. teachers sharing the same disciplinary area) to share courses. Sharing courses makes it easier for teachers to take over each other's parts if the need arises, such as when teachers go on research leave, but it also provides opportunities to share ideas. Gunnar, referring to his former colleague who has recently left her post, misses their pedagogic dialogues:

We taught a lot together. Split the courses between the two of us, sometimes taking turn in teaching to break it up a bit. At that time there was quite a lot of discussion about those syllabuses (9:13).

Lara, being a new teacher, values the opportunity to seek advice and help from one of her colleagues who shares her field of expertise. Her partner, willing to assist her in any way, rarely feels the need to consult others. 'I sail on my own' he explains admitting that while it must be good to be able to share one's ideas with others, this is not his style:

But this is something old in me, just to think of something new and try it out without sharing the idea with others (10:24).

The department's open mode of communication also applies to students. As students progress in their studies their participation in the department's community and access to teachers becomes greater as will be discussed.

4.3 The curriculum of mechanical and industrial engineering

4.3.1 Introduction

In the following section, the curriculum of mechanical and industrial engineering will be described in terms of Bernstein's ideas of knowledge structures, classification and framing. The section gives a brief overview of the curriculum structure, the lines of study and courses provided within the programme.

4.3.2 The formal structure of the curriculum

According to Bernstein's theoretical tools, mechanical and industrial engineering is a discipline with a hierarchical knowledge structure. This hierarchy is clear in the structure of the curriculum programme where courses are given numbers indicating different hierarchical levels. At the first level are courses that are a part of the basic course of study. The next level includes courses that are at the division between basic course and continuing study and the third level includes courses at the master's level. Students within the undergraduate programme can take courses at the second level provided they have completed the prerequisites and students at the master's level may take them, but often with limits. Courses at the third level are only open to graduate students.

The mechanical and industrial engineering curriculum is of a collection type where new knowledge is contested and incorporated into more general and integrated theories (Bernstein, 1999). Different from hard pure disciplines, the content is not as strongly classified as the application of knowledge; the essence of the discipline, requires and demands communication between the department and the field.

Since the year 2003, students within the department can graduate from three different lines of study: mechanical engineering, industrial engineering and a newly established, interdisciplinary programme of chemical engineering. The programme originally included marine engineering but as few students were interested in the subject it was soon eliminated.

Industrial engineering became a part of the programme in 1987. As the emphasis within the mechanical programme had an industrial focus from the very start it was easy for new teachers with an industrial background arriving at the department in 1987 to have its name changed to the Department of Mechanical and Industrial Engineering, thus confirming a broader perspective within the programme and giving it a 'modern' outlook. At the same time the other departments within the faculty also underwent name changes, possibly to follow up on changes within the field as well as to stress their ownership of new fields (31:2). Chemical engineering became a line of study in 2001 with one student starting that year but 14 in the fall of 2006. The programme is still being developed and as it also involves cooperation with other faculties it will not be included further in my analysis.

Despite the two different lines of study provided within the programme, their classification is weak and the greatest part of the two main lines is based upon same or similar courses. Although the mechanical engineering and industrial engineering programs are seen as two separated programs, the curriculum structure of the programs is very similar and formally only 6 courses (18 credits) separate one line from the other. Students on either line of study are required to take 75 compulsory credits of which 60 credits are required within both lines. Although certain courses are required especially for one programme but not the other, the students have room within their 15 elective credits to make their own interdisciplinary choices. The BS programme is 90 credits, concluded without formal thesis or project.

The master's programme is a two year, 60 credit programme where students can either take a 15 credit project together with 45 credits of coursework or a 30 credit project with 30 credits coursework. The 30 credit projects are more common as students find it easier to seek financial support for those projects from companies within the engineering field (31:2). The students select courses that support their master's project and this provides the students with a coherent whole. Each student is appointed a course supervisor who generally functions as the student's research advisor. A master's degree committee, consisting of the research advisor and two experts in the field, is appointed for each student. After successfully submitting the thesis and giving a public lecture on it, the student can then apply for the professional title of an engineer.

The courses within the curriculum programme are classified into three main groups with an increasing emphasis on engineering: a) basic subjects for engineering (physics, maths and computing); b) basic engineering courses (defined as courses where some practical aspects are in focus) and c) engineering courses (described as courses where the main focus is on application and solutions).

This division of courses is stressed in the laws on accreditation by the State through the Association of Chartered Engineers in Iceland where a certain amount of credits within the three categories is required (Iðnaðarráðuneytið og Verkfræðingafélag Íslands, 1992). Despite the classification, the difference between basic engineering courses and the engineering courses is far from clear (31:2). Their difference will be discussed in the next section.

4.4 The pedagogic discourse of the mechanical and industrial engineering

4.4.1 Introduction

In the above sections, the characteristics of the department and the formal structure of the curriculum have been discussed. The pedagogic discourse of a discipline refers to the way and means specific knowledge is restructured and transmitted as a pedagogic subject. The pedagogic discourse creates the pedagogic subject through two different discourses, i.e. the regulative discourse and the instructional discourse. The regulative discourse is the moral one focusing on what to transmit and the order, relations and identity within a discipline. The instructional discourse one specialises in the skills or the how and is embedded in the regulative one (Bernstein, 2000).

In the following section the regulative discourse of the mechanical and industrial engineering curriculum is explored as it appears in teachers' conceptions of the essence or the goal of the engineering curriculum, the ideological curriculum debate taking place within the department and in the formation of students' and teachers' identities. The focus then moves to the instructional discourse whose appearance is traced through different types of courses within the programme as well as within the assessment methods used.

4.4.2 The regulative discourse of mechanical and industrial engineering

The regulative discourse of mechanical and industrial engineering can be described as the moral order of the discipline (Ylijoki, 2000) and refers to the order, relations

and identity within a discipline. In mechanical and industrial engineering the regulative discourse is visible in teachers' ideas about the characteristics of the discipline, the essential attributes students need to take on to become engineers and in their ideological debate over the essence of the discipline. The regulative discourse is further explored through students' and teachers' identities. The regulative discourse also dominates the instructional discourse which will be dealt with separately in the latter part of this section.

'The solution is the big word'

The teachers in the Department of Mechanical and Industrial Engineering have clear views of what knowledge is of most worth within the discipline. Stressing the practicality and applicability of engineering, they stress the epistemological difference between their discipline and those that are seen as hard pure:

Everyone knows what natural sciences are so it is a good point of departure. And the difference between engineering and natural sciences is that the natural sciences analyse problems but do not enter the synthesis, which is to design. But that is the specialisation of engineering. It is not sufficient for us to analyse and understand the problem; we have to provide a solution. The solution is the big word (9:4).

Within the department knowledge is seen as purposive, pragmatic and concerned with mastery of the physical environment. The emphasis on the pragmatic or applicable part of knowledge is visible in the curriculum which includes courses in practical skills taught by vocational teachers, practical assignments for students, vocational projects students undertake as well as in teachers' professional theories. The proactive aim of the programme is to create engineers who not only have the ability to apply their skills to solve problems of today but also to those problems belonging to a future that remain unknown. Students will have to be able to cope with a world that they have not yet experienced and solve problems not encountered earlier:

Because we are thinking how we will do things tomorrow ... we can take any problem there is, dissect it and make solvable

G: And would you have to foresee the problems of the future?

No not necessarily, but after maybe four or three years you might come upon a problem you simply haven't solved before (6:14).

It is this ability, to regard all tasks as solvable problems, along with daring and stamina that has landed their students in various prestigious positions within different fields of work such as the banking system.

What do students need to become 'a universal problem solving machine' as one participant calls this essential quality? First of all a good foundation on basic subjects is seen as essential, especially in maths. The teachers may disagree with the educational attitudes of those providing the basic courses but they do agree that those basic courses provide a strong foundation for students and are as well as indicator of the programme's quality. In the basic engineering courses the students will acquire the necessary tools to attack the problems that are presented to them in the engineering or synthesis courses. There is no clear formal division between basic courses and synthesis courses such as different numbering but the essence is quite different:

Then we have what we sometimes call the 'synthesis courses' when you are entering the world of design where nothing is right and nothing is wrong but the solutions are yet of a very different quality (2:8).

Entering this world of design, the students are required to start thinking like engineers which to them is a new and different way of thinking. Arriving from the hard pure disciplines such as mathematics where great precision is highly valued, the students have acquired recognition rules that are a mismatch to the requirements of engineering. In engineering precision is not as highly valued as in the disciplines categorised as hard-pure (Donald, 1995). One of the teachers claims that engineering students actually need to acquire what he calls *engineerical imprecision*. Ingvar explains the difficulties in addressing this ability in his 1st year teaching and describes his approach to this problem in the following way:

In the course you begin by doing approximations...making the problem manageable. You try out different solutions, one by one, and you assume it's like this or that. In practice I know this doesn't quite do this ... but I just say: Ok, I will just assume this is straight but I know at the same time it is a bit off. But possibly I will get a solution that is simple and good and works so I can see how much [weight] it can take. And this is what I mean by engineerical imprecision. In the problem you

don't include all those details that you will later on in their study and you make the problem simple enough that those kids can bring in some math to solve it (6:10-11).

Describing the characteristics of a good problem solver (engineer), further traits are mentioned. First of all the students have to have a firm belief in their abilities to be able to solve any problems, a belief rooted in a certain kind of daring that is stressed as essential. Creativity is mentioned as an important aspect (to come up with new solutions or see new perspectives) and a certain amount of stamina that will make students tackle the problems as long as needed. Albert also stresses the importance of professional integrity and having an ethical stance, as each problem has many solutions leaving room for the engineer's ideological, ethical and professional stand. As a professional the engineer has duties that are greater than those more trivial ones and Albert reminds me that a good engineer can create and design products that can do the most harm to mankind. 'A good engineer draws with his heart' he adds, quoting one of his colleagues (2:25). Good engineering students do not only need knowledge and skills, the teachers also emphasise the importance of the personal characteristics of their students and a certain mode of being (Barnett & Coate, 2005).

The American versus European conflict

During my study, the teachers began the process of discussing and evaluating the policy of the department which had last been formally revised in 1995 (Field notes 3 and 7). One of the underlying questions in the discussion was: What kind of engineers do we want to graduate? This was further dealt with as the department took part in creating the University's new mission statement (Field notes 19). During those discussions different curriculum conceptions, referred to as the *European and American conflict*, became crystallised.

The *European versus the American* tradition or conflict is a common phrase in the department's dialogue and is used by the teachers to explain controversial views on the curriculum of the programme but also different approaches to teaching. Despite its name, the controversies revolve more around teachers' attitudes towards the aims and the focus of the discipline although those views may be related somewhat to the traditions within engineering programs in different countries or universities. According to the teachers there is a difference between the organisation of the

engineering programs in the US and Europe where the US programs tend to start with a vocational focus moving to a more research oriented one at the graduate level. In Europe engineering programs are usually five year coherent programs with a heavy vocational focus. Albert claims that teachers who have received their undergraduate degree at the University where practical training is at minimum and then go to US to further their studies have in fact got ‘the worst of both systems’ (2:27) in respect to lack of practical training. Originating from the teachers’ experience of study and their experience within the field, Albert sees the conflict as mainly revolving around the question of seeing engineering as a technical or an academic discipline:

I experience a great fracture ... in some sense it is old Europe versus America ...in some sense it is engineering as a technical subject or engineering as science. There are some people here that have never seen anything else than a classroom ... they arrive straight from the books ... have never worked as engineers and of course they experience engineering as pure science (2:16).

To use Becher’s and Trowler’s (2001) terminology, some of the teachers claim they experience attempts within the University to move their discipline from being hard applied towards becoming more hard pure. This academic drift, supported by the research mission of the University will, if not resisted, result in the abolition of all that is vocational in engineering, depriving the discipline of its moral purpose of solving the problems of daily life and in Bernstein’s terms strengthen the classification between the discipline and the engineering field (Bernstein, 1999). The conflict is especially visible in curriculum discussions and debates over the importance and scope of students’ practical training on the one hand and the quality of the master’s programme on the other. In regard to students’ practical training, the lack of facilities and trainers and the high cost of such training make it difficult for the advocates of the European approach to maintain their agenda. In several departmental meetings the purpose and structure of practical training is discussed and debated. Practical training has mainly been provided by workshops outside the university, largely in secondary schools. In one of the departmental meetings the department head presented new rules of the faculty requiring all practical or vocational workshops to be incorporated into regular courses. At the meeting controversial views were raised on the quality of the workshops, the importance of

practical skills for students and the lack of cooperation between those that teach the theoretical part at the university and those who are then supposed to provide skills training in the workshops (1:21-24).

When the master's programme was formally established, attempts were made to make a sharper division between the undergraduate and graduate level. By doing so the department's programme leaned more towards those experienced by teachers graduating from the US. Ingvar reflecting on the conflict again attributes it to teachers' experience of study and different quality standards:

The turmoil is ... some say: This is not a graduate study; this would never be approved of [elsewhere]. This particular course could never be a part of graduate studies in the US. But then other would say that in Europe where this course is originated it would be a part of this five year programme and there you would not have any clear cut distinction [between BS and master's level] (6:27).

Despite differences in background and supposed differences of opinion, the teachers within the department are seldom in conflict and at meetings controversial issues are rather amicably discussed and solved. When asked about the American versus the European conflict, Gunnar claims it is rather to be found within the Faculty of Engineering than within the department:

Not in the department...But within the Faculty of Engineering. There you have two poles. One of the poles, we as engineers in quotation marks, see as too scientific. It is such that you are first and foremost in an academic area. You are publishing a great deal, highly connected outwards to the international science community. Not very vocationally related and not much teaching your students [true] engineering in the sense I am talking about, more just some analytical techniques (9:27).

The object of study within the mechanical and industrial engineering is the visual world and compared with other departments within the faculty their research mission and projects are more related directly to and often undertaken in cooperation with the vocational field. Thus while the teachers in the department may not share the same ideology of the engineering, their disciplinary identity still unifies them against what they see as the academic drift and stronger classification of their discipline within the faculty.

The students' identity

Within the regulative discourse the image or the identity of the good student is located. All the participants, either directly or indirectly, stress the importance of good communication between staff and students. In Bernstein's term, the relation or the social order between students and teachers is marked by weak framing that reduces boundaries and results in a more personal control (Bernstein, 2000, p. 100). Office doors are kept open at all times and during interviews closed doors do not discourage students from popping in with a question or problem. Those requests are all either dealt with in a friendly way or students asked to visit later. The students' annual teacher celebration has also been described. At the very beginning of the programme, the size of the student cohort makes it difficult for teachers to become acquainted with students and some have given up on learning their names. As students move further on in their studies they earn their place as almost equal to their masters, moving from the periphery of the community closer towards the middle (Lave & Wenger, 1999; Northedge, 2003b).

How do the teachers describe the good student? In a community that stresses weak framing within the pedagogic relations, the students are seen as moving towards being active and creative (Bernstein, 2000, p. 13). A good student is one that takes responsibility for his own study and neither has to or expects to be spoon fed by the teacher. At the undergraduate level, where the framing is stronger, the good student works hard, is on task and hands in his or her homework on time. Yet, some of the teachers are worried that the firm but supportive structure of the programme doesn't require much independence from students. As they progress the students are able to attack problems without fear. Gunnar tells me that the teachers within the department are especially proud of their students' lack of insecurity. Not only do they fearlessly attack problems but after graduation they do not hesitate to invade the territories of others such as business graduates. This lack of fear means being sure of one's abilities and Albert cites a conversation he had with Ingvar in the coffee lounge on what is a definition of the good student:

It is without doubt a student that is so confident that he does not buy any nonsense even when he is told to do so. And then Ingvar says: The book I am teaching [in the course] is so bloody good because it has such a lot of wrong answers in the answer sheets. And it suddenly

dawned on me that this was probably the definition we had been looking for! The student starts to tackle the problem. He has the answers at hand and looks them up. And he needs to make a decision and say: O.k. the answer is wrong – not me. And a student that has gained that confidence, he is able to go out and participate in designs that have to do with human lives. A student that fiddles with the problem until he gets the solution provided in the answering sheet, he is not (2:23).

Professional integrity is clearly visible in the above quote and Albert further states that good students may not always be the ones who are well received within the vocational field as their integrity may cause them to take a critical stand against their own employees if necessary.

Female students in the programme

Within the department the female students make up one third of the students. Many of them enter the first year but a large number then move to other departments within the faculty in their 2nd year. Gunnar explains that this might be due to the image of the mechanical and industrial engineering being messier and dirtier than other engineering fields. Lara claims that the 25% female ratio of the undergraduate programme has not changed for a while and finds that worrying. She wonders if the teachers within the department have stopped seeing the lack of female students as a problem:

Maybe one has stopped noticing this big difference. Like this morning when I was teaching. I was teaching in the 2nd year. There are that many girls that you don't see such a gigantic difference even though I know they are fewer in number (4:20).

In the master's programme there are even fewer female students and the teachers have little idea why this is so:

But then you come to the master's programme. That's that course I am teaching. There is only one woman and overall in our master's programme here they are less likely to show up. I am not sure that if you did a statistical survey you would find that they are showing up less in the master's programs in general. They might be going abroad ... they just show less up here ... I do hope they are just going somewhere else (4:20).

Yet the lack of female students is worrying to some of the teachers and Gunnar among others feels it is essential to have more women in the faculty, preferably young ones who would then serve as role models for female students (9:30-31).

The teachers see the female students as much stronger students than their fellow males. The females that enter the faculty are the ones that have brains and have had to prove themselves before entering:

Over all the girls are very strong students and they also participate more [in class]. They are more open but these are special type of girls that come ... They have to be so to have made the decision to enter the field. We only get the top 25 (6: 31-32).

The girls are not only stronger students academically; they also have different way of working on their tasks and add a feminine touch to their design:

[He shows me the bridges the students have made. There are many types and some obviously have been given more thought and work in details. He points out a bridge and says]:

There you see a typical girl's bridge

G: Is this a girl's bridge?

You see the guys' bridges

G: Wait, are girl bridges ... what ... prettier?

Prettier, much more puttering and prettier, much more messing around them (6:8).

During my research the equality representative of the University stated on the local news that male oriented faculties like the Faculty of Engineering needed to take action to attract more female students. She suggested actions such as special courses for female students with a more humanistic perspective or focus. Her ideas were met with an uproar of dissatisfaction among the female students of the faculty and at a public meeting arranged by the students they aggressively attacked her ideas as degrading and showing a lack of belief in their abilities (Field notes 5).

The teachers' identity and role

In the interviews, the teachers stress their role to help the students acquire the necessary knowledge and skills and doing so, one of the characteristics of a good teacher is being able to keep students' attention and interest. The teachers have various means to elicit students' interest. Some reach them by giving good and interesting examples, preferably from the teachers' own experience in the field. Others simply try to make learning fun:

Because ...it helps if you can say a joke in a lecture. Even though it isn't a very special one (20:23-24).

The aim is to do more than just impart knowledge; the quest is to find a way to make the topic both interesting and relevant to the students by 'smearing a little honey' as Albert explains:

I try not to be only instructive and the carrier of knowledge, rather to be broadening and educative in this ... then I try to smear a little honey on the course ... to make it more accessible (11:16).

Despite their attempts, all the teachers find it quite difficult to get students to actively participate in the lectures and find them taking on a very passive role especially in the beginning of the programme. Students' passivity makes it difficult for teachers to become attuned to their students and it is also seen as an indicator of students' lack of enthusiasm and even mental activity:

I feel that you should try to get them to participate more in the discussion, to get them thinking more (11:9).

Students' passivity is somewhat explained by the large number of students in the class and students not preparing for classes but also by teachers' lack of skills in helping students participate. Lara finds it important to have students active in class but is not quite sure how that can be done. She claims she often asks questions but what are you supposed to do if students don't answer:

You see, sometimes they just sit there totally blank. I try to ask them questions and get them involved. It varies. It also depends on how geared up I am. I do feel it differs from one day to another how well I manage to get them along ... It becomes more or less a lecture and I

ask questions but no one answers them ... and I end up answering the questions myself (4:35).

She has thought of calling on students but thinks that might feel intimidating to them. She stresses the shortness of the term and her finding it necessary to cover the topic before the end of it (4:35). Gunnar also blames students' passivity on his own enthusiasm for the topic and the feeling that everything is so important and must be transmitted to the students: 'The students could of course read it in the textbook and one doesn't need to tell them everything'(9:25). Gunnar tells me that in US universities students are given specific grades for classroom participation but thinks that would be quite alien in his department and seen as unthinkable. Thorvald thinks students' passivity may be an Icelandic phenomenon, a conclusion reached after having experienced teaching in Denmark where students were more eager to participate (10:8).

In their lectures the teachers are both trying to help students understand some basic principles but also getting them to think like engineers. To reach those goals the teachers use various means and the visibility and practicality of the knowledge or the subject makes the teacher's task easier as Ingvar explains:

You are dealing with real things and can visualise them. And it is practical and you see the point and why you are doing what you are doing (13:30-31).

This feeling or belief is deeply rooted in the professional theories of other teachers in the department and illustrated in their teaching. Due to the practicality and visibility of the subject, teachers use daily things like a chalk, a can of Coke, and piece of paper to demonstrate the principles of the subject.

Engineering is dealing with the magic of the real world and the teacher's task is to help the student understand that wonder:

What inspires students? To gain an understanding of the things that they have in their hands on a daily basis – to realise it is no black magic – it is understanding the system that we live within day by day (11:24).

The practicality of the subject lies at the centre of teachers' conceptions of it and despite the academic drift of engineering felt and illustrated in the tug of war between the American and the European traditions, the practicality is highly stressed

in teaching. Lara explains her stand relating it to her own experience entering the workforce:

I don't believe in showing up in class to discuss something very theoretical with the students that nobody understands ... so I try to think ... practically: What would be good to know? And in which areas did I feel like an idiot when I started to work after graduation? (4:46).

This practicality is also reflected in her attitude towards teaching. Textbook pictures only go so far and for true craftsmanship it is essential for students to get closer to the material of the trade. True to her beliefs she shows up in class with artefacts that demonstrate the topic of discussion. Engine parts are borrowed and brought to class where they are circulated for students to touch and feel in order to relate the learning to all the senses:

Because you learn so much – the lectures are of course a certain form of transmitting the subject but it is totally different ... I want them to be able to see It ... today I took a piece of turbine with me to class and rims made of magnesium and they get to hold it. (Hold it?) Yes magnesium is the lightest metal there is so ... You see you remember that if you have held a magnesium and aluminium rim...that there is a difference ...You always remember the feeling (4:25)

In interviews I asked the teachers if and how they planned their courses and teaching to meet different students' needs. Few teachers could give me examples of such attempts and the notion of differentiated learning or marginalised students seemed quite foreign to most of them. Lara is the only one who gives voice to this difficult task, describing how she, in a large class, finds it necessary to aim her teaching at the slower learners. Yet, her words indicate that it puts her in an uneasy role of an elementary teacher more than a university lecturer:

If you have the connection to the students and make sure you are progressing at their speed through the curriculum ... you are not leaving anyone behind. And naturally the connection is different because the students differ. And I try to ... you don't just take the fastest or the best into account. Because even if this is a university, it still is a bit like elementary school. It is the breadth, especially when I am teaching at the 2nd year and I have such a large group of students (4:21).

Nevertheless, teachers' positive attitudes towards students and their willingness to be accessible to students at all times, in person as well as via e-mail, demonstrates how

they really care for their students. This caring is for example reflected in the department head's decision to teach a course despite having no teaching responsibilities, in order to stay in contact with his student 'so I know who they are' (13:2). It is also demonstrated by teachers respecting student work load and not making demands that will take their attention and energy from other courses:

Students attend many courses – I try to keep a normal load. I don't believe in that teaching method of having too much load. I have never seen the point in that (4: 34).

All the teachers find it important to 'connect' to students in their teaching and the connection is an indication that teaching is working and learning might be taking place:

I am trying to reach the student. The connection between students and the teacher ... that means a lot to me. I just can't talk to a group of students if I feel I don't have a connection to them ... it is both, I think, something personal as well as professional (4:21).

When the connection is reached, teaching becomes an enjoyable, reciprocal process and teachers have the feeling that learning is actually taking place and everything is going well. The connection is a feeling that is difficult to put into words but Gunnar manages quite well:

You just feel it. I can't explain it, it's just a feeling. You simply feel it, there is this atmosphere in the student group ... it is more difficult in the first year courses, in the class of 100, 150 students. But, yet, even there I think you can feel it too. When you stand up there in the lecture theatre, then you feel a bit how the audience is.

G: And is this important feeling?

Yes, definitely. I am sure that I teach this first year course much better if I can feel I have the audience with me.

G: How do you know you have them?

Well, maybe there are some questions, a little chat and a little joke is told and a little laughter and such. And you feel it fairly quickly and then you have the attention and you come up with a small example from the field and find an interesting side to the issue (9:26).

Teachers and students in the department are seen in a relationship that is built on trust and mutual respect. Teachers are here to help students master the skills and

knowledge needed to become a good engineer, not to obstruct or create barriers for them. Gunnar demonstrating the characteristics of a good teacher stresses this alliance between teachers and students:

Being a good teacher has much to do with attitude and a teacher's manner towards students. A teacher that is only benevolent towards students and is there to help them succeed and they can feel that ... then I think you have come a long way. If there is a flaw in that, the student gets the feeling that the teacher is more there to set them up ... or doesn't treat them warmly ... I think that can be a very tricky situation. So while you have this ... positive attitude, helpfulness ... I think the rest more and less happens naturally (9:10).

While all the teachers stress the importance of having a good relationship with their students, the terms of those relationships are different from one teacher to another. While Gunnar claims he has less personal contact with his students than his colleagues because of his withdrawn personality (9:8), Albert does not hesitate to enter the more personal spheres of students' lives in his caring. After one of the students has tragically committed suicide he decides to talk to all the students about the dangerous effects of strain and stress:

How the strain of school was a concurrent factor driving the student to this act. How they were in actual danger because of the enormous strain and didn't know how to cope with this feeling when you have had enough and there is no time to live the life and this is disgusting and I hate this and I have dreams about it at night and so on ... And I am sure I am the only teacher who did this. But I had to (2: 36).

4.4.3 The Instructional discourse

Whereas the aims and goals of the mechanical and industrial engineering are embedded in the regulative discourse of the discipline, the pedagogical actions planned and carried out to reach the goals lie within the instructional discourse. According to Bernstein (2000) the instructional discourse is embedded in the regulative one, but often it is quite difficult, if not unhelpful to make sharp distinctions between the two (Dowling, 1999). Framing is the concept or theoretical tool used by Bernstein to explain the nature of control over the selection of communication and its sequencing (what comes first, what comes second in learning and teaching), the pacing of the communication (learning) and the criteria and control over the social base which makes this transmission possible.

The pedagogy of mechanical and industrial engineering can be described as an apprenticeship model where the framing is very strong in the undergraduate programme but becomes weaker as students progress in their study (Pratt, 2002) and are inducted into a community of practice where the discipline is seen as the community (Lave & Wenger, 1991; Parker, 2002; Valimaa, 1998). From the very first time the students enter the programme until their graduation from the master's programme they tread a very distinct path of course work that can be defined by different levels of framing, realised in the different type of courses of the curriculum.

As has been explored above, the framing of the relationship or the social order between teachers and students within the department is best described as weak. This is not reflected in the discursive order of the instructional discourse which appears to have a strong framing (Bernstein, 2000, p. 13). Every 3 credit course is awarded 6 class periods per week, usually divided into four lecture periods and two periods of example classes or tutorials. This is a form deeply rooted in the pedagogic discourse of the discipline and further enforced as being the determinant for teachers' wages. Until 1999 courses were awarded certain financial values in accordance with the type of instructional activity taking place (see Chapter 1.5.4). In 1999 the University's council suggested a sum payment to courses opening up space for the teachers to change the instructional methods. Despite changes in regulation, the instructional structure has kept its place within the faculty.

To ensure an optimum organisation, classes are distributed over the week according to a module system that was introduced some years ago to increase uniformity and decrease clashes. In a recent seminar on teaching within the Faculty of Engineering the main focus was on the form of class hours and a young teacher explained his attempts to break what he experienced as barriers to his teaching. While many of the participants agreed to the limitation of the strict form, others pointed out that such conformity made it easier for students to move from one course to another within as well as between departments (Field notes 28).

The strength of the framing gets weaker as the students progress in their studies, as will be explored in the discussion of different courses within the programme: the service courses, the basic engineering courses and the 'real' engineering courses.

Service courses

Entering the programme of mechanical and industrial engineering, students take courses in basic subjects as well as basic engineering. The basic courses such as mathematics, physics and computing are provided by the relevant faculties in those disciplines as *service courses* bought by the department. They are provided on a common agreement that the teaching of a subject is best done by the specialists in that discipline. In some interviews, participants both within the Department of Mechanical and Industrial Engineering and the Department of Physics refer to ‘the rules’ regulating the service teaching but despite great efforts those rules are nowhere to be found in any written form. The ‘rules’ are rather a unwritten agreement between the service course providers and buyers based on the understanding of the latter that the courses are an important source of income for the service providers who might face financial destruction of their disciplines without them.

In department meetings it is clear that there have been several incidents when the members have not been too pleased with the pedagogical approach within the service courses and find that their service providers, in the light of their respected disciplines, lack certain humility. There are discussions about the lack of cooperation, few attempts to suit the instruction to the interests and even abilities of the students, and dissatisfaction about some of teachers given the responsibility of teaching. Basically the department has little control over the service courses and their pedagogy reflects the pedagogical discourses of the relevant disciplines. Nevertheless the teachers see the curriculum of the basic subjects as the essential foundation for further progress and indeed to some extent providing the quality for the whole programme. Although basic courses lay an important foundation in the mechanical and industrial curriculum, they are a part of other disciplines’ pedagogic discourses and will not be further discussed here.

Basic engineering courses

Basic engineering courses are defined as those courses with some practical aspects as their main focus. In those courses student learning is seen mainly as acquisition of knowledge yet with a strong emphasis on the students’ application of that knowledge. In my first interviews some of the participants frequently referred to *the American*

versus the European model or tradition. The model refers to both ideas on the aim of the engineering programme (see above) but also to instructional methods. Basically, the American model of teaching refers to very strictly structured acquisition courses where the framing of the instruction is strong and the students are given little freedom or space of control. Albert ironically describes the method like this:

Four lectures a week, three lab hours, exercises, a steadfast treadmill, never relaxing, turning in homework, and so on. It guarantees that the kids are working at their maximum performance. And they never have time to study! (2:12).

The American model is compared to the European one which refers to a weaker framing of instruction where students are seen as independent or autonomous learners that are responsible for their own learning and little is done to establish a formal learning situation for them. Albert compares the two models in this way:

This method of teaching is great in the undergraduate courses – no loose ends, no dilemmas. No ethical, financial or technical problems – that’s how we should teach the basics. This is a thousand times more effective way to get the surgical tools into the kid’s toolboxes. Rather than the German method where Herr doctor professor walks into the audio and sings his aria and three hundred students are practicing the ancient Chinese bookmaking art of writing down their notes (11:42).

As a part of strengthening the framing, all the teachers teaching the basic engineering courses prepare and hand out syllabuses. This is not necessarily the case in ‘real’ engineering courses. The syllabuses describe students’ learning tasks through the topic of study step by step:

I usually have a book and on the first day I hand out [an outline] how I am going to go through this book, chapter by chapter, page by page. It is a kind of overview, just a table and on the right hand side are the problems they have to hand in (25:32).

Aside from readings and which problems to hand in, the syllabuses also include assessment criteria, the practical training needed, reading lists and all necessary information for the students. They are handed to the students at the beginning of the course but also posted on the Internet. Teachers typically use the first lesson in the course to go through the syllabus and explain the structure of the course and may also use that moment to explain to students the aims of the course and its importance

in the structure of the whole programme. Lara tries to address her students' expectations and to stress their responsibility for their own learning:

I always start the first lesson by introducing the topic that we will be studying and why we are studying it ... and then I ask them: What do you want to know? What are your expectations ... what do you feel you should learn? I find it important that they understand the goals ... that they understand that they are not only my goals for them but that they themselves have their own goals (4: 37).

The syllabus can also serve as a medium for teachers to engage their students in a dialogue on the purpose of the course and their own professional aspiration for their students. It is not only a tool to formalise and structure the learning but also serves as a kind of contract between teacher and students, providing students a kind of security as to what to expect:

This has naturally to be clear from the start and it can't be changed in the middle of the course. They must know what to expect (9:23).

Although few teachers in the department have studied in Germany, the dilemma of the American versus the European model is real to them and often referred to. It is the dilemma of where to position oneself on the student autonomy or framing axis. The teachers seem to agree that the American model of instruction is very efficient but at the same time some of them make excuses for adhering to it, claiming it is not very academically demanding for students. Although the teachers want their students to become critical and autonomous engineers the American method is nevertheless seen as a good instructional model for the beginning students and helpful to keep students on track:

I do think this method is suitable there. It is control because they are in the 2nd year and you know if you start to give them a free rein nothing comes out of it ... which you might be able to do more of when you are gone further and in a different course. And I have weekly assignments and you know you can't turn it in late – they have to hand it in on time. That's how the course wheels on. They are always in the clear beforehand what is expected of them (4:27).

This method or model is seen as providing the beginning students with the necessary framing or structure they need, entering a new kind of thinking. Ingvar explains how he, teaching a course in the 1st year, makes attempts to have students think and act as engineers in the field: 'You are trying to start to work this culture into them' (13:27).

But as it is the first course for students in the subject, it has more to do with practicing solving problems than real design. All problems and designs have to be simplified but yet in such a way that it will require students to make options for their solution and thus building on the core of engineering thinking (13:27-30). The role of the teacher is seen as the one of the master, carefully initiating his learners into the practices of their trade:

The teaching technique we use ... we assign them problems and ... maybe first in a course we naturally use the lecture to show how we would attack the problem and then we assign them problems to solve so this is in some sense ... to some extent ... in quotation marks the workmanship of the master, that is supposed to pass on. And yes then we are waiting to see if they haven't got the hang of it and are able to solve the problem (9:7).

Where the American model is applied in the basic engineering courses, the organisation of classes is based on a departmental tradition that is almost invariant. In each course, students get four 35 minutes lectures per week where the teacher will cover the topic by explaining for example certain principles or laws of nature and their effects, using the blackboard and/or the overhead projector. The students have their textbooks at hand with diagrams, explanations and problems and are then given problems to solve and hand in a week later. The problems are taken from the textbook or created by the teacher and often rotated from year to year to avoid copying. The students hand in their problems and the teacher, or most often the teaching assistant, reads over them, marking them slightly with question marks or underlining and they are then graded or recorded. In tutorials, the teacher hands out the marked assignments, solves the problems on the blackboard or with the use of the overhead. Students ask questions and might require or ask for further explanation (13:16-20). In some courses the students are required to do some practical training, either in the faculty's laboratories or, where necessary, in facilities rented in private establishments or schools.

Weakening the frames – 'real' engineering courses

When students have been introduced to the skills and knowledge of the engineering field in the basic courses they enter the 'real' engineering courses that are also called 'synthesis' courses. Moving from the strong framing of content selection and

teaching methods the ‘real’ courses are characterised by more flexibility in curriculum planning, increased students’ responsibility for their own learning and different kinds of learning. The courses also serve as an important bridge for students into the professional field.

The engineering courses are taken by the students in their third year and at the master’s level. They are often elective courses with the student numbers ranging from around 10-25. In these courses the teachers are teaching their field of expertise where their research is located. Students have by now mastered the necessary foundation in engineering and are deemed ready to work closer to and sometimes at the side of their masters. This new stage is emphasised in the location of the students who are now given classrooms to work in across the hallway from teachers’ offices so they can easily confer with their teachers. Teachers also pay visits to the students’ classroom to see how they are progressing. With a smaller student number in classes, communication becomes less formal and weaker framed and this is further stressed by social events taking place where students prepare and host a teachers’ celebration. Students at the master’s level often become teacher assistants and as such take on more the role of co-workers than students.

The basic aim of the engineering courses is to provide the students with ample opportunities to apply the skills and knowledge they have acquired in previous courses ‘and tackle the situation and analyse the problems themselves’. From the straightforward problems of the textbooks the students can no longer follow a prescribed curriculum and have to acquire data and process the information needed to solve the problem on their own. Students have to experience the unpredictable, messy situation facing engineers in real life, where information may be hard to get and solution are never clear cut. Albert refers to student thinking skills as *quagmire thinking* where there is no secure base to be found:

I don’t need the same honey, I can be more brazen there ... it not the same broadening, I am going deeper ... I call it quagmire thinking ... I have never known a real problem that fulfils all the requirements for the equation you want to use. And where all the data you need for the solution is available. I have never known that to happen in reality ... I am trying to get them into the quagmire (11:17).

This kind of thinking is best practiced and developed in application courses where the students take on projects of different kinds. The type and number of projects can vary from one course to another and from one year to another. Some projects may be strongly structured by the teacher but in others the students are given more freedom and responsibility. Gunnar finds it an important learning task to have his students figure out their own projects as that requires them to apply their analytical skills in developing the project from the start:

I always have them go out themselves and find their own project ... I say to them: Just go and find your own projects to work on, I will hold your hand, you show me your idea and I will possibly guide you elsewhere or find a new approach if this one doesn't work. And then they go out to the companies to talk to people ... (Why do you find this important?) ... I just find it important that we are not putting a list of problems in front of them and then their task is just to select from it ... because there is a great difference in getting an assignment where you do your calculations and solve it or to really go into the company and try to figure out the problem and be good enough in the methodology as to be able to solve it (9:15).

Moving from the 'treadmill' of basic engineering courses to the 'real' courses is not always an easy transition for students. Some of the teachers find the students lacking the integrity to handle the weakening of framing and are quite frustrated with their lack of responsibility:

I think – Hey – where is the initiative ... I don't think those kids should be fed. Because they do need to show some initiative. I want them to show initiative. It is difficult to find the balance and sometimes it just doesn't work ... I tell them: You are in the master's programme! This is what it is all about (4:33).

Teachers also need to deal with student's procrastination. A common method is to have them hand in progress reports and Thorvald describes how he makes use of task meetings rather than lectures where the students enter a meeting room and the meeting is run in similar fashion as could be found in a regular engineering company. Each student states the status and the progress of his or her project and the group brainstorms over new methods or possibilities if needed (10:5).

In the projects practicality is stressed and Thorvald describes how he encourages his students to look at their own environment and come up with ideas of design that could be of actual use. At the end of the course, the students present their project in a

presentation that often also serves as an oral test where they are questioned about the project by the teacher and sometimes an external moderator. Sometimes the presentations take place within the establishments that provided the issues for the projects and the master's projects' are publicly presented.

The teachers are quite proud of the students' projects and their quality. They are seen as good enough for research or conference papers and some have made it into the engineering yearbook while others have been of interest to the national media. Yet the value of the projects in the course grade is debatable. Some of the teachers see them as good quality indicators showing how well students can integrate knowledge and skills from the course into their work. Lara feels they should weigh quite heavily in the final grade and Thorvald thinks they provide a much better measurement of students' skills than a written final test:

I have always been considering, should I have a final test? Do I need a test to assess if the student can really tackle the task or not ... And [in the projects] I think I have a good indication of students' knowledge (11:38).

Ingvar, on the other hand, points out that this increased emphasis on large projects needs to be considered carefully. As there are no strict rules on the provision of external moderators within the department, the judgmental responsibility is totally in the hands of the teacher which he can see as creating danger.

Assessment: From problems to projects

The changing framing of the instructional discourse is quite evident in the different type of assessment used to assess how well the students have acquired the necessary realisation rules. In the basic courses where students are expected to 'work on the treadmill', the students receive constant feedback on their progress through their weekly problems. Those assignments never count for more than 30% with the final test counting up to 85% of the final grade. Ingvar relates this assessment methods to the American model and claims that over there [in US] assessment may be more distributed and formative, but here the Faculty Council has a rigid rule about how large a proportion of a course final grade can be made up by other assignments and tests. This is seen as a precaution against students cheating (6:25-26). The rules are

though becoming formally less rigid, leaving it more to the teachers to design their own assessment schemes.

The student's weekly problems are seen as a way of giving them practice to acquire the necessary skills and knowledge or practice the recognition rules that they will be asked to demonstrate or realise in the final test of the course. Students are made aware of what is expected of them by detailed syllabuses and usually they have access to previous tests and the weekly problems are made to resemble test items.

Designing the final tests the teachers try to be fair but some of them admit that they like to come up with trick questions that will demonstrate students' real understanding of the subject. Johann does this by designing problems that the students can solve quickly if they realise or can visualise the solution but can also solve with the 'bulldozer method', i.e. a method by which it takes a much longer time to solve the problem (20:23).

To help his students, Albert designs his test items in multiple segments. He finds it more honest to split them up into segments so if the student gives up on the way he can clearly see what the student is able to do and the student has the possibility to get going again. This attitude is also stressed directly to the students:

What I try to tell them over and over again is that what I look for in a test solution is not what they **don't know**, but what they do know. They draw on this and try to answer as much as possible (11:13).

The weekly problems Ingvar gives to his students to solve are similar to those on the final test. He admits that he finds it quite difficult to write the test items. He uses real pictures and images while the textbooks tend to provide simplified or schematic ones and the transition from a schematic textbook image to a picture of a real object often tends to cause problems for the students (6: 30-31). The difficulties students encounter in dealing with a new way of thinking often results in them doing very poorly on the first test but Ingvar, claiming he has become milder in the later years, allows students to try to do better in the next test and discounts the first one (13:15).

In the 'real' engineering courses as well as at the master's level the students' projects not only provide the students with the experience of working as engineers but also serve as stepping stones into the actual field. Very often the projects are either

defined or provided by companies in the field and at the master's level companies have been known to award financial support to the students working on them. A final presentation of a project often takes place in the respective company and solutions may actually be implemented. The strong relations to the professional field gained through the projects are highly valued by the students who are not only said to appreciate that they are dealing with 'real' problems but see this as an important means of becoming known to professionals in the field which in turn may be useful for their future careers.

Providing students with this opportunity to work in the field seems to be relatively unproblematic and Gunnar claims that the small size of Icelandic society makes it a much easier task for the teachers than for their colleagues abroad. The size of the society makes it quite easy for teachers and students to get in contact with establishments within the vocational field and provide the students with the essential experience that cannot be granted differently:

It is much easier for us to get some realistic or real projects for our students from the professional field. You only have to pick up the phone and call someone. Possibly a partner in Bridge ... [Doing the projects] is one of the important things in engineering. There would be little use of us teaching them by the book. They would hardly be prepared to take on and solve some projects in the field (9:15).

The vocational field is often run by former students holding high positions within institutions and companies. This creates a network that makes it easier to gain access for their students and their projects. The network is built on previous experiences of relations between teachers and students who 'carry with them good memories from [the department]' (20:11).

4.5 Curriculum development

4.5.1 Introduction

In the previous sections the formal curriculum and teachers conceptions of the pedagogic discourse of mechanical and industrial engineering have been described. The regulative discourse has been demonstrated through the teachers' ideas of the aims and goals of the discipline and through students' and teachers' identities. The instructional discourse has been traced through students' and teachers' social relationships and the degree of framing characterising different type of courses.

My second research question relates to the stability of the pedagogic discourse, i.e. what forces affect the pedagogic discourse of mechanical and industrial engineering, either to strengthen or weaken it and how do teachers experience their power and space with regards to curriculum development?

As teachers are seen as the main bearers of formal as well as informal responsibility of curriculum development, the focus will first be on their influence on the pedagogic discourse before turning the attention to other forces affecting curriculum development.

Teachers as curriculum developers

As former students in engineering programmes of different universities, the teachers have been initiated into the culture of their discipline through its regulative and instructional discourse (Bernstein, 1990; Northedge, 2003a) and it has had a prominent influence on their professional theories (Handal & Lauvås, 1990) as well as their curriculum ideas. The teachers refer to their previous experience in multiple ways and on various occasions as when Ingvar bluntly states: 'I think I teach in a similar way as I have been taught' (6:19). The pedagogic discourses the teachers carry with them may collide when it comes to making decisions regarding the curriculum structure or the direction of the programme, issues that lie at the heart of the discipline's regulative discourse. Ingvar, in this rather lengthy excerpt, manages to put into clear words the formation of pedagogic discourse on teachers' minds and attitudes toward the teaching of their discipline, metaphorically describing the teachers as created by different gods (i.e. universities):

It surprises me more and more how those years you spent in graduate school ... from 25 to 30 or there about ... somewhere around the age of 25, how really formative they are in this regard.

G: What do you mean? What opinion you have? ... /

My opinion on the structure of the programme and how things are suppose to be. And when people say: Well in America it is like this – it really should be read: In my school in America.

G: Yes and there is a difference between ... /

And there is a difference between schools. So it's not only that people are comparing themselves to each continent but comparing themselves between schools within the States.

G: And stick to?

And stick to what it was like in my school

G: Because they are coloured by ...?

Yes, because it has somehow put its mark upon you...you are stuck on it being the only right thing

G: Which complicates the discussion a bit?

Yes ... God created man in his image and it can't be expected that we do otherwise

G: No, and in other word, so many have started to create man and that makes many Gods?

Then you have too many Gods and that's the problem (6: 28-29).

Not only are the teachers brought up within different pedagogic discourses but the participants, in their narratives, each speak from their unique experiences and views, reflecting different professional theories. Teachers' professional theories can be seen reflected at various levels within the curriculum development. The *American versus the European conflict* discussed earlier is, for example, an expression of teachers' deeply rooted ideas about the essence of their discipline that looms underneath in the department's curriculum discussions and debates.

Discussing their ideas of designing courses, planning students' learning tasks and assessment, methods of teaching and attitudes towards students, the teachers are exposing their professional theories. Such theories are self descriptions and it is not the aim of this study to explore or verify if or how they are put into actions. Some of the teachers are quite aware of the distinction between exposed ideas and actions. After describing his idea of teaching, Ingvar contemplates: 'I think I am actually talking in contravention of what I really do' (6:15). Teachers' professional theories can be seen in Lara's emphasis on students' vocational experience and her attempts to help students physically experience and feel the material she is teaching. Or they can be experienced in Gunnar's emphasis on the importance of mutual trust between the teacher and his or her students. They can also be felt in Albert's insistence on

professional integrity which he claims arises from his experience in Germany at politically historical times. Albert, quite aware of his hidden curriculum agendas, refers to the hidden curriculum as *Leitmotif*:

They are called Leitmotif by Wagner. Yes, by Wagner. If you listen to operas by Wagner, there is always a Leitmotif underlying the whole opera (12:18).

How do teachers go about making their curriculum decisions? Where do their ideas about the pedagogical practice arrive? As none of the teachers participating in the study has received any formal pedagogical training, their experience as learners and teachers is their main source of curriculum ideas. Lara is the youngest teacher of my participants, starting her third year of teaching when the interview took place. She describes her experience as a total novice slowly gaining more experience and taking more risks when developing her courses:

You see when you start teaching for the first time you have to have a bit of ... a model to follow. One is not confident enough to incorporate [into the course] your own things you feel you can transmit. That comes later. I find that I am getting a bit more relaxed, you know, more confident. Then you can start to impart more from yourself. One can start to change a bit from this predominant way.

G: Do you feel you dare to be more yourself?

Yes, and you know you might think: it would be nifty to have this and then you don't see it as a risk anymore. Because you know when you are teaching for the first time you want to be sure that they are definitely learning the basics. And you don't want to ... you know it is often a bit of an experiment of what works and what doesn't (4:28-29).

Lara has no problem articulating the sources of her curriculum ideas. In the following quote she stresses various sources for her curriculum development:

Nobody controls what I put into my courses ... But of course I have my models. I am not inventing this myself. These are all courses I have taken myself. And I have as a model the teacher who taught the course before me...I also build my course much on the course I took in my study... I learned from her [her former teacher] a lot ... and I have been in touch with her. But now there is so much on the Internet so I know precisely how she structures her course ... I also talked to my friends that are academics and that have taught that course and asked them what textbooks they were using (4:22-23).

Courses are structured and designed upon the work of a predecessor teaching the course and on the teachers' own experience of taking the course as a part of their study. Former teachers can be used as role models and even contacted for assistance and advice. The Internet is often mentioned as teachers look at the websites of prominent universities in search of ideas and validation of own practice. Research leaves taken abroad provide teachers with opportunities to get new ideas and some of the teachers have tried their hand in teaching on those occasions. Visiting academics have also been influential as in the case of Thorvald who observed a guest teacher teach his course. The teacher, emphasising different approaches in teaching, has influenced Thorvald's ideas even though he did not find his approach fitting his own professional theory:

I really enjoyed watching this [the course] and actually watched him while he was teaching the course, actually he was teaching me too. And there were many things that I found excellent but I think it might be a bit a question about characters. I tend to like to have things more organised and I felt it was all a bit loose but it was clear that many students really liked it (11:7-8).

Despite long experiences of teaching, none of teachers has received any formal training in teaching. Many of the teachers mention previous teachers as role models for their way of teaching or for interacting with students and Thorvald speculates if this may be due to the lack of teaching skills:

You see because one hasn't learnt how to teach I think I might have chosen certain [previous] teachers as role models, indirectly, and adhered to their ways of teaching (10:12)

Finding space within curriculum development

In the account of the pedagogic discourse of the mechanical and industrial engineering, the teachers' various curriculum decisions have been described. Within the strict framework of the basic engineering courses and the less framed structure of the engineering courses, teachers do enjoy agency and power in the curriculum development. This agency and power may be at times not be appreciated by teachers, felt more restricted at some levels than others and even not consciously experienced. Within the boundaries of the pedagogic discourse of their discipline the teachers do have some space for their personal and professional theories. The teachers' different

professional theories can be identified in their curriculum decisions involving tasks such as selecting a textbook for the course, making decisions about the number of problems or projects for students to solve and writing them out, finding ways to engage and evoke student's interest during lectures and making assessment criteria.

As has been explored earlier, the classification of the curriculum and the framing of the instructional discourse are very strong in the service courses and the basic engineering courses. In those courses the teachers describe the same instructional praxis that is rarely questioned. The courses, the knowledge selected and the instructional methods are frequently described as 'standard'. By *standard* the teachers are referring to courses that are taught in a similar fashion all over the world:

You can find similar courses in other universities. That's what I mean by standard. There is nothing unique in that sense. Nothing that is built on a specific Icelandic situation ... Like in this course ... you have *Analysis* one, two, three, it continues on and on, increasing the theoretical part but none the less rather standard. You can find the same course in other universities – even though this is very theoretical; the textbooks are more and less the same (13:3).

Classical refers to the long lifetime of the courses which means that the teachers have more or less experienced themselves as students:

I am teaching one of those courses [classical] that I took myself here for about 20 years ago. Basically the course is the same aside from new software that allows for more flexibility (20:16).

The standardisation of the courses reassures the teacher that they are indeed teaching the subject in a similar manner as other teachers in the world and to the same quality standards as is the case in other international universities. But it also ensures that the teachers know exactly what knowledge and skills their students have mastered in the course preceding theirs, an important factor within the hierarchical curriculum. The standardisation of the course makes it easy to keep some kind of continuity as students go further. All the teachers that teach similar courses in the next year know what texts students have been dealing with and therefore know what to expect (13:29).

This 'standard' instructional discourse is hardly ever abandoned although Ingvar claims the standardisation only refers to the content and not to the teaching methods or students' learning tasks, as those can be varied within the framework or the boundaries of the course:

Well you can change the methods of teaching infinitely but the content as such is very standard

G: You say you **can** change the teaching methods?

Yes you know, should we have math problems, should there be reports, should there be discussion groups, should there be cooperative groups or individual tasks.

G: And when you make those decisions – what affects them?

I don't know, what you feel or what you see as essential (6:23).

Indeed, Gunnar describes for me his attempt to change the structure of his course by lessening the number of tutorials and instead having the students hand in their problems to be read and graded and the right solution posted on the web. This means that framing has been weakened but as a counterbalance, students are offered increased office hours and Gunnar takes the time in class to emphasise to students their need to take responsibility for their own learning, especially as they have now taken the big leap from secondary school to university. Although some students respond badly to weaker framing, Gunnar says that this course is one of a few in the first year that is not used to eliminate students from the programme which may explain the freedom to weaken the framing. He thinks the students experience a feeling of relief escaping the stressful situation (in other courses) and instead enjoy dealing with the subject (14:21).

Designing the 'real' engineering courses, teachers enjoy a much greater freedom than when teaching the basic engineering ones. Thorvald explains it as working within a certain framework where the boundaries are the credits assigned to the course and student work load, but within that frame he has the freedom to make changes:

There is a certain frame we have. I know approximately how much burden I can put on students within this frame. Then I know which projects I can include. Sometimes I have a few problems and one big design project. Or I might have three smaller design projects. It

depends a bit on the material I cover but the quantity of work is based on experience (10:15).

Within the formal framework the teacher has some scope to make his own curriculum decisions both in regard to content and students' learning tasks. In some of the interviews the teachers were given the opportunity to select a course they wanted to discuss. Aside from the department head, who only taught one course, the others all selected 'real' engineering courses. Albert elected two courses, one basic and the other engineering so as to help me understand the differences between them. This indicated to me the teachers' feeling of ownership of specific courses, but also the scope of freedom that made them want to share with me the range and application of their different educational ideas. They also seemed to want to make use of a rare opportunity to express and discuss their ideas and sometimes worries about their curriculum decisions:

You see, this is kind of fun ... once in a while someone like you arrives to shake one up but the thing is that one gives much too little thought to teaching and teaching methods (9:32).

Within the engineering courses more space is opened up for personal as well as professional teaching ideologies or theories. There the teachers had experimented with instructional methods and activities and described attempts such as coordinating courses with teachers in the Department of Business, dividing courses into smaller modules, stressing students' presentation skills, using case methods and cooperating with designers and artists.

As the courses are no longer seen as *standard* or *classical*, selecting the course content and focus becomes an opportunity to adjust the curriculum to teachers' research interests, to the need of the vocational field or the uniqueness of the Icelandic society and its industry. Gunnar explains how he goes about making his decisions on what issues to cover:

I have five or six universities in the US and Canada as a comparison. You look at which courses they are teaching there and so on. But then there is always something that has to do with the uniqueness here. You do take into account that here there is no car industry but rather something else.

G. So you are preparing them for the vocational field here rather than elsewhere?

There is at least very little in the curriculum about forestry [laughs out loud] (9:26).

Teachers look for a good textbook for their courses but often they serve more as supplementary than providing the foundation for the course. In other instances providing reading material is more difficult:

It is much more complicated like in the master's course ... because there I am teaching my research area and there is no textbook available and I am distributing articles to them [the students] and assigning them problems (2:10).

In a sense the curriculum decision making has been moved from the publishing companies to the teachers as will be discussed later. The freedom to make curriculum decisions also extends to instructional methods. In selecting the students' learning the teacher can make a good mixture by blending design projects and small maths problems in various degrees depending on the issues to be covered. The amount of students' tasks is evaluated by the teachers' experience.

If the number of students selecting courses goes below a certain minimum set forward in the rules and regulations of the faculty, the course cannot be taught in a regular manner. Nevertheless the course can, if accepted by the department, be taught as a *reading course*. This means that the students, usually about 2-6, are grouped together in a tutorial like course. Textbooks are rarely provided but reading material is gathered from different sources, often by the students who then take responsibility for giving lectures to their fellow students. The teachers' role is more to assist the students preparing their lectures and posing questions during them (20:17). The department's budget allows for a few reading courses every semester though they have to be discussed and formally accepted at the departmental level (26:8).

Pedagogic Recontextualising Field

According to Bernstein, the pedagogic discourse is constructed in the Recontextualising Field where two subfields, the Official Recontextualising Field (ORF) and the Pedagogic Recontextualising Field (PRF), struggle over the pedagogic discourse and its practices. As has been discussed (see Chapter 1), the State has little

direct influence over the curriculum of the University although it has a strong influence through its financial provision. Within the Pedagogic Recontextualising Field, different pedagogic agents struggle over the pedagogic discourse (Bernstein, 1990). Within the pedagogic discourse of mechanical and industrial engineering, there are clear signs of the PRF's influence on the curriculum. Most clearly these 'external' curriculum influences can be seen in the impact of the textbook publishing houses on the pedagogic discourse and teachers' conceptions of the discourse of 'good teaching'.

Textbooks

The textbook is a central issue in the standardisation of the basic engineering courses and serves as the vehicle for the mobilisation of students into practice (Nespor, 1994, pp.54-55). In the interviews some of the teachers pull out massive textbooks when asked to explain how they go about making curriculum decisions. As Ingvar explains, the textbook takes away all complications over what and how to teach a course:

The subject is very plain and it is taught in a similar manner all over the world. So it is no big issue to decide how it should be taught and what. ... You might have to select a textbook, you rotate it, mostly for oneself when you become tired of teaching in the same way ... so you don't fall asleep (6:23).

Since the textbook is such a key element in the course development, it would be interesting to try to understand how a teacher might select a textbook for his students. The textbook not only provides the structure of the course but the content, the problems students are meant to solve, the methods and visual aids they have to support their learning.

Ingvar (and this is true for others too) claims that there is no difference between the textbooks, they are published for an international market and are more or less the same. He emphasises this with his little story:

I taught the 5th edition last year and ordered a new one and according to the Student Book Shop this was the only edition available. Then it turned out that there was a 6th edition ... it was quite similar to the previous one but with a few extra problems. But enough so everybody had to get the new one ... and the kids were worried as some had already bought the older edition. I told them it didn't matter as I was still teaching the 3rd edition anyway (13:6).

Yet later, when asked why he has opted for this textbook, he finds it difficult to answer. At the time he selected the textbook it was in its 3rd edition which he saw as an indication of its quality. He has occasionally made changes and taught other textbooks and mentions British ones. But those tend to be differently organised, not as heavy on the text and thinner with a slightly different focus. There might be a bit more emphasis on computer problems while the one he is using is more focused on doing math by hand ‘but for some reason, I keep falling back on this one’. Further probing reveals that this focus is a one he finds more suitable for students in their 1st year (13:8). Albert, on the other hand, looks for a textbook that he sees as pedagogically focused or student friendly, which means that they have been set up to provide the student with step by step guidance through the material:

A book like this [holds up a thick textbook] is something you might read at the speed of a paperback ... a good student reads this book for the first time at about 40-60 pages an hour

G: Yes, because it is a kind of a student friendly book?

A student friendly book. It starts by dead simplifying the whole stuff into total basics that can be understood as you read on. And they load you with more and more complex items and the simplifications are recanted and the case made more and more complex, page by page. The result is a book that is over eleven hundred pages

G: Oh, it looks a bit terrifying.

Yes and an extreme number of calculated page problems, so this is a book you can plainly sit down and read (1:8-9).

Lara also uses the textbook as a validation that she is designing her courses in the same way as others in the world. Using a widely known and much published textbook then becomes a type of quality assurance, guaranteeing the quality of the curriculum knowledge and its global comparability.

Many of the teachers state the need to make changes in the textbook used from time to time. This is seen as a professional act to help the teacher to avoid getting bored and stagnated in teaching. A new textbook requires the teacher to refresh his teaching notes and create new problems for the students. A new textbook is not necessarily a better one ‘but of course it is very good if you can persuade yourself that you found a

better book' (9:11) says Gunnar and adds that students don't like the change as they have to finance the cost of the new book (9:11).

The textbooks do not only control the content of the course (what is taught) and the sequence (what comes first, what comes next), their influence can also be felt on students' learning. Ingvar explains how the strong structure of the textbook, where problems are related to specific sections, does not prepare them to identify and analyse new problems posed for them in the final tests. Unable to transfer their textbook learning into new and unknown situations the students find the assessment unfair (13:8).

It seems obvious that the publishing houses are quite influential in the recontextualisation of the disciplinary subject taught in the basic engineering courses and their control of the learning taking place is increasing. The teachers assert that the publishing houses are now putting less effort into updating and revising textbooks but more effort into making support material for the teachers and the students. Gunnar explains this situation:

The textbook publishers are increasing their service enormously ... there are Excel sheets that are included, there are Power Point overheads, there is ... you name it! There are CDs with maybe short videos about something that is happening in the firms and is relevant to the topic ... (14:23-24).

He admits that this is very helpful for the teachers and students although he is not sure how much use both parties make of the resources available. And he confesses that all this support material possibly makes teachers reluctant to make changes within the curriculum.

The 'good teacher' discourse

Quite often in the interviews, the teachers refer to 'the right way of teaching' or their inability to teach in 'the right way'. I regard these statements as teachers' reactions towards my role as a director for the Centre for Teaching and an expert in pedagogy. It seems clear that the teachers are, at the same time, measuring their teaching against some discursive ideal of good practice, a practice that especially values the use of Power Point presentations. Aside from assigning problems the main teaching method

teachers discuss is lecturing where the use of Power Point programme is experienced as an institutional or even an international obligation that not all teachers are at ease with. Some teachers take their dislike and reluctance using the Power Point programme as a measure of a lack of teaching expertise. In the interview Thorvald confesses more than once his insecurity of not doing 'the right thing' in teaching:

There is one thing I have to ask you about ... and that is ... what I like best is to use the blackboard and write and talk around my writing. I kind of use the overheads but I do not base my lectures on them and ... doesn't this make me old fashioned? (11:40).

Yet, the Power Point overheads are sometimes seen to interfere with the dialogue and connections between the teacher and the students, keeping the students in more passive role:

Very often there is an incident where you have some discussion and then I can take an example to explain. But on the other hand I feel that when I use the overheads I don't get as much discussion and participation (11:41).

Other teachers find it helpful for themselves and their students to post their overheads and notes on-line although their use in the lecture may still be seen restricting. The blackboard is used to draw pictures and explain processes and mechanisms and in those instances, prepared overheads don't seem to be sufficient. Yet, detailed pictures are difficult to draw and there the overheads come in handy:

They get the overheads before class. But the overheads are not always fully developed because I feel ... I use them in the teaching. I write on them. But it is a lot of pictures and I am lousy at drawing so it would take all my time to draw all those crystals and atoms and all that. So in that subject it is very helpful to use the overheads. I almost teach solely with the overheads using the blackboard for explanations if I need to write something more or draw up extra explanatory pictures (4:24).

Other curriculum change forces

The curriculum and the pedagogic discourse of mechanical and industrial engineering have developed from its establishment in 1972. Like other disciplines within the University the engineering curriculum has undergone structural and institutional changes where it has been seen as necessary to follow international developments in order to strengthen the status of the University. The change from a

one cycle to a two cycle programme and the establishment of a master's programme are examples of such transitions.

The incorporation of industrial engineering in 1994 is an instance of formal curriculum development at the disciplinary level (Becher & Barnett, 1999). This curriculum transition seems to have taken place without any resistance or opposition which may be explained by the study line's popularity and the weak classification between the two lines of study. As Helgi points out, the curriculum programme in mechanical engineering had been planned with a broad focus from the very beginning and included some elements of industrial engineering. The formal structures of the two lines are very much aligned and students can graduate from either line or from the two lines combined, depending on their choice of elective courses. The incorporation of the new line of study has therefore not required any major changes in the curriculum. Some adoptions have been made and courses have been merged with a new focus:

The basic course in thermodynamics ... was way too theoretical for the industrial engineers. It is ridiculous to have [them] take physical thermodynamics as a foundation that they will never build up on. So the resolution was to go over the sphere, take those four courses, pick out of them the practical aspect, those things that they need to know and understand and then I am trying quite a lot to connect those thermodynamical principles to the world of money and the IT field so they will get to see that the first law of thermodynamics is in plain language: You get nothing for nothing and very little for six pence (12:5-6).

As has been discussed above, teachers experience the basic engineering courses as classical and more than one teacher mentioned that these courses had barely changed since they had experienced them as students themselves. Discussing the 'real' engineering courses, teachers often mention curriculum changes made because of new knowledge and skills within the field. They refer to introducing new research to students, incorporating new standards used in the vocational field and even new approaches used in the field which can, as is the case with Thorvald, cause some problems in teaching even though this is an approach he has incorporated both into his work and research:

This is a bit new ... well this a totally new approach in modelling and it is often most difficult when you are introducing a new approach when

you have to rethink everything ... and possibly also one hasn't figured out the right method to teach it (11:30).

In a department meeting in December 2006, one of the teachers brought a new course up for discussion. This course, he claimed, was a subject or an approach that was being incorporated into the engineering curriculum all over the world. The following quote from my field notes explains how the teacher tries to persuade his colleagues of the importance and value of the new subject and how they, after some pondering and several attempts to fit this new knowledge into the existing pedagogic discourse, decide to make it a part of their discipline:

We are caught up in our own world

How do new courses get introduced into the programme? In the meeting, Gisli, a relatively new teacher in the department, introduces a new course he wants to incorporate into the programme. Explaining its importance he tells his colleagues that the course is taught at MIT and all around the world. This is an interdisciplinary course he is designing with a teacher who is (I think) in Biology. He thinks the course should be at a master's level but open to students from different disciplines. He suggests a name for the course but the department does not find it quite fitting and in the discussion that follows they make various suggestions. It is clear that by coming up with names they are at the same time trying mentally to understand the essential of the course and come to terms with what it is all about. Gisli nods or shakes his head and tries to explain the true nature of the course. Someone claims: We are caught up in our own world!, referring to their difficulties in incorporating something new and different into the curriculum. They figure out obvious overlaps between the new course and other courses in the programme, trying to place it within familiar contexts and further their understanding of the new topic. But at the same time I feel that they are making the strange familiar. Trying to place a new piece of knowledge and skills into their own context, adding to it a new dimension. Someone stresses the relation of the topic to Economics but another states: No, this is our way of thinking.

By the end of the discussion the department seems to have adopted the new field and figured out that after all it fits well into their way of knowing and thinking and that it can be approached from many different angles already used in other courses. Gisli wants to keep the course open and does not want to make any engineering courses as prerequisite as that would make it difficult for students from other disciplines to attend it. The final blessing comes when it is suggested that those teachers teaching (what is now seen as) related courses will visit the new course and give lectures that stress the relations (26:9).

The cultural context of Iceland

As has been described earlier, the rationale for the establishment of the engineering programme in Iceland was the need of a fast developing society for expertise in the disciplinary area. As an applied science, mechanical and industrial engineering can be expected to be related to its vocational field. From a socio-cultural perspective I find it interesting to explore if and how the cultural context of the discipline in a specific society is seen by the teacher to influence the curriculum construction and development.

In the study, I was given many examples of how curriculum development is related to the Icelandic context. From the very formation of the programme, Helgi gives an example how he, as the programme's only teacher, attempts to adapt the curriculum that he has experienced himself abroad to the needs of the Icelandic economy:

So I just took *Thermodynamics 1* and *Thermodynamics 2* and kept them unchanged but made the courses more practical and started early on to teach geo-thermodynamics and fishing or marine engineering techniques. Those, of course, were very practical disciplines for Iceland (25:15).

As has been described earlier, the curriculum programme of mechanical and industrial engineering consists of two different types of engineering courses, i.e. the basic ones often referred to by the teachers as the *classical* and *standard* and the 'real' engineering courses at the upper level of the programme. Clearly, the basic courses are rarely seen as providing much flexibility for adjustment to the needs of the Icelandic society, although the teachers will often refer to their own experience in the vocational field to acclaim their practical knowledge, enrich their teaching and aid students' interest and understanding of the subject. The teachers may also provide contextual knowledge related to the subject:

So I add to it from home [something related to home] and then I try to make use of my own experience. One's own experience is always present, you know. From the engineering firm. What will they need to know in [this subject] when they start working in the firm. So I introduce the European standards (4:24).

The 'real' engineering courses have a much weaker framing than the basic ones and there the teachers and the department enjoy more autonomy. For some of the

teachers the Icelandic economy should simply be the main focus in the curriculum development. Albert holds strong views on this subject:

And no matter how we look at it, if we are going to be doing something reasonable in science oriented education here, it is quite clear we will never compete with MIT in status except in geothermal heat and fish ... I would think for the faculty as such, ok I will broaden this and include civil engineering and say: Geothermal heat – fish- earthquakes (knocks on the table emphasising each word). Finido. In other fields we don't stand a chance (12:34).

Other teachers may not hold such a strong view but in designing their courses at the engineering level they frequently make use of their own research and vocational experience within the field. Within the courses students work on projects within the vocational field which bring them right into close relations with their future place of working.

The influence of the vocational field

With mechanical and industrial engineering being an applied discipline, the relationship between the discipline and its vocational field is of great significance. As discussed above, the teachers in the department experience good informal relations with the vocational field. The small size of Icelandic society and the close network of previous students in the programme make it easy for teachers to help their students to enter the field via their projects. Teachers frequently carry out research and work with different enterprises in the vocational field and some like Thorvald, teach courses in the Institute for Continuing Education where he finds the encounters with engineers in the field informative:

I have given some continuous professional development courses which have been attended by engineers from the field and there I have felt what they want ... and the actual reason for giving the courses is to connect to those engineers (11:39).

But how influential is the vocational field when it comes to curriculum development of the engineering programme? In the early start of the programme the Association of Chartered Engineers in Iceland (ACEI) was very influential in the curriculum development and today they hold the responsibility on behalf of the Ministry of Industry to award the professional title of engineering (Iðnaðarráðuneytið og

Verkfræðingafélag Íslands, 1992). Today the department head meets with the chairman of board and the chief executive officer of ACEI three or four times a year for discussions and the ACEI requests to have a representative of the University on the board and within its educational committee. Suggestions for new degrees are sent to the board, but more for information than approval, states the department's head, who then adds:

Our relationship is based on respect and trust – as would the relationship between middle age couples (30:2).

At my first meeting in the department three so-called adjuncts were present and participating. At that time five adjunct posts were awarded within the department to specialists within the field. The adjuncts were appointed for three years and attended department meetings where they had the right to vote. The adjuncts entered courses in their specialist area and sometimes taught their own courses. They were not seen as part-time teachers and did not hold any administrative roles but were seen as creating a connection between the engineering field and the discipline. At the meeting, the adjuncts actively participated in the discussion and voiced their opinions on assorted issues on the agenda. At some point, in a discussion on the need and practicality of a hands-on workshop for students, one of the adjuncts claimed that the curriculum for students did not reflect the skills and knowledge needed in the field, a statement that was responded to in a rather passionately by Lara wanting to stress the department's lack of resources:

[The adjunct] points out that there are only two courses that don't cover very much and possibly not what is most important to know. In the engineering companies much of this is done by computers. Now the students don't get to try those new tools and only see pictures of them instead of learning how to use them.

Lara responds right away and says: Must be allowed to answer this. Of course the courses are supposed to focus on **using** the tools not only looking at them in pictures but we just don't have any tools! (1:23).

At a meeting in November 2002, discussing the department's mission and vision, the only participating adjunct interrupts the teacher's presentation with remarks that I find quite blunt. Discussing the aims of the programme he claims:

Possibly you are teaching something that is not needed? You might be teaching something you like to teach rather than what the vocational field needs (7:16).

Later in the same meeting the adjunct states his doubts about the teacher's knowledge of the vocational field:

The adjunct claims calmly that the relationship towards the vocational field needs to be inspected and adds: But you are just not in the clear. You don't know what is happening in the vocational field (7:19).

Neither of those remarks is responded to by the teachers who continue with their presentations.

During the first meeting I attended, the adjuncts' role was discussed and new ideas voiced. It was claimed that the adjuncts' role in the meetings was unclear and in a sense it was unfair for them to have to participate in meetings dealing with the run of the mill matters and that the relationship between the department and the field was already established through students' projects. It would be more productive to have a group of advisors from the field that would meet twice a year for discussion (1:19-21). In a meeting in December 2006 I discovered that for the last couple of years adjuncts had not been appointed by the department as the old system was seen as difficult and unproductive. Adjuncts, I was told, became tired of sitting in on department meetings where diverse issues were being discussed (26:15-16).

The department's relation to the vocational field may be described as ambivalent. In a sense the teachers are well connected to the field through students' projects and their own research. Some of them, like Lara, are very conscious about their aims of teaching as partially being the preparation of their students for the vocational field even:

This is the way I see the teaching. We are preparing the students for the engineering field here in Iceland. We are preparing the students for further studies here and abroad. You know, we are preparing them in such a way that they can learn theoretically and go on into the master's or doctoral studies. Here or there. But, we also have to keep in mind ... I see it as a part of our ... I also see it as my role to serve the economy. We are graduating people that are able to go to work. For people out there (4:50).

Yet, direct influence of the vocational field on the curriculum development is limited and seems to, if anything, be becoming less. This development is, as pointed out by Ingvar, in opposition with the international trend in engineering that is reflected in different approaches of accrediting bodies such as ABET (the Accrediting Board for Engineering and Technology). According to Ingvar the focus of the accreditation process has now moved from looking into curricular issues such as the methods of teaching and students' learning to be solely on the competence of the students within the workforce:

They totally changed the direction and started to look at the production, how functional is it. It no longer makes any difference how you go about producing or the method of producing, just how the production functions. And here I am referring to students as products (13:40).

When asked if this turn of focus towards performativity does not call for better responsiveness from agents within the Icelandic vocational field, Ingvar doubts their ability to give constructive feedback to the department. He claims their criticism is mostly based on their own experience during their time as students within the department rather than focusing on the skills and knowledge of the graduates (13:40-41). This attitude possibly explains the department's discharge of adjuncts from the vocational field.

Summary: The pedagogic discourse of engineering

The curriculum structure of engineering is a combination of strongly classified singular subjects such as math and physics and the more regional engineering discipline. The vertical knowledge structure of engineering gives rise to an integrated code curriculum that has a hierarchical knowledge structure. This is a curriculum structure that Henkel and Kogan call the directed curriculum (Henkel & Kogan, 1999). Students in the department move systematically through a rather strongly framed undergraduate curriculum within which they are given some opportunity to make interdisciplinary choices.

The discipline has from its establishment had a regional focus towards the vocational field. The interrelation between the vocational field and the discipline is established through teachers' research and students' projects but direct influence of the vocational field on the curriculum development is limited and is becoming less. The

University's research mission is seen to be moving or forcing the discipline towards a more singular mode of being, i.e. more academic.

The classification of the undergraduate programme is especially strong within 'basic engineering courses' provided by other disciplines. In those courses, international textbooks provide a very strong external framing of knowledge seen as 'standard' and 'classical' (Bernstein, 2000, p. 23 Note 3). The knowledge is determined by global tradition and publishing houses.

As students progress further into 'real' engineering courses there is a shift in the framing of the engineering curriculum. The course content ceases to be 'standard' and 'classical' and in the selection of knowledge (the course content) more local aspects such as teachers' research areas and interests, and/or the felt needs of the vocational field are taken into account. Textbooks become more supplementary to other texts selected by teachers. The framing of the content of the real engineering courses is weaker and more local than of the basic courses, i.e. they are rather based on teachers' interests and ideas than external agents such as textbook publishers.

The aim of the programme is to produce engineers that have the necessary knowledge base but most importantly, the skills to solve unforeseen problems. Such skills call for a certain degree of 'engineerical imprecision', i.e. the ability to act in unforeseen ways and to be creative and sedulous. The teachers see their task as preparing students for the vocational field but also to enable them to continue further academically. Within the programme, teachers overtly disagree on which curriculum aspects or perspectives should be the main focus. With the majority favouring and stressing the practicality of the discipline they find them differentiating from other departments within the engineering faculty and going against the University's strong research policy.

The students' identity moves from being strongly framed to a weaker framing. The hard working student is an example of the strong framing of student identity at most of the undergraduate level. Simultaneously the framing of student identity becomes weaker, student/teacher relationship less authoritative and good students being described as 'confident' and 'fearless'.

The instructional discourse of the basic engineering courses is strongly framed and referred to as ‘the American model’. Explained as ‘apprentice model’, the teachers model problem solving in lectures after which the students are given their own problems to solve and hand in. Despite a strong framing, the instructional discourse does allow for some variation of teaching methods and assignments, a scope the teachers use to ‘freshen up’ their teaching. The instructional discourse of the ‘real’ course has a weaker framing and teachers can experiment with various kinds of assignments and projects for students

As students progress to more advanced levels of study, the framing of the instructional discourse becomes weaker and the curriculum more regional towards the vocational field. Third year projects and master’s projects are done in close connection with the vocational field and often financially supported by agencies within the field. Students are provided spaces to work independently on their projects next to their masters.

CHAPTER 5: THE DEPARTMENT OF ANTHROPOLOGY

5.1 Introduction

The Department of Anthropology was included in the study as an example of a soft pure discipline. Within the department four teachers participated in the interviews, two of them being interviewed more than once. The first interviews were conducted in the end of 2004 after I had gathered most of the data from the Department of Mechanical and Industrial Engineering. In 2006, I again entered the department to further extend and confirm my understanding.

In the following chapter the pedagogic discourse of the anthropology curriculum and programme will be explored. The chapter consists of four main sections. Section 5.2 provides insights into the location of the department in time and space. I start by giving a short account of the historical roots of anthropology as a discipline within the University of Iceland followed by information on the department and the participants in the study. Section 5.3 describes the structure and organisation of the anthropology curriculum both in terms of its knowledge structure and the type of courses provided within the programme. In section 5.4 the focus is on the regulative discourse of the discipline which is demonstrated in the characteristics of the department; teachers' conceptions about the essentials of their discipline and its development as well as what they see as valid knowledge to be included in the curriculum of the programme. In the final section the 5.5 teachers' ideas about the instructional discourse are explored as well as the different student and teacher identities socially constructed within the discourse.

5.2 Location in time and space

5.2.1 The foundation of anthropology within the University

Anthropology is located within the Faculty of Social Sciences and became a discipline within the University around 1970. The discipline was then included in a general social science programme which encompassed anthropology, sociology and political science (Sigfúsdóttir, 1977). Whereas the establishment of mechanical and industrial engineering was seen as serving an economical need, social sciences was established as a result of student uproar and claim for more disciplines within the social sciences:

It all started in the wake of the '68 uproar. The students on campus in the fall of '69 demanded a larger menu and to have access to more disciplines including social studies or social sciences. And they succeeded! Unbelievable but within a year the programme had started (15:6).

Reflecting on the 40 year history of the subject, Arnaldur, who was among the first students of the new discipline of anthropology, states that the discipline has undergone great changes. To begin with, he claims, the emphasis was on the integration and the interdisciplinary nature of the three disciplines. Courses and research projects were interdisciplinary but as student numbers grew, the disciplines became more specific:

And the same thing happens here that the cooperation quickly diminishes and people start to strengthen their 'own' discipline within quotation marks (15:7).

In Bernstein's terminology the classification of the discipline was becoming stronger (Bernstein, 1971). Explaining the development, Arnaldur points out that as time went on the best known interdisciplinary university models (such as were found in the Scandinavian universities Tromsø and Roskilde) came under attack and university teachers within the disciplines saw their academic needs best fulfilled by strengthening their individual disciplines. Anthropology thus became a separate department in 1980.

5.2.2 Students and staff

In the autumn of 2004 the department had a staff of seven but is also affiliated with folklore studies, a disciplinary field with two academic staff. The seven members of anthropology are two full professors who have been within the department since 1982 and 1994; one associate professor since 1998; two assistant professors hired 1998 and 2001 and one just recently employed. Since 2005 one of the full professors has been on a long term leave. Part time teachers are many and vary from one semester to another.

In the year 2004–2005, 188 students were registered in the anthropology programme; 162 within the BA programme (105 females and 27 males); 19 within the master's programme (14 females and 5 males) and 7 students are presently studying at the PhD level (5 females and 2 males) (Háskóli Íslands, 2007a).

5.2.3 Participants in the study

I conducted interviews with four members of staff. The participants were *Arnaldur*, *Urdur*, *Katrin* and *Sigrun*. The participants' experience of teaching within the department varies from 3 to nearly 30 years. Three of them received their undergraduate degree within the University but their MA and PhD degrees from UK (1), US (2) and Sweden (1).

5.3 The anthropology curriculum programme

5.3.1 Introduction

Formally, the anthropology programme is located within a departmental unit called Anthropology and Folkloristics. Folklore as a discipline was established within the University in 1980 and became part of Social Science in 1980 and part of anthropology in 1996. In 1990 it became a major subject (60 credits) and in 2005 a full major subject (90 credits). Despite belonging to the same department there is not much co-operation between the two disciplines and as my research focus is first and foremost on anthropology, folklore will not be discussed further as a part of anthropology.

In the following section the formal anthropology curriculum will first be introduced and then described in terms of Bernstein's ideas of knowledge structures and framing.

5.3.2 The formal structure of the curriculum

Within the Department of Anthropology the following lines of study are provided:

- BA in anthropology as a main subject (90 and 60 credits) and anthropology as a minor subject (30 credits)
- MA in anthropology (60 credits)
- MA in developmental studies (60 credits)
- Diploma in development studies (15 credits)
- PhD in anthropology

The master's programme in anthropology was established in 1999 and the number of students in the programme is at present 20. Previously about 30 students have graduated. It is a 60 credit programme with 15 credits compulsory courses, 15 or more credit optional courses and up to a 30 credit research project. Students can also enter a PhD programme within anthropology.

Development Studies were established within the programme in 2005 when the Icelandic International Development Agency (ICEIDA) funded a post within the department. Within the programme students can take a master's degree in Development Studies and a 15 credit diploma degree within the same programme that can then be integrated into the master's programme.

The anthropology curriculum programme consists of two types of courses, i.e. compulsory courses and optional courses, all courses being 5 credits. The compulsory courses make up 45 credits within the 60 and 90 credit programme but 25 credits within the 30 credit minor. The compulsory courses are either theoretical or methodological. The theoretical courses provide introductions into the field, an overview of the history of the discipline and its major contributors and its theoretical foundations. The methodological courses are concerned with ethnography as a method.

The optional courses fall into two categories; limited optional (or restricted) and 'free' optionals. The previous ones refer to courses where students are required to elect certain numbers of courses from those provided whereas 'free' optional courses are the ones that students can then use to fill up their own curriculum according to their interest. Students within the 60 credit framework have very little freedom to choose optional courses but within 90 credits student have a larger range of options (16:7).

5.3.3 Structure and framing of the curriculum

From a theoretical point of view, anthropology has a horizontal knowledge structure which Bernstein describes as 'a series of specialised models of interrogation and criteria for the construction and circulation of texts' (Bernstein, 2000, p. 161). This structure is quite different from the hierarchical knowledge structure of mechanical and industrial engineering and is portrayed as a sum of different languages, where

each language can be a certain theoretical school or a mode of inquiry. Held together by a 'relational' idea, which in the case of the anthropology department is a strong consensus about the essence of the discipline, the curriculum is constructed by the selection of different languages, i.e. different courses that may change from time to time.

Another feature of the horizontal structure is that knowledge is often transmitted through the teachers' 'gaze', i.e. the teacher chooses the style and lens to teach through. The teachers within the department are graduates from different schools of anthropology but unlike engineering there are no continental splits within the disciplinary ideology to be found within the department. Teachers can hold perspectives or 'gazes' they find appropriate. Arnaldur claims this is due to the small size of Iceland and the fact that anthropology in the University does not have a long tradition to build upon. Even though teachers enter the department from various universities the discipline has become a 'global cocktail' and teachers arrive with their theories and paradigms from various places (15:8). These curriculum characteristics are demonstrated explicitly in teachers' curriculum development as I will discuss later (see section 5.4.5).

Although some courses in the programme do have prerequisite requirements and the first year is being structured more firmly, the curriculum structure allows anthropology students to proceed through the programme in a rather individualistic and unstructured way. In the first interviews some of the teachers claim that the programme is 'flexible' compared to other disciplines and that students can indeed arrive with 'whatever' packages from different disciplines and have them counted into their curriculum thus referring to the curriculum's weak framing. This 'flexibility' is seen in accordance with the multicultural aspect of the discipline:

I guess that anthropology is relatively flexible compared to other disciplines. It lies within the nature of the discipline ... a certain heritage that is widely arrived at. So we haven't had reasons to close the doors and say: Here you go, this is what is required (15:10).

Later the teachers within the department take time to dissect and analyse the curriculum programme and discover that the flexibility in the programme is more an illusion than a reality. Whereas courses have been added to the core curriculum little

by little, student choice is in fact much more limited than the teachers previously realised (27:2).

5.4 The pedagogic discourse of anthropology

5.4.1 Introduction

The pedagogic discourse refers to the regulative and the instructional discourse of a discipline where the former is the moral one mainly focused on *what* to transmit and the instructional one concerned with the specialised skills or the *how*.

The following section takes off with a description of the characteristics of the department before addressing the regulative discourse of the anthropology department. The regulative discourse is described by exploring teachers' conceptions of their discipline, what they see as the aims and goals of transmitting their discipline and what they see as valid curriculum knowledge. The instructional discourse will be discussed in section 5.5.

5.4.2 The characteristics of the department

The Department of Anthropology is situated within the Social Science building, Oddi, although the teachers do not share common facilities there. Two teachers have their offices in the Social Science building, three in a newly established office unit at a nearby hotel and the newest member was at the beginning of my research located in a building hosting the academics of the Humanities but has now moved into the Social Science building. The department members meet formally at department meetings and the three academics sharing offices in the hotel unit often meet informally in their coffee lounge where they like to discuss their teaching and curriculum planning. Classes take place in the Social Science building and lecture halls at other buildings around campus.

Getting to know the department I was struck with a feeling of the scattered nature of it. Strongly situated within the regulative discourse of the discipline is the idea of academic freedom of teachers in teaching as well as in research. Teaching has until recently been seen as private area and responsibility of teachers and interference taken as a lack of trust:

I feel that within the department there is a bit of emphasis on teacher freedom to decide what is taught in their courses and even in introductory courses where we try to incorporate permanent teachers, we are not interfering and we trust him or her to do this (16:19).

Communication between members of the staff mainly takes place at the departmental meetings which were, at the beginning of my research, rarely held and usually 'overburdened by students' business' (15:17). Common discussions on curriculum development and matters of teaching were exceptional:

G. Do you discuss curriculum decisions?

No, no very little. Well, when we established the graduate programme, we of course had to sit down and ask: What do we want? What rules apply generally within the faculty? So there is not a lot of discussion going on (15:17).

The lack of a common dialogue forum is further stressed with the dispersed location of the teachers. Katrin has had to move her office four or five times and feels that those moves have made it difficult for her to relate to her department and colleagues:

I find it very uncomfortable, when you are starting and about to get to know people. I feel it has hindered me in getting to know my colleagues ... especially from my own department (16:6).

Katrin then became situated in a new office, where she along with two other teachers have set up a small community where a common coffee lounge is frequently used for informal discussion. Now, it seems that the tide is changing and some of the newer or younger teachers feel a strong need to discuss their teaching and find a space for more communication or dialogue on the curriculum within the department. This is seen by them not as interfering but a way to share expertise and strengthen pedagogic practice:

I, on the other hand, enjoy talking [about teaching] to others. I don't really think that I want to interfere in what others are doing, I just think it is fun and that I learn from it (16:20).

During the time of my interviews, Urdur, a strong advocate for more cooperation within the department, became the department head. It became her task to lead the department's policy discussions during the University's policy formulation. Under the influence of the policy discussion within the department she suggested they

would meet for a whole day in the beginning of the semester 2006 and continue to meet regularly on a weekly basis claiming ‘you need time to talk’ (27:4). During those meetings, the department has systematically discussed the anthropology curriculum, the discipline’s future development and made attempts to standardise the instructional discourse:

Personally, because those weekly meetings are my idea, I feel they have reunited us. But of course it may be that the department head at each time ... has stronger relations to others. So maybe I don’t experience us as so dispersed anymore (27:13).

Although it still remains to see how significant many of the amendments made within the department in the autumn of 2006 will prove to be, they were important for my focus of study, making it a more interesting but nevertheless more difficult to capture.

5.4.3 The regulative discourse of anthropology

In the case of anthropology the regulative discourse is most transparent in teacher ideas of the essence of the discipline, what it means to be an anthropologist and what aims and goals are seen as most important to transmit to students. The regulative discourse also dominates the instructional discourse which will be dealt with separately in section 5.5. This section, however, explores teacher conceptions of anthropology and the influence of the historical and situational context on the formation of the discipline. The experience teachers have of the development of their field and their attempts to strengthen their discipline and expand its regime will be then be discussed.

What is anthropology?

Within the department, all the teachers share a common understanding about the essence of their discipline. Studying and understanding small parts of the society as an example of the wider world is what anthropologists do:

We are building on a certain heritage ... a holistic viewpoint. We are taking a little part from the society but we are relating that part to the society as a whole ... you try to understand the meaning of certain phenomena in relation to the society. That doesn’t mean you say

everything is just fine, but you try to understand: What is this, what is going on, what does this mean? (16:14).

This comparison or analogy is the ‘anthropological spectacles’, the essential feature of the identity of the discipline:

There are two things [that distinguish the discipline]. One hand it is the comparison. We are always looking at two or more societies. Even though we are looking at our own society we are holding it up against a mirror, reflecting it. How are comparable issues, in quotations marks, in other societies ... This is something that is essential to the discipline ... always those spectacles on the nose (15:13).

The other essential feature of the discipline referred to is the methodology, i.e. ‘the ethnographic methodology’ (15:13) that is specific to the discipline but has now been incorporated into many other disciplines.

Contextualising anthropology

While the teachers share the vision of the essential characteristics of the discipline, the regulative discourse of the anthropology programme is strongly embedded and shaped by its historic origin or its organisational saga (Merton *et al.*, 2004). The programme was created within a context that has influenced which languages make up the curriculum. As has been stated earlier, the anthropology programme was established as an integrated part of Icelandic Society Studies (Sigfúsdóttir, 1977). The interdisciplinary roots have influenced and shaped the discipline in such a way that the research focus within the department has from the start mainly been on the Icelandic society rather than on distant societies as the teachers claim is a more common mode of teaching the discipline. One must, though, bear in mind that before the establishment of the Department of Social Sciences the Icelandic society had not been a topic of social research so basic research in the area was desperately lacking (Sigfúsdóttir, 1977). The ‘local’ paradigm of the discipline has nevertheless been seen by the department as ‘tacky’ [*heimaóttarlegur*] and differentiating them and their discipline from the ‘proper’ way of doing anthropology. In 1997 the department spent some time reflecting on their curriculum structure and status and presented a policy statement (Háskóli Íslands, 1997):

We got a grasp on things ... and spent some time discussing where we were heading. And I remember that we took the stand that

anthropology should face more outward than it had done previously (15:7).

Following up on this view the department hired two new teachers with their research emphasis in distant cultures both of whom have since then made attempts to localise their research areas. Far from being disappointed with this development, Arnaldur finds it in step with epistemological changes in the disciplinary field:

It relates to a dispute about the discipline ... is it the discipline's freshness and strength to go away – to explore with the eyes of the guest? Or is that just an old romantic notion? That is the latest idea of many (15:9).

The changing discipline

Anthropology as a discipline has an integrated code with a weak classification which means that communication from the outside is less controllable than in disciplines with a strong classification (Bernstein, 2000, p. 11). In a multicultural, globalised and post-modern world, the teachers see their discipline as a carrier of highly relevant knowledge whose core has been taken up by others and that has become an essential part of different kinds of studies such as cultural studies and various studies focusing on marginalized groups. Arnaldur sees this development as rendering the privileges of the discipline but at the same time extending the influence of anthropology into needing areas:

It has long been said ... that the aim of anthropology is to communicate cultural codes to ease interaction and multicultural relations and decrease conflict and collision and this is what we have been doing all along ... but lately it is as if anthropology has lost the privilege of doing this. Which is fine (15:15).

Yet, he ponders that at the same time as the discipline is questioning and abandoning its own paradigm of culturalism, others, such as business programmes, are eagerly marketing such an approach as an aid to sell products in foreign markets (15:15-16).

With a new multicultural view, anthropologists are no longer academics whose task it is to look at 'strange people'. Now the 'strangeness' can lie within your own culture. Urdur explains this paradigm change in the following way:

While some anthropologists study cultures that are far away, others study those that are closer. And at the same time you want students to acquire a certain tolerance and to know about issues far away, you don't want to stress this image that what anthropologists do is to go far away and look at strange people ... we need to show them that this methodology can also be applied in our own environment and see that our way of doing things is not 'normal' (16:38).

This perspective can be seen reflected in teachers' attitude towards field work. Previous student field trips to Greenland have been abolished due to lack of finance but also due to the view that invading the same little village year after year seemed improper and in a sense not in line with more recent disciplinary thinking.

Strengthening and expanding the discipline

Despite changes in the disciplinary field and the use of its core by other disciplines, the teachers in anthropology feel that their programme is going strong. The anthropology society within Iceland is growing to 'a critical mass' and supported by the research programme of the university has become a 'robust, national disciplinary society' (15:12). Student numbers within the programme are increasing and the department's participation in the University's policy formulation has been an opportunity to discuss their programme and make strategies to strengthen it even further. In a departmental meeting strategies that can be interpreted as strengthening the classification and expansion of the discipline have been proposed.

An example of stronger classification, the department decided to take over two foundational courses *Theories in Social Sciences* and *Qualitative Methodology* that have previously been shared with other disciplines within the Faculty of Social Science. Discussing the rationale behind the decision, Sigrun states that it is both financial and disciplinary and 'to have more influence on what is included in the compulsory part of the programme' (24:5). Having students take the theoretical course provided by another discipline means that the department does not get the financial benefits. Taking over the methodological course had a stronger disciplinary rationale. Ethnographical methodology is seen as the essence of the disciplinary identity and 'anthropology has always seen qualitative research as belonging to them' (24:20). Yet the teachers in the department feel they have had little influence

on the faculty's methodological course which was seen as giving students a methodological focus that 'polluted' them (24:20).

With ideas of expanding the anthropology programme, the department is both finding ways to attract more students to their programme and to claim their disciplinary territory. In order to attract students, suggestions have been made to make the discipline a more attractive minor subject option and to structure more specific lines of study within the programme which could possibly appeal more to students:

Yes this is all anthropology and then students themselves have to elect their own line of study. But we could easily offer a minor with emphasis on multiculturalism. We do have some really great courses there (24:16).

Multiculturalism, being a strong part of the disciplinary identity, has become a popular issue and the department head has been approached by members of other departments that are interested in offering such lines of study saying:

'You know what. If you [the Department of Anthropology] are not going to offer multiculturalism as a line of study, we will. Because it is needed and there is a demand for that kind of studies and if no one is going to create a package called multiculturalism we will do it'. And it is just obvious that this is ours (24:16).

In the discussion, other possibilities of special issues or lines of study have also been addressed such as anthropology of health which is also seen as an area of great interest within society and well aligned with the teachers' expertise. Not using that kind of opportunity to strengthen and expand the discipline is by seen as 'just absurd' and a consequence of the department's lack of promotional skills as 'we have been totally hopeless in marketing our discipline' (24:17).

5.4.4 The aims and goals of the anthropology curriculum

What do teachers see as the most important goals within the pedagogic discipline? Are those aims and goals changing? In this section teacher ideas about the aims and goals of teaching the discipline are discussed. The movement of the discipline from a humanistic education to a more vocational orientation is described.

Anthropology as general humanistic education

Are the epistemological changes in the disciplinary field reflected in the curriculum development of anthropology? Discussing the aims and goals of anthropology, Arnaldur is convinced that the teachers in the department more or less share the same vision and values and describes these as ‘general humanistic education’:

We don’t have any common stated goals but I suppose we all share similar values about general humanistic education – and that people are aware of different cultures and that this will decrease prejudice and ease the way for multiculturalism and interaction across borders and globalisation. I suppose we are all somewhere on that wavelength (15:14).

Indeed similar ideas are echoed in other interviews. The humanistic approach to education is also stated on the department website where the following can be found (Háskóli Íslands, 2005b):

Besides specific knowledge base within different areas, studying anthropology also encompasses practical knowledge that can be of use in different contexts such as:

- Acquiring a broad, holistic viewpoint
- Critical thinking
- Training in good and disciplined work methods
- Practice in writing and publishing texts
- Knowledge for acquiring and processing theoretical sources
- Practice in stating one’s opinion and points of view for an audience
- Training in putting oneself in other people’s shoes
- Multiple theoretical background

A great emphasis is placed on critical thinking which is seen by teachers as an essential skill for students to acquire:

If there is anything that I would want my students to walk out with it is critical thinking and that they have mastered a certain way of working, in the way they approach things (16:15).

The implications made by teachers on critical thinking, which is seen by many as the core of higher education, is that it is the skill to look at the society and social affairs

from a critical perspective (Barnett, 1990, p. 162). To learn theories and basic concepts is nevertheless seen as an important foundation for work of a critical nature. Finding it difficult to distinguish between the everyday horizontal discourse and the horizontal knowledge structure of the discipline, students need to be taught to realise the difference between personal opinions and a sound theoretically based critical stance. Student criticism needs to be embedded in disciplinary understanding:

But of course I expect students in the first year to really learn the main concepts – it is not our role to teach them facts but how to acquire knowledge on their own. But of course I expect them to learn the concepts really well, and remember them and all that ... I can't expect them to come and criticise without understanding what they are criticising. I want them to understand the basics (16:15).

Urdur states that this kind of thinking is not specific to anthropology and university education should be teaching critical thinking at least within the social sciences. Students in the programme leave the BA programme to take on various working responsibilities and it is important that they have acquired the academic skills needed:

They may not feel they have learnt much but they are able to make use of their skills in learning, writing and discussing knowledge. And possibly they have learnt anthropology at the same time (16:15).

Moving to the master's level brings students further up the ladder of critical thinking, allowing them to more fully enter the disciplinary dialogue of experts:

You take this foundational knowledge one step further, to be able to enter a dialogue on theoretical concepts and take what you have been studying and criticising it even further (16:16).

From singular to region

Initially, the teachers who I interviewed stressed the academic perspective stating that even though the discipline does not explicitly prepare students for specific occupation, the knowledge and skills students take with them can be put into use in various work settings:

It is always the question of when something is practical and when not. Because our students seem to be putting their education very much into

practice in reality ... of course there are some that can't get a job but you just see them using their education in various places (16:40).

Putting their knowledge into practice has until recently been seen as the task and responsibility of the students. Interviewing teachers two years later this academic focus seems to be weakening. The department has spent considerable time in discussing the status and future development of the discipline in relations to the University's policy formulation and now more vocational considerations are articulated, most strongly voiced by Sigrun, the newest teacher on the team. Sigrun holds a pragmatic, vocational view and questions the programme's academic focus. She sees the reliance on the academic perspective as an attempt in 'preserving the species', meaning that the programme's aim is mainly seen as a stepping stone for further academic studies. Sigrun is also worried that in a sense the department is letting students down by not preparing them for the vocational field. Despite being 'good students', graduates are not ensured any specific space or place and have to compete for jobs with graduates from other fields. Similar to sociology, another soft pure discipline, anthropology students have no reserved place within the vocational field but as sociology has a stronger or better known image among the public, their candidates may fare better than those from anthropology (23:37-38). Sigrun feels that this is something that needs to be discussed within the department and questions this academic focus which she finds too narrow:

I think we are realising that the master's studies within anthropology are aimed at preparing students more for a research degree than preparing them to take part in the economy. And it is my opinion that we need to think this over. We have to understand that we could have different aims in the programme. That the students, most of the students, see this [the master's study programme] as additional education that will ease their way into the economy. They are not planning on entering the PhD level but in the organisation of the programme we, the teachers, are very much preparing them to do as we have done (23:33).

In my most recent interview with the department's head, Sigrun's more practical and vocational vision seems to have been received positively by other teachers in the department and seen as a means to strengthen the discipline and make it a more attractive option for students.

From a Bernsteinian point of view, the anthropology discipline can be seen as moving from being a classical singular discipline towards a more regional one. Singular disciplines have strong organisational and political boundaries and have been identified or described as 'self-sealing and narcissistic' (p. 54-55) mostly concerned with their own development and growth. Regions are, on the other hand, recontextualisations of singulars and face inward towards singulars and outwards towards the external field of practice. The identities of regions are more likely to face outward to their field of practice and may become more dependent on the demands of that field and the context (Bernstein, 2000, p. 54-55). The discussion within the department and teachers' worries about the discipline's relations to the economy and the transferability of their students' skills in an indication of such a regional movement.

5.4.5 How is 'valid knowledge' selected?

Curriculum, according to Bernstein, defines what counts as valid knowledge (Bernstein, 1971, p. 47) and during the interviews I discover that while the teachers share a strong, common notion of what knowledge and skills are of most worth within the discipline, this consensus is neither an explicit nor a general topic of discussion. The following section gives an account for the curriculum development within anthropology. The section is divided into four components where the first two describe the characteristics of the different types of courses that comprise the curriculum, i.e. compulsory and optional courses. In section three the relation between courses and teachers' research is explored and the final section focuses on how curriculum development takes place.

The curriculum as compulsory courses

As stated earlier, the formal anthropology curriculum consists of compulsory foundational courses and a broad spectrum of optional courses, some of which students need to include in their selection. The teachers take turns in teaching the compulsory courses and at the master's level the department has decided that at least two teachers should share the teaching load as it is seen as important to incorporate all the teachers at that level in the teaching. This way the teachers will share the responsibility of the programme and become accessible to students. The compulsory

courses are seen as standard or 'classical' and are 'not really anyone's field of interest or research' (24:22). In these courses the curriculum is often structured by 'classical introduction textbooks' (24:23) to which teachers add texts in relation to their own area of interest (24:25). There is a common agreement about 'classical' texts that need to be included in compulsory courses and sometimes this agreement is made quite explicit at department meetings. One of the teachers describes how she was required to teach a course belonging to another teacher and did not find it particularly interesting and felt she was given too strict orders on what to include in the course:

It was decided at a department meeting that [the course] was to cover the former part of the 20th century. Well, I couldn't change that. I became tired of teaching it because of this. Of course I could just have said at the meeting 'I don't want to teach the former part of the 20th century' and added: 'I want to teach something new'. But I just wasn't interested in familiarising myself with the most recent development; you can't be everywhere (16:30).

More commonly, the course content is seen as the responsibility of teachers who will cover classical text of the subject but also be permitted to add their own 'gaze' to the course:

Maybe this is different in other departments but I think for us it is quite normal, if we take for example this course, I think everyone would find it quite normal if I had other perspectives or emphasis than [other teachers] as long as there was some similar basic foundation (16:22).

Adding your 'gaze' to a course is seen as wanting to refresh a course and teach something new, mostly by changing older texts for newer ones:

Introduction – it is just that kind of course that I think everyone thinks it's fine to rotate a bit, if they want to teach something new they just bring it up at the departmental meeting (16:9).

Developing the curriculum and keeping it afresh is done by reviewing student reading material, the texts, sometimes throwing half out for new ones (16:29).

The compulsory courses are seen as essential in the curriculum but not strictly as belonging to teachers. They are rarely related to teachers' research areas or other areas of interest as is the case with the elective courses where teacher ownership is

quite strong. But nevertheless, teachers may feel that they 'own' some compulsory courses more than others:

It is quite clear who will teach some of the courses. Because this person has created the course and suggested it as a new course in this area ... then of course it is yours. But, then of course there can be situations, especially concerning the compulsory courses, that they must be taught even though the person is on research leave and so on and then people experience a different ownership towards some of the compulsory courses (23:8).

The curriculum as optional courses

The optional courses fall into two different categories of 'restricted' optional courses and 'free' optional courses although the teachers find it difficult to rationalise the differences or boundaries between those categories. When asked for reasons why courses are included in the curriculum, the teachers refer to tradition, the common understanding of what anthropology is and to universal ways of organising anthropology programmes. Katrin and Urdur explain the rationale:

G: I am trying to understand this ... there are certain courses that you claim are essential ... who decides that they have to be a part of the anthropology curriculum?

Katrin: It is possibly rather that there is a tradition for the courses and this is one of the major areas of anthropology

Urdur: And when you look to other countries they are also taught there (16:11)

Even though the rationale for restricted optional courses is rarely discussed among the teachers there is a common, tacit consensus about their existence within the programme:

At department meetings then, you know, someone is needed to teach that course. It isn't stated directly but it is clear that everyone feels that ... there is no one who says: Hey, let's just drop this course, just stop giving it! Don't you agree? [asks Urdur] This is never said directly but people just want to include this course in the programme (16:12).

Different from compulsory courses, the elective ones, restricted or not, clearly belong to individual teachers, who design them and teach 'alone':

Some courses are taught by two teachers, *Theories* for example. But most courses belong to someone and then you are alone (15:19).

The curriculum and teachers' research

Within the sphere of the optional courses the area for teachers 'gaze' and language really opens up. Courses that 'belong' to certain teachers usually reflect their expertise or research interest and are even seen as the driving force for teacher research within the distribution field. Arnaldur describes how he uses his courses to explore literature and get new ideas in a dialogue with students:

I have always seen it such that the courses are the driving power for me and if I am going to look into a certain area then without further notice I will set up a course. And I really find it rewarding – it kind of forces you to dive into certain literature which then sparks ideas and dialogue with students. I have always seen an extremely strong feedback between teaching and research and I don't think it is healthy for me or other academics to be away from teaching for too long because then you lose that speed (15:19).

Such interest may change over time like in case of Arnaldur, who spent 20 years studying the area of his doctoral research but got bored with it and has changed his research field (15:19):

But of course it happened during your career that your interests change. I spent twenty years studying [an area] which was the topic of my PhD. And it was fun and I had plenty to do and taught courses on the issue every second or third year. But now I am fed up and have moved to another area (15:19).

Teaching courses can also enlighten teacher interest in an area they have not researched previously:

Some courses relate directly to my research area, like [names a course]. But it wasn't always like that, I had started to teach the course long before [the research] (16:10).

The developing curriculum

Teachers also change the curriculum to follow up on disciplinary changes and offer courses on topics they find interesting and that they think will provide insights into latest developments within the field as well as in line with perceived interest in the

community. 'We find it important that what is taught in anthropology reflects what is happening, also within anthropology as a field' Urdur claims and continues:

I also find it important that we reflect what is in the discussion at the moment like with our course on globalization. It's not only fashionable to talk about globalization, but it is an emergent issue under discussion and students need to get insight into those issues that are being taught. It may not be a relevant topic in the years to come, but at the moment it is something that shapes theories, shapes the dialogue and what people are publishing in journals. And then I think is natural to reflect that in our teaching (16:12).

Certain areas within anthropology may temporarily become outdated or 'not cool' but are brought back to life due to societal changes. A topic such as 'relations' [Sifjar] is mentioned as an example of an area where artificial insemination, new modes of family relations and family structures have made a previously rather dull and unimportant issue highly relevant again:

Then you change the course and update it in alignment with what is happening today and then somehow you feel that it must be included. For a while people were wondering - should this be included or not and? - now one feels it is quite a must (16:12).

To increase student options but also to introduce new areas of interest (a new language) within the discipline, the department gladly welcomes course suggestions from the outside. These are made by graduated students arriving back home from their studies and wanting to introduce their area of research within the discipline. They are, if financially possible, given the opportunity to teach courses as part-time teachers:

We have often been restricted by financial resources but we have tried to open up possibilities for part-time teachers – people that are arriving home with their PhD. And as we are a small discipline we have tried to keep this open ... to show the variety within the discipline. And usually it happens that the newly graduated bring in a suggestion ... feeling that their area [of research] is missing (15:11).

Getting new graduates involved with the programme and the department is also seen as a part of strengthening the anthropological society and the discipline as such.

Because of the small size of the department, teachers are forced to teach many different courses and sometimes teachers also get 'stuck' with courses. Urdur

explains how she, in the beginning of her career, taught over nine different courses and still teaches courses she claims she has little interest in:

Maybe because I had been a part-time teacher and had taught certain courses, I kind of got stuck with them (16:9)

While teaching many courses can be seen as tiresome, other teachers see it as an educative benefit. Arnaldur finds that teaching different courses has actually helped him understand his discipline and the interconnection between different areas of study:

I think it is a strength of a little university like ours that academics are forced to have a couple of areas of interest – well maybe you don't have to have it as your interest (laughs) – but you have to teach different courses and that I find quite fulfilling ... What you learn in one course generates into another. That came as a surprise when I started teaching. I saw this as totally different slots ... but soon you see that what you are reading or studying for one course ... there are new and new connections (15:20).

Within the anthropological curriculum one can find courses that once were relevant to teachers or the discipline but have not been taught for a long time. Those courses tend to accumulate and are referred to as 'sleeping courses':

But then there are other courses where the teacher may say: Well now I am going to rest this course for a while. It isn't related to my concurrent research. Those will be courses that are not as related to the foundational areas ... [but they are] still included in the course catalogue (16:12).

When the number of 'sleeping courses' has accumulated for a while it becomes difficult for students to see what courses are actually available for selection so in a departmental meeting all optional courses that had been 'sleeping' for a long time were weeded out. This was seen both as a necessary 'spring cleaning' but also as providing students with a more realistic view of the actual range of elective possibilities:

They ['sleeping' courses] give the wrong impression that there is more option than there actually is. Rather we should emphasise the courses that part-time teachers bring in which are more exciting rather than advertising something that isn't really taught (27:5).

A decision to teach certain courses is based upon financial resources and the availability of teachers. Teachers' research leaves can make curriculum planning difficult and if temporary teachers are not found, courses may be dropped even though they are considered important.

5.5 The instructional discourse of anthropology

5.5.1 Introduction

The instructional discourse of a discipline is, according to Bernstein, embedded in the regulative discourse which produces the order in it:

The theory of instruction also belongs to the regulative discourse and contains within itself a model of the learner and of the teacher and of the relation (Bernstein, 2000, p. 35).

As with regulative discourse, the pedagogic practice can be explored using the concepts of classification and framing. Where framing is strong, the pedagogic practice is visible, i.e. the rules of the regulative and instructional discourse are explicit to the student and the teacher. Where framing is weak, the pedagogic practice is likely to be invisible, i.e. the rules of regulative and instructional discourse are implicit and largely unknown to the student (Bernstein, 2000, p. 13-14).

In this part the instructional discourse or the pedagogic practice of anthropology is explored. The first section focuses on teachers' identity of the students. What kind of student identity does the anthropology curriculum set out to create? The second section deals with teacher identity and how changes to the identity of teachers and their relations with students are being proposed in the departmental discourse on curriculum and teaching. In section three the pedagogic practice of anthropology will be demonstrated by providing examples of the practice of advocates for the different models of teachers. The final section explores the origins of teachers' instructional ideas.

5.5.2 The students' identity

The identity of the good student

The instructional discourse carries within it the construction of the identity of the student. As the teachers within the department share the similar values and visions regarding the goals of anthropology it is not surprising that they share a similar view

on the student. Their identity of the good student is that of an active, critical and academically skilled graduate. Like their colleagues in the Department of Mechanical and Industrial Engineering, the teachers in anthropology are at times worried about students' passivity which is here more seen as a fault with the educational system rather than lying within students themselves. Arnaldur, reminiscing on his own time as a politically active student, finds students now more interested in their individual performance but admits that his feeling may be opinionated:

But now I find students are much more passive. The system and the whole framework are just given. And they are just thinking about maximising their own performance within this framework. But this is just a subjective evaluation, you get older and more distant from students (15:24).

Student passivity is seen as their reluctance to being autonomous and responsible learners and as will be explored later some of the teachers try in their pedagogical practice to stress methods which increase student participation. In general, the teachers describe the model of the student as being knowledgeable, skilled and active. They want their students to leave their programme with a sound theoretical knowledge base and the methodological skills necessary for further research but also to have acquired general academic skills of reading, writing and presenting knowledge:

I would like the students that graduate from anthropology to know the history of the discipline and the main issues, perspectives, theories and methodology. But most important is of course to have people that are able to read and write well, i.e. people that are ... when faced with a task to quickly get references, find the substance, can write, clearly organise their text and are able to present the issue well (23:29).

Being 'reflective' is also an important skill for students in the sense that they need to become aware of their own background and ensure that their stance is made clear to them and others. 'In anthropology it is important to understand where you come from' Sigrun explains (23:30) stressing the need to be able to situate oneself as a critical part of doing ethnography.

Students entering the programme, many from secondary schools, are used to stronger framing in pedagogic practice which is not seen as highly 'academic'. To help them enter the discipline, the teachers have proposed a more structured curriculum and a

stronger frame for the first year. Courses within the first year are being made 'larger' (in credits) and more inclusive, restricting students' possibility of selecting optional courses. This is seen as simplifying their entrance and helping them to socially adjust:

So they are in a certain package and do not have to make many options ... both to increase the unity within the group, so they feel that they belong to a group (27:12).

The department has also emphasised that the first year courses should be taught by permanent teachers and attempts made to include topics of study that evoke the attention of new students and attract them to the programme. The social aspect is seen as necessary to make students feel at home in order to keep them on the programme where their presence will ensure the necessary funding for its future existence (23:25).

The weak grammar of the horizontal knowledge structure of the discipline makes it difficult for new students to distinguish the language of the discipline from their everyday common language. Since 'critical thinking' is stressed as an important skill, the students have to understand that there are differences in personal common day opinions and real critical thinking that is always embedded in theoretical knowledge:

Of course I expect them in the first year to learn the concepts extremely well ... and that they are not critical until they understand what they are talking about ... Thinking critically is just not ...well sometimes they think they can just come right away and say: No, well I disagree! Without any rationale (16:15-16).

While most students will be aided through instruction to realise the necessary skills and rules of the disciplines, not all students possess the abilities (or recognition and realisational rules) to take on the anthropologist's identity. Lack of writing skills and critical thinking along with too little imagination will make it difficult for students to survive within the programme:

The thing is, if you find it difficult to write, and have problems with the essay as a form, it will be difficult for you to do anthropology ... you are in the wrong place. And you have to have some imagination but also to be critical and deliberate and take nothing for granted (23:32).

5.5.3 The identity of the teachers: Repertoire or reservoir?

As stated previously, the identity of the teacher within the Department of Anthropology has, since its establishment, been of the lone ranger or of great privacy. Academic freedom is highly valued both within research and teaching and interference is seen as an act of distrust or at least invading areas of privacy. Teacher 'ownership' of courses is stressed in the interviews and strongly related to their individual research interests. In Bernstein's terminology, teacher communication within the department can be described as strongly classified:

If I teach my courses alone they are my private matter. There is little tradition for us talking together unless there is a possibility of overlap ... but aside from that I think we are single workers [einyrkjar] (15:26-27).

The strong classification is further demonstrated with teachers physically not sharing any common spaces. Recently, the younger teachers have been less happy with the privacy model, voicing their longing for more dialogue and discussions within the department. Katrin is 'sure that just by communicating more we would be more in agreement' (16:17) thus seeing the teacher group moving from private repertoire to a more common reservoir (Bernstein, 2000, p. 158). But she also thinks that within the department, teachers fall into two groups, those who want more coordination and communication and others who would find such attempts as invasions into their own area (16:17).

At the establishment of the master's programme the department decided that some courses should be taught by at least two teachers to ensure the participation of all permanent teachers within the programme. Urdur, happy with this development, sees this decision as providing a new arena for teachers to share and cooperate in their teaching and curriculum planning and 'forcing' teachers to work together:

It helps that we have courses taught by two teachers and then they have to cooperate. Like in the master's courses we are forced to work together and that is fine (16:20)

An eager spokesperson of cooperation and communication, Urdur, supported by Katrin and Sigrun, has proposed a new teacher identity within the department which can be described as that of partnership. The difference between the two identities can

be seen in the way teachers approach sharing courses. While Urdur and Katrin see this as an opportunity to work together and spend hours discussing and planning their co-operational efforts, other teachers such as Arnaldur describe sharing courses as an act where 'mainly each is responsible for his or her part (15:27). That type of 'sharing' is unacceptable to Sigrun who claims after such experience she could 'just as well have said that [she] taught two and half credits of the course' (23:44).

In the Department of Anthropology the third teacher identity emerges, i.e. the identity of the part-time teacher. An extensive part of the teaching within the department is in the hands of part-time teachers. They have been welcomed into the department where they bring in courses in their own area of study and provide a more interesting and varied curriculum for students. Some of them are active participators in the departmental community as research students but many of them just enter the community briefly to teach a single course or two. Having neither a formal place nor physical space within the department, the part-time teacher identity is very marginal. The part-time teachers do not attend departmental meetings and as these are the places for curriculum discussion and decision making they miss out on opportunities to influence the curriculum and can easily be forgotten. Sigrun describes how a course taught by a part-time teacher was left out of the course syllabus by mistake:

No, she [a part-time teacher] wasn't there herself and somehow as it is the task of the permanent teachers to make the course catalogue and everyone just thinks about his or her own courses ... so her course was not included (23:23-24).

At one of the department meetings, the teachers voiced their opinion that the requirement for courses being 5 credits instead of 3 credits, restricted students' options to select more varied courses and made it difficult for students from other disciplines to include anthropology courses as their elective. The department head suggested that optional courses could be made 3 credits instead of 5 credits and felt that others at the meeting were in agreement. Later, however, teachers seemed to have forgotten this decision and were worried that it would result in them doing more work for lower wages. In the end, the department decided to change only courses provided by part-time teachers to 3 credits with them unable to voice their opinion 'because they did not attend the meeting' (27:10).

5.5.4 Strengthening the framing of the instructional discourse

When it comes to pedagogic practice, Bernstein's concept of framing becomes relevant. Framing refers to the nature of control over the selection of communication and its sequencing, the pacing and control over the social base which makes this practice possible. As explored in previous sections, the teachers within anthropology are granted considerable autonomy when it comes to organising their courses in regard to what to include in the curriculum and what 'gaze' to take. This freedom has until recently been fully acknowledged in regard to teaching, i.e. planning and carrying out instruction. In the whole-day department meeting teachers not only discussed course content but attempts were made to coordinate or standardise the pedagogic practice as well. Urdur explains how they discussed possible overlaps, the structure of the 1st year curriculum and how many classroom hours should be allocated per course credit. The amount of required readings and demands made towards students were not discussed but 'we at least discussed that it was an important issue to discuss' (27:8). Urdur felt that the discussion had actually revealed that due to academic freedom there was no coherence within the pedagogic practice:

There was no system. It was so ridiculous ... there was no coordination because when the things are not discussed; they little by little just happen (27:6).

Yet she very consciously stated that despite the need for a more coherent system, such a system must be flexible enough to allow for teacher preferences claiming that there was not 'necessarily a need for total uniformity, but we must at least be conscious [of what we are doing] (27:6).

During the same meeting, teacher and students' relation and identities were explored. Part-time teachers attended part of the meeting, participated in the discussion and welcomed this rare opportunity to discuss pedagogical practice. According to Sigrun, the discussion focused on teacher rights and responsibilities and legitimate requirements and expectations of students. Are teachers required to publish their lecture notes and transparencies on the University's learning management system before classes, how closely must they adhere to their own syllabuses and are they, in fact, required to deliver syllabuses to the students? Can students be expected to attend classes when publicly there is a rule of freedom of attendance within the

faculty? And if students do not attend classes how can class participation be emphasised and made a part of students' grade?

G: Is this what the temporary teachers wanted to discuss?

Yes and they were asking: What really applies? (24:12).

In the discussion teachers went about sharpening students' as well as their own identity as teachers and measuring those identities against the faculty's and the University's formal regulations. In doing so the teachers discovered that taken for granted rules of practice could not easily be found within any formal regulatory framework and were rather a part of a regulative hearsay.

In the light of Bernstein's theories, the recent discussion and strengthening of teacher and student roles as well as more coordination of instructional practice can be seen as strengthening the frames and lessening the privacy that was previously seen as an essential part of teacher identity. Stronger framing of teacher roles are supportive of the needs of the part-time teachers that so far have experienced weak framing as lack of social belonging to the department. With a weaker classification or less isolation between teachers, new structures of social relations make the possibilities of participation and cooperation between teachers more prominent and more open to a flow from repertoires to reservoirs (Bernstein, 2000, p. 158). The identity of partnership seems to be becoming stronger at the expense of the identity of privacy. Within the department two teachers' identities emerge, that of the traditional teacher and the one of those striving for more cooperation and partnership in teaching.

5.5.5 The instructional practice

Is there a 'standard' way of teaching?

Despite teacher freedom within teaching, the instructional methods within the department do not vary greatly between teachers. Theoretical courses are usually constructed as teacher lectures and student discussions. Sometime these two activities are carried out separately, even by different teachers, but mostly teachers like to interweave the two methods. Students are given lists of texts to read, some compulsory and others as suggested reading material that students are required to make use of in their essay writing. Texts in the introduction courses are often in the

form of textbooks but in other courses they are original anthropology texts and research papers. Sometimes students are given an assignment to search for appropriate texts to introduce in class. In methodology courses lecturing is less dominant and students are given more practical problems and projects to work on. Students are provided with syllabuses that list the text to be covered each week and describe the course assessment. Course grades are mainly based on written assessments and final tests that make up from 30-60% of the final grade. To be able to demonstrate that they have acquired the expected realisation rules students write essays. A typical essay is 8-10 pages and usually gives student quite a free rein on topics and approaches, i.e. the structure and content are very weakly framed which might give students problems with recognising the expectations made. An example of a typical assignment is the following:

Students write a short essay on the course issues they find interesting and can use only supplementary and compulsory reading texts. The essay should be around 3000 words and double spaced. Cover page and references are not included. The essay should be stapled in the left hand corner and should not have plastic covers. Students introduce their essays in discussion groups on [date].

Teaching as a 'traditional' teacher

To give more insight into methods of teaching, Arnaldur's methods will be used to demonstrate an example of a 'traditional' teacher. Like other teachers in the department Arnaldur has a good notion of the 'cocktail' of goals that make up his teaching:

G: What would you like your students to take from your course?

I haven't thought about this consciously – I would like to see that I have trained them in thinking critically about a certain area and awoken research questions and [trained them to] follow them through and acquire standard knowledge in the field, certain literature. Yes, I think this is the cocktail (15:22).

But he also admits he doesn't dwell much on his own teaching. He likes to organise his courses alone and likes to stick to similar structures and methods:

There is almost always a written test and an essay. And the test counts for two-third of the grade. In some courses, mainly at the master's level, there are just projects and essays. But in 90% of the courses I

teach within this fixed form and I have actually never changed it (15:31).

Arnaldur rarely discusses his instructional methods with other teachers. He stresses the importance of dialogue to enhance student critical thinking and likes to use pictures and rich visual material to explain and interest students in his lectures. His method of assessment is partly organised with the 'pedagogical goal' to enhance student critical thinking and personal standpoints and help them understand the relational ideas between the texts at the same time they acquire a necessary overview:

And the test – usually I have prepared one test question which I discuss with them a month in advance and encourage them to discuss among themselves. And that is then a question that demands that they have an overview of all the readings and can relate different parts and take a personal stand ... the pedagogical goal is that they won't just arrive at the test from rote learning – page this and page that – but that they will analyse and think abstractly about the issue as a whole. The rest is more restricted – what did this author contribute or ... (15:32).

Admitting that he doesn't use the Internet very much and stressing his dislike for what he feels like a requirement to use Power Point slides he claims that the constant request for students being connected to the Internet diminished the importance of a good theoretical book and a meaningful dialogue between teacher and students:

I haven't made use of the Internet to the same extent as my colleagues ... it is a bit of a gimmick. I mean a good theoretical book has its benefits and people should not forget that even though the Internet is enormously powerful and will give you access to qualified scholarly journals. But this demand about being constantly on-line and endless search in data bases ... I think it has gone overboard. At the end of the day the conversation in the classroom and teacher and student dialogue means much more than a fancy Power Point show. This is my bias so I don't spend much time on it (15:25).

When asked if he can describe his ways of teaching he hesitantly states that he could do better but that his methods are based on many years of teaching. Yet those 'tricks' that he has picked up and make up his teaching repertoire do not apply when student groups become too large:

I adhere to routine teaching methods that are shaped by years of tradition in teaching a group of maybe 10 and where you know everyone and it is easy to keep a dialogue going and follow up on each

and everyone's interests. And those tricks are maybe not very conscious just something you have somehow learned to use – they just don't apply in lectures with 80 students (15:26).

Teaching as 'cooperative' teachers

Katrin and Urdur are good examples of 'cooperative' teachers that stress partnership in teaching. In their new location, they have formed a community of cooperation. They feel they have much in common, both being young women and sharing the experience of remembering and referring to being 'new academics'. Urdur likes talking about her teaching and sharing instructional ideas and sees such sharing as professionally enhancing. Katrin also likes to share and discuss her teaching and instructional methods and being younger and less experienced than Urdur she often seeks her advice:

I find it very comfortable to be able to discuss with Urdur, both bigger issues but also some things I feel insecure about ... like 'wait is this normal' and being able to admit that this is how you think. Like 'do you think I am too strict here ... and how can we get students to participate more (16:18).

Through discussing their educational aims and beliefs Urdur and Katrin feel they share a similar professional theory. They enjoy working together and find course planning an exciting cooperative task. They have spent a good deal of time discussing learning and teaching and enjoy finding new approaches in their courses. They happily explain how they are in the middle of the process of planning a course on globalization for 3rd year students and master's level students they are going to co-teach. In planning the course they put great emphasis on student active participation, in-depth discussions on theories and on enforcing students to take responsibility for their own learning. Drawing from their scholarly experience and teaching experience they have come up with numerous methods to ensure those goals. They want students to bring 'memos' to every class, which are written reflections on the topic. Students have to be ready to provide their memos in class and then send them to their teachers for further inspection. Two students will take turns to be prepared and responsible for leading the discussion on the topic in every class with a third one acting as a guest lecturer and giving a short presentation of his/her choice of the reading. Every student is to give an oral presentation in class and, to ensure the common provision of knowledge; they have arranged to have students participate in

a formal symposium where they will present their final papers to other members of the course. ‘We are systematically figuring out ways to force students to be responsible for their own learning’ (16:24) they claim.

Where do instructional ideas come from?

As described in the section above, the teachers within the department use different models of teaching to transmit their knowledge to their students. Sigrun is the only teacher who holds a formal teaching certificate but Arnaldur has some experience of teaching at the secondary school level before becoming a university teacher. In the interview the teachers can easily describe their repertoire of instructional methods and instructional aids that are being used to help students recognise and realise their knowledge and skills. When asked where and how they have acquired their expertise they most often refer to their own time of study. When asked where instructional ideas to get students to tackle the reading material come from, Katrin states that similar methods were used in her favourite courses in the US and Urdur also refers to her own experience of study as a source (16:25). Arnaldur, questioned about the origins of an interesting method of assessing student answers: ‘I think it was in my own graduate studies in the UK’ (15:32).

As with their colleagues in the Department of Mechanical and Industrial Engineering, the teachers’ own experience of study is as seen laying the foundations for their ideas and expertise in teaching their discipline:

G: Do you think your own time of studying anthropology has influenced your way of teaching?

I am sure that it must be. You don’t have any other models. I don’t know any didactics. I have never learnt how to teach. Even though I have done that for 30 years (15:32-33)

Experience is also an important source of knowledge and the teachers claim to learn from their experience and mistakes with the help of the University’s student evaluation feedback. But experience is the strongest:

I didn’t know how to teach, had never taught before. And I feel I have learned a bit from mistakes. Yes, the experience and the mistakes and I would have been quite happy to get more guidance on how to teach (16:33).

Summary: The pedagogic discourse of anthropology

The curriculum of anthropology is characterised by a horizontal knowledge structure that gives rise to a collection code curriculum where the content of courses (the ‘what’ of knowledge) is constructed by different languages or courses that may change from time to time. This is a curriculum structure that Henkel and Kogan call the ‘directed curriculum’ or the ‘individualistic curriculum’ as students can influence the direction and content of courses and teachers are free to offer options whether or not they link with other elements of the curriculum (Henkel & Kogan, 1999). Courses are not hierarchically structured and as long as students fulfil requirements of compulsory courses and adhere to the faculties rules of commitment, they can move through the curriculum in their own sequence and pace. The programme is seen as ‘flexible’ in the sense that students can take courses outside the programme and arrive with knowledge that will generally be acknowledged as a part of the curriculum

The classification of the discipline is weak which makes it ‘a global cocktail,’ meaning that it can include various parts of knowledge taken from different discourses or languages. Courses ‘fall asleep’ or become obsolete and are thrown out in ‘spring cleanings’ and new knowledge is incorporated into the curriculum regularly. The teacher’s ‘gaze’ is fully accepted, referring to teachers’ autonomy for personal preferences of knowledge (texts) to be included in courses. Curriculum texts are frequently changed. Aside from some basic courses, the bulk of the curriculum is made of courses that ‘belong’ to teachers and reflect their research and/or personal interest.

The aim of the anthropology curriculum is to provide the students with general and disciplinary academic skills where ‘critical thinking’ is seen as essential. Until recently the focus of the programme was predominantly academic but a performatory shift can be felt within the curriculum discourse. The shift is rationalised by the need to provide graduating students a better competitive standing within the vocational field and to acknowledge a societal need for the disciplinary knowledge in times of multiculturalism. The latter rational is also part the departments’ attempts to strengthen the discipline but at the same time moving it from being a singular to a more regional one.

The students' identity is characterised by the weak framing of the regulative discourse. The ideal student is described in active terms as 'active and critical' and teacher's role is to further encourage their active engagement.

The instructional discourse of anthropology has in general a weak framing but is being strengthened in the undergraduate curriculum, especially in the first year. Where framing is weak, the pedagogic practice is likely to be invisible to students. Within the department the invisibility was also felt among teachers and especially the temporary teachers who called for stronger framing. The weak framing opens up spaces for a varied instructional discourse, including the pedagogic practice of 'traditional' teachers as well as those termed 'cooperative'

CHAPTER 6: THE DEPARTMENT OF PHYSICS

6.1 Introduction

In the study I selected the Department of Physics as representative of a hard, pure discipline (Becher & Trowler, 2001). The selection was neither based on knowledge about the discipline nor the department. Comparing the departments of mathematics, chemistry and physics, they all seemed similar in demographic terms. I did however find the reciprocal relationship between physics and the engineering through service courses interesting. Within the Department of Physics I conducted interviews with two teachers in 2005 and two in 2006 aside from participating in meetings on teaching within the faculty.

With my social science background it has proved to be more difficult for me to ‘understand’ or ‘recognise’ the physics discipline. If foreign language is used as a metaphor, I as a tourist shared the same social science language of anthropology, spent sufficient time in engineering to understand their language but have had to travel within the world of physics with some difficulties.

In this chapter, section 6.2 gives a short overview of the historical development of the discipline as well as its size in numbers of students and staff and the participants within the department are introduced. Section 6.3 provides an overview of the physics curriculum, its structure and framing and explains the different types of courses that make up the physics programme. Moving to the pedagogic discourse, the regulative discourse of physics is explored in section 6.4. The ‘foreignness’ discussed above is the reason for the rather lengthy discussion about the characteristics of the department. The characteristics described are the department’s disperse nature and smallness, its emphasis on research, the difficulty of the discipline and finally the two different types of physics, the theoretical and the experimental. Section 6.5 explores the regulative discourse appearance within the physics curriculum. The aims and goals of the physics curriculum are discussed as well as the developmental trends of the curriculum programme. Finally, section 6.6 deals with the instructional discourse of the physics curriculum. The section starts by articulating the student identity embedded within the discourse and how curriculum development calls for new student identities. The pedagogic practice of physics is

analysed in regard to framing and finally teachers' attempts to go against the pedagogic practice are described.

6.2 Location in time and space

6.2.1 Introduction

The following section describes the historical development or the organisational saga of the physics discipline within the University. The number of staff and students as well as a short description of participants is provided.

6.2.2 The historical development of the discipline

The Department of Physics with the University has two different roots. In 1951, physics, along with history, geography, life sciences and mathematics, was established as a subject towards the BA degree within the humanistic faculty at the University. The focus of teaching was to 'be mainly practical and focused on preparing them [students] to become teachers at various schools' (Jónsson, 1961, p. 54-55). Students studying physics attended more or less the same courses as engineering students with some additional courses designed specially for them. This BA programme in physics never became popular and sadly did not make its mark on science education of children as had been the hope with its establishment.

Within the Faculty of Engineering students had been receiving physics education as a part of their engineering programme and it was within that faculty that the first professorship in physics was established in 1957 when Þorbjörn Sigurgeirsson was appointed. He also became the head of the Physics Institute when it was established in the wake of his appointment (Vilhjálmsson, 1987). In 1965, a new regulation relocated the BA programme in mathematics, physics, chemistry, life sciences and geography and geology within the Faculty of Engineering. The programme was still very focused on teacher education. In 1969, the Faculty of Engineering was reorganised and became the Faculty of Engineering and Science acknowledging the growth of the science disciplines and BS programmes were established in physics, chemistry and mathematics (17:3). The teacher education emphasis became secondary to the science orientation (Vilhjálmsson, 1987).

In 1966, the Science Institute was established incorporating the Physics Institute and its research. The Science Institute has been influential for the development of the

physics department and its curriculum. It provided the field of research and facilities for teachers in the new physics department and researchers and specialists within the Science Institute have both provided teaching within the department and taken part in the development of the discipline (Helgason, 1987). The Science Institute is an autonomous research institute subdivided into the Institute of Earth Sciences and the Institute of Physics, Chemistry and Mathematics, which are both dedicated to scientific research and higher education (Háskóli Íslands, 2007a). In 1985 the Faculty of Science was formally established.

In 2006, the 12 teachers in the department are located in 5 different buildings somewhat related to their specialist research areas. Three teachers are located in VR III (Engineering and Science building) where the main laboratories are located, three of them are to be found at the Science Institute, three are located in Tæknigarður (The Centre for Technical Innovation) and one has his office at the Icelandic Meteorological Office.

6.2.3 Students and staff

In the autumn of 2006 the Department of Physics had an all male staff of 12 with a few part time students and researchers and specialists working at the Science Institute. Sixty-four students were registered in the BS physics programme, 17 females and 47 males. In the master's programme fourteen students attended physics, 4 females and 10 males. Nine PhD students were registered in the programme, 2 females and 7 males.

6.2.4 Participants in the study

In the Department of Physics I conducted interviews with four participants, *Thor*, *Halldor Tomas* and *Rafn*.

All four participants have a long experience of teaching within the department, ranging from 15 – 35 years. Two of the participants gained their undergraduate degree from the University and then moved abroad for their PhD degree (Sweden and UK) while the other two did all their academic studies abroad (Denmark and Scotland). Three participants worked as researchers at the Science Institute before

becoming teachers within the department and one served as a research associate at a foreign university for a while.

6.3 The physics curriculum

6.3.1 Introduction

According to Bernstein, physics is a discipline with a hierarchical knowledge structure. The development of knowledge within this structure is toward ‘more and more general propositions which integrates knowledge at lower levels and across an expanding range of apparently different phenomena at abstract levels’ (1999, p. 167). Knowledge bases develop through opposition between theories with attempts to contest new knowledge theories and ‘to incorporate them into a theory that is more general and more integrated than the existing one’ (1999, p. 163). The physics curriculum is a collection type curriculum where the content is strongly classified and there is a tight control over the production of new knowledge (Bernstein, 1971, p. 53). There are strong relations between teachers’ work in the production field (i.e. their research) and the field of recontextualisation as will be discussed in section 6.3.4.

The following section opens with an overview of the physics curriculum, describing the lines of study available to students and then exploring the different types of courses that make up the programme.

6.3.2 The formal physics curriculum

The BS curriculum

Students entering the physics curriculum are offered three lines of study for a BS degree, i.e physics, applied physics and geophysics. A degree in physics is, according to the departments’ course catalogue, planned for students ‘who are preparing for research and instruction in various areas of physics as well as preparing for graduate studies focusing on theoretical as well as experimental physics’. The programme in applied physics is seen as an option for students who are especially interested in research and developmental work within high technical industry, and geophysics for those interested in research and instruction in that area. About 60-80% of the programme within the BS degree is made up by required courses. Students have the opportunity to elect optional courses within the department or, with special permission, outside the department, according to interest and research orientation.

The fourth year

After finishing their BS degree the students can either directly enter the MS programme or take ‘the fourth year’. The fourth year is a 30 credit course that was a more viable option before the establishment of the master’s programme. It was previously seen as an option for those students wanting to improve their grades and knowledge before going abroad or even a place where students could wait a year for other reasons. It is also used by those who don’t have the required minimal grade to enter the master’s degree programme (17:7).

The graduate programme

The master’s programme was established within the Faculty of Science in 1999. Within the Department of Physics, students can create their own lines of study with regard to the disciplinary area of their advisor, who is either a teacher within the department or a specialist researcher within the Science Institute. To aid students, the course catalogue lists all teachers and specialists along with their areas of research (Háskóli Íslands, 2004). The research project usually accounts for up to 45 credits of the 60 credit requirement with relevant courses making up the remaining number:

The research projects are usually 30 – 45 credits. The student finds an adviser, a master’s committee is established and sometimes some kind of courses are provided (17:8).

Students work closely with their advisors on the research projects often participating in his or her ongoing research. Students are encouraged to take part of their studies abroad.

At present, nine students are in the PhD programme within the department. PhD students select master’s courses and are also required to take part of their studies abroad.

6.3.3 Different type of courses within the programme

The physics curriculum has a hierarchical knowledge structure and a strong framing especially at the BS level. Within the programme, courses can be classified according to the strength of their framing, i.e. teacher agency in making curriculum decision varies between the level of the programme and the type of courses taught.

Basic courses

The hierarchical knowledge structure is very visible in the BS physics curriculum programme where courses with the same name are given gradual numbers and each course is a prerequisite for the next one. The disciplinary knowledge is described as a ‘puzzle’ or ‘a brick’ and it is not until well into their studies that students are assumed to be able to see a somewhat holistic picture of the puzzle:

Different from what I hear from other disciplines, all our education is built on steps. We teach *Physics* 1 – 2 – 3 – 4, we teach or learn *Mathematics* 1 – 2 – 3 – 4, and we keep on learning more and more. And it always based on what is already there and it is not until you have reached that point and are at the third year in the BS programme that you start to understand the context (18:15).

In the first year of the physics curriculum, half of student courses are mathematics taught by teachers within the Department of Mathematics. The other half is what is termed ‘basic courses’ in physics (17:5). The basics courses are either 3 or 4 credits – often taken with students from other disciplines (such as mechanical and industrial engineering) with a one credit addition for the physics students that are then required to go deeper into the subject. Depending on the subject, courses are usually organised into lectures and laboratory classes and either tutorial or discussion classes where students hand in weekly problems and typical problems are demonstrated by teachers.

The basic curriculum of physics has a strong framing both in regard to the curriculum and the pedagogic practice as will be discussed in section 6.6. The strength of the curriculum framing of the curriculum is created by the rotation of the courses among teachers, the extensive use of textbooks and the international ‘exchange value’ of the courses.

The basic courses are arranged in a hierarchical manner and students attend them in a fixed order. The basic courses are rotated among the teachers of the department. They do not belong to anyone and ‘most of the teachers are able to teach more and less all courses and ... only get to keep the courses for a certain time, rotating at the average every four years’ (18:24). The rotation is a conscious decision within the department based on practical as well as professional reasons. Teachers need to be

covered when taking research leave but the rotation also ensures the freshness of the teaching and is a way to bring teachers back to basics, should they drift away:

G: Why do you do that [rotate courses]?

First of all we think that everyone worth calling himself a physicist should be able to teach this and secondly we find that fruitful. We think you might get tired or bored if you did this more than three, four times in a row. And we think this has worked out well. And of course the research leave system also calls for this (17:3-4).

The discipline is seen as international and ‘the basic courses are similar all over the world’ (18:27). Students in exchange programmes move into the physics programme and the local students travel to foreign programmes, so courses need to hold an international exchange value which is also ensured by the use of international textbooks:

Physics 1 is very similar all over the world, *Physics 2* is very similar. The course I am teaching ... sometimes students have to be assessed into the programme. I notice that this is very much the same, even the same textbooks ... There is one textbook in electronics of masses that is taught all over the world and it is also taught here (18:27).

It is not only the textbooks that provide the framing of the content of course. The department has also published a booklet for the first year courses that includes the main issues and concepts in Icelandic and ‘is the core of the textbooks’ (17:39). The framing of courses is a common agreement and if a teacher wanders too much from the course territory that will be attended to by the department and put ‘back under control’:

We keep it like I said before ... like in the theoretical part we have *Physics 3*, *Quantum Mechanics 1* and *Quantum Mechanics 2*. There has to be a hierarchy. Well, it has happened that a teacher teaches *Quantum Mechanics 1* like it was *Quantum Mechanics 2* or *Physics 3* as it was *Quantum Mechanics 1* and that had caused a general discontentedness within the department and we try to discuss this and get it back under control (18:26).

Laboratory courses

Laboratory classes are a part of some of the basic courses but can also be taught as individual courses. In laboratory classes students are divided into groups of 8-10 as

the facilities don't allow for larger student groups (22:25-26). Usually teachers either teach the lecture part or the laboratory part of a course. The teachers of the course will then 'have to coordinate the main line of the course'. This rarely creates a problem as the big basic courses are usually very strictly organised in regards to 'what to teach and what laboratories to do and how the tutorial classes will be done (18:33). It is 'group work' between those within the department. If changes are made [they are] 'discussed back and forth' (18:33). The framing of the laboratory courses is strong and the experiments and student's methods of carrying them out follow a strict set of rules (18:26).

The teachers are all quite happy about the quality of the laboratory courses in the undergraduate programme, feeling like Tomas, that they do well in 'teaching students how to systematically state their results, work with their data and present them in an organised way (22:24). But in the last couple of years the department has had to reduce the laboratory experiments in the basic physics courses as a part of dealing with a lack of financial resources. Laboratory classes and courses are time consuming and costly so little by little the experiments have been minimised. Halldor sees this as very negative development as he thinks the status of the laboratory work is what will in the end both distinguish the University from other competing national universities and provide the programme its quality (18:7).

The optional courses

In the upper year of the BS programme the curriculum is almost only physics and students can take optional courses depending on their special interests (17:5). Those courses are seen as providing the students in the upper level of the BS programme with a view of the possibilities waiting ahead within the discipline:

Then we start teaching courses that are model courses maybe from nuclear physics, condensed matter physics, astronomical physics ... so the kids get to know what they want (18:15).

Due to the small number of students, the department is faced with problems providing an extensive programme of optional courses and 'model' courses at upper level and in the master's programme. Within the BS programme, optional courses are offered every other year so they can be taken by students at either 2nd or 3rd year

(17:20). Students at the master's level can take courses belonging to the BS level and often do so when they 'change their emphasis and need to catch up in areas they have not previously covered in their programme' (17:10-11).

In the optional courses, teachers get to teach their areas of interest and research and are allowed much more freedom in the curriculum design than within the basic courses and 'can form it if you only get students to attend' (18:26). The framing of the courses is weaker and the textbook becomes less important and the content may vary from year to year depending on what the teachers see as most relevant for the students at that time:

There you are trying to have them work independently and bringing in articles and such so the curriculum does change a bit from year to year. And when I am teaching at the 2nd or 3rd year then it becomes more independent and then you hand them more reading materials and so on ... you rather select from the textbook and add something to it.

G: What do you add to it and why?

It is just because I find it [the topic added to the course] more relevant and then I have something specific in mind, that I do know what they will go on to study (17:31).

Unfortunately, due to the financial status of the department it has 'been forced to limit [their] offerings of optional subjects' (18:10) so 'the programme is based on students taking part of their credits in other department than ours' (22:25). Although this need for interdisciplinary study could be seen as weakening the classification of the programme, Tomas claims it is an educative action for students that may even expand their horizons (22:25).

While none of the teachers are happy about the financial strain of the department it has at least simplified the curriculum process, as Halldor somewhat cynically explains. The work related to the writing of the annual course syllabus has become simpler. Earlier each teacher had his own pet project that he wanted to include but as the financial strain has become more, things are changing (18:22). Instead the department now allows students to participate in the curriculum process by voting for the course or courses they would like to keep in the programme the following year. This is not only done for democratic reasons but as an attempt to have students select courses and attend them in sufficient number.

We just came from a departmental meeting where we made decisions on which optional courses will be taught. We have a certain group of optional courses that we have more and less moved over to the graduate level but we do allow students to have a elective meeting about which courses they would like to see in the syllabus next year. We allow them to come and almost have a voting on what they want and we kind of try to push them together as they are so few and our department can't adhere to the rule that a course is not taught for less than 10 or six students. If that was the case there would be no optional courses at the third year. But we pack students together to make a group (18:22).

Yet in this democratic method of students electing courses, Halldor feels there are some underlying attempts to influence students and the elitism of the theoretical courses is reflected in students' views so that those courses are voted for rather than the laboratory ones – which also are more expensive to run (18:22).

Reading courses

Because of the low number of students, graduate courses are rare and the only method possible is to create or design a 'reading course' for students:

If you have a master's or doctoral student you may have to create a specific course around his or her subject and then you try to round up some other students for that course as well (18:24).

Reading courses balance the lack of optional courses and are an attempt to provide a coursework with a small student group. They are designed almost on a voluntary basis on behalf of the teachers, usually around student projects and Tomas understands this to be a part of mentoring graduate students (22:23). It is seen as more a student project than an actual course and the teacher's task is to 'collect a reading list, hold discussion classes and such' (22:23). The framing of the reading courses is much weaker with teachers being able to move away from the textbook and add to the list of reading of their own choice. Students also take more responsibility for the curriculum.

But even the reading courses have been cut down in recent years. Rules regarding the minimal number of students for a course are adhered to more strictly and there is a tendency to cut down payments to teachers for such courses (22:24).

Students' research projects

At the graduate level of the programme, with teachers providing reading courses as a part of the formal curriculum and students working closely with their teachers and advisors on the individual research projects, the framing becomes weaker. Students' master's research projects are usually 30-45 credits. The student finds an adviser, a master's committee is established and sometimes some kinds of courses are provided, most often reading courses (17:8). Finding an adviser means that students become a part of the teachers' research team. They become co-authors with a group of other students or assistants (22:3-4). '[They] produce articles that get published in edited journals so this is ... a part of research' where students are cited as authors along with the teacher (22:4). 'But the main thing is that the work that the master's level students, not to mention the doctoral students, do, is work that will be of use in research and is often published as articles' (22:5).

Teacher research will be discussed in section 6.4.5 but it is fair to say that at the graduate level the framing of the curriculum, to a large extent, moves from the standard structure of the recontextualising field and bears more resemblance to the structure and dynamics of the field of production.

The service courses

The physics department provides service courses for quite a large number of students, mainly from engineering. Providing up to 28 courses that are all very large and with a large number of teachers, means that service teaching is a highly important part of the department's financial survival. The service courses are basic courses in physics that are very similar to those provided for physics students but give different credits or are adjusted to different abilities of students (18:5). The large number of student numbers often make it possible to offer specific tutorial and discussion classes to students from other disciplines. Tomas claims that the department consults their teaching with the service buyers, especially the department of engineering, 'that's the way it must be if it is supposed to function' (22:27). The textbook used is selected in accordance with the curriculum of the engineering students. But Tomas also stresses that the professional, disciplinary knowledge lies within department and the provision of knowledge should be within their custody:

But we are the disciplinary department, these are our courses, we teach them and have the custody over them. This is our subject but of course we have to do in such a way that it serves (22:26).

This is a difficult position and can give rise to conflicts when the department is somewhat at the mercy of the service buyers as will be discussed in section 6.4.4.

6.3.4 Strengthening the frames

As explored above, the physics curriculum has a hierarchical knowledge structure and strong framing at the BS level. The framing gets weaker as the students progress through the programme and at the master's level most of their curriculum experience is working on their research projects in cooperation with their teachers.

Knowledge and skills introduced in each course at the BS level is seen as a small brick or puzzle but exactly which courses students attend to gain the bricks does not make a great difference for their final outcome. Even though the programme does not provide many specialised optional courses the students are believed to have, in the end, acquired a solid trustworthy foundation:

The BS programme is mainly to establish a good basic disciplinary foundation and neither I nor [a colleague] has any great ambitions about our students taking [courses in this special area] nor that by the time they finish their BS degree they need to have done a whole lot of specific courses. Because they really learn enough. If they do spend the three years getting the right foundation and always solving interesting problems, it is the best training they can get (22:31).

In recent discussions within the department, an even stronger framing of the BS programme has been voiced. Halldor thinks that at that level the programme should be simplified and the optional courses should be kept to a minimum. The discipline should be general enough to incorporate all different fields or areas of physics within the BS programme. This claim has gained strength with the establishment of the graduate programme. With limited resources and money, manpower should not be spent on the basic programme but rather used to strengthen the graduate programme, where 'people can, without trouble, pull in their own areas of speciality' (18:15). Others are worried that simplifying the BS programme by abolishing the lines of study will mean less students interested in the programme and that the department should rather aim for a common core curriculum but also allow students to explore

different areas of study that will also show them further possibilities for graduate studies (22:40).

6.4 The regulative discourse of physics

6.4.1 Introduction

In the following section the main characteristics of the physics department are explored. Those characteristics discussed are the disperse nature and the small size of the department, the role of research and teachers' attitudes towards the value and difficulty of the discipline and finally the two types of physics in the curriculum. The discussion is meant to tease out those characteristics that are most influential in regard to the structure and development of the curriculum and the pedagogic practice within the department.

6.4.2 What is physics?

Like other teachers in the study, the physics teachers were asked to explain the nature of their discipline. This proved to be a rather difficult task. One of the participants found it feasible rather to explain mathematics as the most important tool of physics and another teacher refers to the Latin origin of the name saying that the 'name of it refers to its nature ... physics is Greek for Physios which is I think is analogous to Natura in Latin' (18:14). Physics, they claim, is about understanding natural phenomena, either theoretically or by simulating them (18:14) and it has:

Something to do with energy and mass and power and those concepts that are being used. And material refers to things dead or alive. But it has also to do with the methods and ways of measuring and numbers and models and theories and laws and finally using mathematics (17:22).

Under the heading *What is physics?*, the department website gives information about the kinds of tasks physicists deal rather than the nature of the discipline. It is difficult to know if the vagueness of definition is due to the complexity of the discipline, teachers not being used to addressing this question or if the question is just seen as irrelevant.

6.4.3 The dispersed department

Compared to the Department of Engineering and even anthropology, the physics department seems dispersed. As stated above, the twelve teachers within the department are located in five different buildings. Finding the actual or formal location of the physics department is no easy affair for me and even the department's website offers little helpful information. I run into trouble entering the offices of three of my participants. They all work in areas that seem to need to be highly protected and can only be entered by secret codes, intercom numbers and the assistance of friendly by-passers. This may only be limited to the actual physical space of teachers as students participating in an external evaluation of the Faculty of Science claim they found their teachers to be 'in general accessible' (Menntamálaráðuneytið, 2006b, p. 22). The dispersed location of teachers is more and less tied up with their research areas. Thus Tomas, being in geophysics, is located in the new Natural Science building; Thor has his research within the Science Institute which explains his location there; Rafn is one of the founders of various physics technologies and is located in The Centre for Technical Innovation and Halldor is the primus motor in experimental teaching and has his offices in the laboratory building.

The scattered location means that the teachers rarely get the opportunity to exchange ideas and discuss teaching and mostly 'you talk to those that are closest' as Halldor said. He adds that the department's location in different places does not provide a venue for 'common coffee times' but that the teachers do try to meet during lunch in the cafeteria (18:21). Tomas, who has recently moved into the new Natural Science building, is enjoying the opportunity to get together with some of his colleagues from the department as well as those from different science departments. He states:

[There is] ... a geological division within the department on campus ... we are here and then there is a department on the other side. I can feel how just by moving into this house has joined together this group and all communication is so much simpler. People take a walk to other floors, drink coffee ... this is so much more comfortable and has its influence (22:43).

Halldor claims that although the teachers do not share the same locations, the department has been fortunate and that within it you will not find much disagreement

and dispute over ‘small matters’ (18:25). Compared to the engineering department, the teachers within the department are nevertheless seen as not only being ‘more scattered’ but also ‘more individualistic’ (18:25).

The individualistic character of the department is interestingly explained by Rafn by the nature of the discipline. Rafn has experienced moving between the world of physics and the world of business where he discovered that even though the two fields made use of similar intellectual tools and methods such as maths and calculation, the way of thinking was very different and, as he claims, reflected in different type of governance. He feels that within physics you have a horizontal governance structure as everyone is at the same level. Teachers can disagree but it is done by the use of logical arguments. In the world of business, intuition plays a larger part and decisions are more made from intuition and opinion than logic. As you cannot have many opinions, someone has to be at the top. This calls for a more hierarchical structure of governance (23:23-24).

6.4.4 Surviving the small size and the financial strain

The Department of Physics is not only dispersed but it is very small. According to the financial distribution rules of the University (see Chapter 1), departments are allocated funding mainly in terms of number of students graduating. Since 1999 the physics department has been graduating on average 12-14 students a year. This number includes students graduating from the BS programme (in physics and geophysics), the master’s programme (from physics, geophysics and astrophysics) as well as doctorate students. At the same time the increase in number of students attending the University has been little under 50% (Háskóli Íslands, 2007a). The physics department is far from seeing the same increase in student numbers but Tomas states that would prove difficult as the student group they can actually recruit from is limited and competition is fierce from disciplines such as engineering and medical studies. New universities, establishing departments in engineering and science, will further limit the potential group of students (22:17-18).

The department’s survival is helped by the service courses provided for other departments, mainly engineering. The service courses taught by the department make up for about quarter of all the courses offered within the programme which only tells

half the story as those courses tend to be very large ones, with up to 15 teachers teaching on each course (22:25-26). So financially, the department is highly dependent on the income from the service courses. In discussing the department's policy, one of the major threats to the department's existence is losing the service courses (Eðlisfræðiskor, 2006). This could possibly happen if the service buyers such as the Faculty of Engineering decided to provide their own physics courses for their students. Tomas claims this is not a possible action at present as it is a common agreement that teaching courses should be done by the disciplinary specialists, although I am unable to find any formal documents stating that this is the case. The agreement seems to be an informal reciprocal one:

They [the buyers of service courses] can't do it within this system. That is the defence, the idea that the disciplinary teaching is best placed with the professionals in that discipline and also to protect that ... the foundation is not taken from the [discipline] (22:35).

The financial strain for the small department has been felt quite severely in the recent years and its effect is clearly visible in regards to the curriculum. The department has been forced to cut down expensive curriculum structures such as laboratory classes and practicals (18:8). Lack of finance makes it more difficult to employ part-time teachers and teacher assistants. The need for expensive technology and equipment makes the department especially vulnerable for financial cut downs:

There is a difference between faculties and disciplines. If you look at it the difference in need for finance is often because of the expensive technology and equipment needed within the sciences. We are not renewing our laboratories and the tools we need for teaching (22:34-35).

And as often seems to be the case, the financial strain influences the discussion about teaching in a negative way:

The discussion about teaching and the organisation of teaching is shaped by saving money and cutting down and then the professional aspects are left out (22:42).

The service courses will be further discussed later but it seems fair to state that physics as a discipline is a very small and vulnerable unit within the University whose financial survival is to a large extent dependent on the willingness of other departments to buy teaching services.

6.4.5 The importance of research

Development of research areas

Despite the small number of students within the programme there is nothing small about the discipline itself. The teachers within the department are all respected and well established researchers in their field. Their work is published internationally and in cooperation with the Science Institute they are successful producers within the field of production. Between them and the specialists at the Science Institute they are the founders and carriers of physics and physics research in Iceland. The first professors and founders in the department were well known physicists that applied their new discipline mainly to geophysical research within Iceland. Looking back on the research activities within the Science Institute, Helgason (1987) states that it has been threefold: Long-term research related to individual teachers; incidental short-time projects; and the creation of technical equipment for research (p. 132). Halldor explains how the department has been moving away from the more local research of the founders (Gíslason, 2000) and decided to focus their research strength on three main issues instead of ‘fiddling with this and that’ (18:12). Those areas are condensed matter physics, astrophysics and mathematical physics which are areas ‘that have some momentum and a critical mass’ (18:10-11). The main reasons for selecting these areas have to do with teachers’ interests but also the specific situation of the small size of Iceland:

The department cannot compete with large nations and lacks the resources and equipment – so people have just found their own niches where expensive equipment is not required and used their connections with other nations to go and get data that they then process at home (17:12).

But Halldor also stresses the international aspect of the discipline and research, claiming there is nothing Icelandic about it:

No we don’t want that. There is nothing Icelandic within astronomy, there is nothing Icelandic in high condensed matter, there is nothing Icelandic in mathematical physics. Yet those are the groups that get the largest fund, have the international connections ... we think primarily from the research (18:12).

This international research focus as well as the internationality of the discipline is stressed by other teachers as well and may be interpreted as the department’s attempt

to globalise their discipline and move it away from the localisation of its founders. But it is also a response to increasing research demand put forth in the University's research policy.

Research and the curriculum

Teacher research areas and their attitudes towards research are highly relevant in various ways to student learning. As has been discussed in section 6.3.3, the programme at the master's and doctoral level mainly revolves around student participation in their teachers' research which then in a way becomes the core of their curriculum. The teachers' attitude towards research is also influential in the curriculum discussion. Those speaking loudest in favour of research claim that until now the University has not lived up to being a 'real' university and has been:

[B]uilt up on totally false premises. The teaching done at the BS or BA level has not required the kind of research we claim is the basic foundation for university education and much of what we have been doing ... we could have done as good teachers without being highly involved in research(18:15-16).

Halldor feels that times are changing and the University's research policy has become something worth discussing. With the expansion of the graduate system the University may have a chance to become a 'true' university with its teaching and learning based on academic research. This should result in Bernstein's terms in strengthening the frames of the undergraduate curriculum and putting more effort into the research-based learning at the graduate level (18:16). Those views are shared by other teachers within the department although Halldor is the only one who voices the opinion that the University should move from meritocracy to become a more selective and elite institution:

I am not worried about competition – I am a strong advocate for competition ... I think the University should just close its doors and become a 8000 student research university of a high calibre and those that can not make it into the University in their first attempt they have to go somewhere else and try again ... we should not stick to this meritocracy and let everyone come in ... but close and become bloody good (18:39).

A strong research orientation was expressed by other teachers within the physics department as well.

6.4.6 The respected and difficult discipline

The elitism voiced by Halldor above may not be the common attitude of the teachers within the department but my participants do all experience their discipline as a highly respected one:

I sometimes feel that there is a bit too much admiration for us physicists ... This can be widely felt ... not only in Iceland but this is quite common. It is a discipline that is respected in the science community.

G: And you can feel that?

Yes you do.

G: By the way they talk about you?

Yes and to us (17:14).

The respect stems from the notion that the discipline is a difficult one to master and is respected as belonging to ‘disciplines that are founded upon mathematical physics that many have difficulties with’ (23:5). The abstract thinking, claimed to be needed to master the science disciplines, is not in the range of all students. This is, according to Rafn, a part of the hidden curriculum of students’ earlier schooling:

G: Why is it more difficult?

It just seems to be that many find it hard to cope with mathematics, this abstract thinking in mathematics and physics. So little by little it is constructed in the schools that those who can handle this can handle quite a lot. It is more difficult to study and it is not for everyone (23:5).

As will be discussed later, Rafn does see the abstractness and difficulty level of the discipline as more a myth than fact and thus as an approachable issue or problem in pedagogic practice. Others may not share that view and in the policy formulation one of the weaknesses mentioned is the tendency of teachers within the department to be arrogant (Eðlisfræðiskor, 2006). When I question the chair of the department about the indication of arrogance he only states:

(Laughs) ... there are people who are very aware of themselves and not everybody handles that equally well (22:46).

According to Bernstein, physics is an example of the singular disciplines which '[O]rganisationally and politically ... construct strong boundary maintenance ... and develop strong autonomous self-sealing and narcissistic identities' (Bernstein, 2000, pp. 54-55). The singulars are more concerned with their own development rather than their application to the field. This is very well demonstrated in the department's discussion around the University's policy formation where Tomas states the view that the discipline itself will always be above and more important than its recontextualisation and pedagogic practice:

We are mainly looking at the discipline, not the department ... It doesn't matter what happens to this department, it is just a structure, but it is the discipline. This is where the discipline is located and it is the discipline that is important. It is this kind of thinking we are trying to keep the [policy formation] within (22:33).

As will be discussed later, teacher and general attitudes toward the discipline is profoundly reflected in the pedagogical practice and attitudes towards students.

6.4.7 Physics is not physics

I soon discover that there are two types of physics, theoretical and experimental. Halldor and Rafn belong to experimental physics. Halldor explains that within all physics departments there is a certain tug of war between theoretical physics and experimental physics that 'appears occasionally when courses get organised and when decisions need to be made about the worthiness of the laboratory courses' (22:51). Halldor finds this turmoil 'normal ... because if you have different groups with different views you are bound to have [disputes]' (22:51). He further stresses that this is a traditional division and not always a clear one as some teachers may move between groups. But then there are those 'that are only in theories and do not do any experiments' (22:51) and the theoretical teachers are not commonly found teaching the basic courses in the programme:

They could be teaching the theoretical parts of the [basic] courses, that is quite possible. But it is more often the case that the theoretical physicists are teaching the theoretical third year courses (22:51-52).

Both Halldor and Rafn see the theorists being more conceited or at least being seen as more prestigious than those teaching experimental physics. Theoretical physics is

the ultimate abstract part of the discipline and the great thinkers belong to that section:

Yes it is the opinion here that it [the theoretical physics] is a bit more ... (above?) - yes the most posh. Well Einstein was a theoretical physicist ... and when it comes to thinking the greatest thoughts it will not be done with a screwdriver (22:52).

The division between theoretical and experimental teachers is, according to Rafn, stronger than in most other science disciplines. It is a division that is not necessarily found within the field of knowledge production where theoretical and experimental physicists always work in teams and ‘nothing will work unless you have both factors and then it would be my stance to carry a very strong respect for the part I cannot do myself’ (23:16). In research, the two parts are in a reciprocal relationship even though Rafn does think that the ‘theoreticals do not quite understand what a good experimentalist is’ (23:16). But when it comes to the recontextualisation and the teaching of the discipline, the reciprocal respect doesn’t enter the curriculum and ‘they think it is just crap to be teaching these [laboratory skills] to students. Somehow they experience this skill or talent as something that doesn’t have to be taught or practiced’ (23:16).

While the division between the two kinds of physics may both be ‘normal’ and ‘traditional,’ it does influence the curriculum in many different ways. It is elitism that divides teachers as well as students into two groups, favouring the theorists and appearing in actions like which students receive the greatest grants, as Halldor points out. He adds that ‘there is always a kind of elitism hanging over. The theoretical physics is seen as a track for the academically strongest students and the other one for [others]’ (18:18). And in the constant fight for finance, the laboratory classes with their expensive technical equipment are the ones that are first cut from the programme. ‘There is a lack of state of the art laboratory equipment in a number of departments’ (Menntamálaráðuneytið, 2006b) is the conclusion of the External Peer Review Group that recently reported their evaluation and despite good attempts this indeed affects the curriculum:

The laboratory part of teaching tends to tolerate worse the cut downs ... but we do try to stick together to defend that part of the programme.

Maybe it is more about what emphasis there should be within the programme (22:51).

In this section the characteristics of the physics department have been explored and structured. These characteristics are the ones that I see as being an essential part of the regulative discourse of the department and as such highly influential for the understanding of the physics curriculum and its pedagogic practice.

6.5 The regulative discourse in the curriculum

6.5.1 Introduction

In the following section, the appearance of the regulative discourse within the physics curriculum is explored. In the first part the aims and goals of the physics curriculum are examined. Then the focus is on the developmental trends of the curriculum programme and finally the methods of making curriculum decisions are explored.

6.5.2 The aims and goals of the discipline

In planning and constructing the physics programme, the aims or goal of the curriculum, tacit or explicit, provide some kind of vision of what makes a physicist a good physicist. Being a good physicist has much to do with applying your intellectual abilities. ‘You need to be a quick thinker and be able to figure the core’ (17:22), able to ‘understand logic and discursive relations’ (17:15) and ...‘to be perceptive with numbers and quite good in doing math’ (17:22). Students also need to have ‘an overview over physics’, to be able to ‘transfer the methods between problems’ and to be ‘able to think independently and take nothing for granted’ (17:36). Physics is more than finding the right solution to a problem and this is something students must be taught:

Much too simple thinking irritates me. Such as to think that each problem only has one solution. You have to get them away from that kind of thinking (17:35).

Learning to communicate is also seen as an important goal. A good physicist will need to be able to talk about the discipline in a common language understood by different people:

He [a good physicist] has to be able to talk about the discipline in plain language. Physicists may have to work with all kinds of people that do

not necessary have the same special knowledge and even physicists do not need to have the same area of speciality (17:36).

The teachers also want their students to become independent and to ‘turn out people that are independent, thinking individuals in this discipline that are prepared or ready to take on tasks without having to have their hand held at all times’ (22:9).

Finally, some kind of ‘workmanship’ is essential although it is difficult to put such ability into exact words. Thor refers to it as ‘intuition or what it should be called which is needed to become a good physicist’ (17:14). Although Rafn disagrees with the use of the concept of intuition he finds no other way of describing it. He explains that when you are teaching the students:

You are on one hand teaching the principles and the stringency and these logical things and that you can just do by books and lectures and God knows what. But then you have to teach, I think, intuition ... you have to keep them on your knee with an apprenticeship method (23:20).

He describes this modelling as ‘a child watching his parent ... that is how you build up this feeling. You have to get the feel of things’ (23:21).

6.5.3 Changes in the purpose: from elite to less elite?

How is the vision of the good physicist carried out through the curriculum? When the physics discipline was established around 1970, the department gave a careful thought to the aims and the goals of the new programme, predicting where the emergent need for graduates would be the greatest in the future. Thor describes how the teachers foresaw the future at that period:

First of all, some part of the student group would continue into graduate studies and secondly there were the students entering [secondary school] teaching or that’s what we thought we were educating people for ... Thirdly, we were educating people for industry or something like that but that was a bit ... unclear. But this was the picture, those three main compartments (17: 15-16).

More than three decades later, reflecting on the department’s previous anticipation, Thor claims that they have in some sense been quite wrong in their estimates. It is the unclear ‘third compartment’ that has become the largest receiver of students:

And then time passes, ten or twenty years and then it appears that much fewer students take on teaching than we had anticipated and probably more enter graduate studies than we had foreseen. But then the market just expands and students start to enter the computer field and into all kinds of mathematics – this has also happened internationally – into the financial system, the banks ... and the large scale industry and industry has taken more than we had predicted (17: 15-16).

The programme was not at all aimed at the unforeseen development and it came as a surprising ‘by-product’ (17:16) that seems to have been, at least on the surface, acknowledged by the department. On the department’s website it is claimed that ‘the training and methods of physicist are useful in many vocational areas’ and Thor states that ‘it is internationally known that the purview of those that have a physics education has expanded’ (17:15). With the expansion graduated physicists can now be found within various occupations as well as doing academic research:

We are so lucky here in physics that people work in all possible and impossible occupations from doing research into being in the banks calculating some changes in currencies and there seems to be an endless need for more people with some kind of scientific education (18:16).

But has this new need for a scientifically knowledgeable and skilled workforce been taken into consideration within the physics curriculum? Thor explains that quite the contrary, due to the University’s recent research emphasis, the department has without purpose ‘started to feel that we are mainly educating researchers ... and that may mean that unconsciously we are on the look out for that kind of students’ (17:23). Those students do not need to be the ones with the highest grades ‘because when it comes to doing research it is all about patience and determination’ (17:23). Yet there are few signs that the physics curriculum is being changed to specially train students for the third purpose and Thor claims that such actions would be both unthinkable and unnecessary as the programme has proved its high quality the way it is:

No we would never do that deliberately ... we would just say ok you go this way or that way – this just goes to show that this is a good foundation and there is no motive to change it (17:24).

Thor’s view is a good example of a singular argument and not all teachers agree with it. Halldor being the spokesman for experimental research is also the founder of the

latest line of study within the programme, applied physics. He speaks critically of what he sees as the 'elite' attitude within the department, accepting only the academically best students and focusing on theoretical approaches:

What I have for the longest time seen as being the problem for the physics department and more so earlier and before I arrived ... was that this was some kind of 'elite'. It only received the academically strongest students and nobody was anybody unless he could stand by the blackboard and had this theoretical approach. This was the bunch that was supposed to educate students for the various occupations and tasks made available for physicists (18:18).

His new line of study, he argues, has made new pathways for students who have the ambition to do some developmental and creative work within companies rather than entering pure academic careers:

We opened up a study line in applied physics which is physics that makes it possible for the kids to get into developmental work in modern companies and invent and so on (18:18).

He feels that by providing the new line of study, the department has opened up the programme for a broader group of students suggesting that the 'academically best' students are in fact not the best candidates for the new era of work. The students needed are the more practically oriented and creative ones who seem to avoid physics and rather enter engineering as a field of study where they, in Halldor's view, graduate with a lacking background in science:

Yes, and we find out that the academically strong students are not necessarily the best ones in physics and not necessarily in the areas that we want to stress. We are not turning things around and saying: Lets just take in the dunces but the others can stay on in the theoretical physics but this is how things happen ... Those [students] we really want in the programme are partly those entering engineering. Not to steal them away but because we think that in many ways the modern high technology society needs a stronger science foundation before you enter the application (18:18-19).

It remains to be seen if Halldor is right and the new line of study will work against the elite curriculum within the department and recruit a new type of student to the programme.

Rafn, being even more critical than Halldor, feels that the department has in fact never discussed its aims and what kind of students to graduate. This laissez faire attitude is according to him ‘tinkering and as such not very efficient’. Wrapped in their own pomposity, the discipline has never felt the need for a critical introspection nor taken into account environmental needs. What has kept the discipline afloat is the ‘luck and good fortune’ that creating elite researchers is in alignment with the temporary needs of society and ‘this methodology we have such experience of using [i.e. doing scientific research] is the same one that society needs to adapt to’ (23:31-32).

6.5.4 How is valid knowledge selected?

The developing curriculum

Within the department there is little need to discuss the curriculum per se and the teachers do not see themselves as having active agency in the selection process. When I ask how the content of courses is selected, Halldor explains that it is not ‘selected’ but is rather an agreement based on departmental tradition:

You see we don’t select the material for the courses, we come to an agreement what is in the courses. It is more and less a departmental tradition. If you teach *Electrodynamics* this is the material you cover, if it is *Physics 1* you are teaching this is the material you cover and if you teach a laboratory group these are the experiments you teach (18:26).

This departmental agreement doesn’t have to be discussed or debated and it is only when teachers do not stay within the agreed frame of topics and demands that the department finds the need to interfere and take action:

G: And this gets discussed?

This is discussed and we have emphasised that it is the department that selects the teaching. The discussions we have within the department are often because a teacher is too demanding towards his students so he is using more of their time than is normal or wants to make a course more difficult than has been the tradition (18:26).

Designing basic courses is seen by Thor following a ‘rational coherence-structure’ (17:37). You may wonder which problems or exercises to include for students but mainly this is ‘an inner structure’. The ‘inner structure’ or ‘rational coherence-structure’ refers to the strong framing of the disciplinary content and its structure that

is taken for granted. Of course, he states, there may be some other factors that need to be considered such as the size of the classroom and ‘if you want to use overheads ... or if you want to do this on the blackboard ... or how you use the Web’ (17:37).

The minor difficulties felt by teachers in organising courses could suggest the timelessness of the discipline, but Thor claims that the discipline has changed enormously in the last 35 years in line with international development (17:11). The issues and the emphasis within the discipline have changed ‘because things are being used in quite different ways and there has been such progress’ (17:11). He then goes on to explain how modern physics, that was developed around 1900 (the theory of relativity and quantum mechanics), only entered the physics curriculum in 1950 while many of those theories were not being fully applied in technology until the latter part of the century. So while the disciplinary content has been more or less the same in the last 50 or 60 years, its application in modern technology has moved it from being abstract ideas to becoming the source for everyday items like computers, changing the presentation of the subject within the pedagogic practice:

But now this technology that is used in computers and all high technology is based on physics from 1900 which means that now when we are teaching them this physics we can make references to the computers ... and daily life (17:21).

Although courses are still taught under the same headings and with similar content since 1950, the way they are taught or the instructional methods and practice is different:

We try to follow the times ... but yet ... I think the main development takes place within the courses. The courses taught in the 2nd and 3rd year are taught quite differently than they were under the same name or almost the same name twenty years ago (17:20).

The curriculum changes follow the evolvement of discipline and the research methods applied:

[Research methods] are becoming a larger part of the discipline as it becomes ... more analytical. The discipline develops and people are using much more sophisticated models today than twenty years ago. Partly because of the use of the computers (22:30).

The international/global curriculum

The structure of the physics programme is, according to Tomas, mostly related to the US system but as Europe is moving into a similar system there will be little difference between the systems. There is nothing Icelandic or local about the content or knowledge of the discipline:

Not in regards to content – of course not. Not unless you go into deeper thinking like that thoughts in one language are never the same as in another language ... but we are teaching the same things and we are of course using English textbooks throughout (22:29).

There may be slight cultural differences, Tomas adds, but they are more in terms of instructional practice and traditions and the length of the programme:

In Germany there would more discussions – there they would discuss things more philosophically than in UK and US ... These are the same things but there is difference in how much basic education you have got (22:29).

As in engineering, international textbooks largely determine the content of the courses as well as the problems and experiments students make within the course. A few years ago Rafn's teaching assistant did a survey of all the textbooks used in the basic physics courses internationally in order to find a textbook that would be well suited to use with computer-assisted learning. He found that there were only 3 to 5 textbooks used all over the world in this specific course (23:13). In the foundation courses the textbook creates the foundation both for the course structure and its content. Thor explains that this can be done as the content of the basic courses is so standard all over the world and it is a frame that students also feel comfortable with:

When I teach *Physics I* which is a big course for engineering students, I like to follow the textbook ... I also think this is what the students prefer. These books are very standard, and we joke about them all being the same. But they do have a standard content; it is a strong tradition what you teach in first year physics.

G: You can go all over the world and see this book and teachers are teaching like you?

Twenty books and they are more and less the same. The same subjects and mostly in the same order (17:31).

Thor explains how he changes the course textbooks every 5 to 10 years and claims ‘you may have a very standard content but you vary what you want to cover in class and what to emphasise’ (17:38).

6.6 The instructional discourse of physics

6.6.1 Introduction

In the following section the focus is on the instructional discourse of the physics curriculum. The section starts by articulating the student identity embedded within the discourse and how curriculum development calls for new identities. The pedagogic practice of physics is analysed in regards to its framing. Finally teachers’ attempts to go against the traditional pedagogic practice are described.

6.6.2 The student identity

The instructional discourse carries within it the identity of the student and within the Department of Physics the disputes about aims, goals and the future development of the programme is reflected in discussion about the spectrum of legitimate student identities.

The intellectually strong students

As explored in section 6.5.2, the cognitive or intellectual abilities of students are highly emphasised within the physics programme. This means that the identity of the intelligent and academically strong student is strongly embedded in the regulative discourse of the discipline.

Rafn claims that what distinguishes a good student from those who are not ‘is the ability to think logically ... which students more and less bring with them to the programme’ (23:22-23). So the identity of the good student needs to be established long before he or she arrives at the department. The secondary school plays an important role in the identity formation, not only in preparing students in regard to knowledge and skills but also by initiating within the students the respect for the discipline and its difficulty:

Nobody enters these disciplines ... and succeeds unless they are well prepared from secondary school and of course it pays off to have

already acquired the *modus operandi*. And to know that you do not learn a subject like that by merely reading for the final test (17:19).

The difficulty of the programme is seen as unquestionable and indeed closely related to its perceived quality. To enter the department the students need to arrive from certain lines of study within the secondary school system and must fulfil the faculty's requirements for minimal knowledge in mathematics, physics and science. But to be able to survive the student needs to have taken all the mathematical courses provided by the secondary school and if possible some of the other science subjects as well (22:10). A good science background from secondary school may help but nevertheless the students have to work very hard to make progress and possibly much harder than students in other disciplines:

G: What students will make it?

There are all kinds of students. This is not an easy education and the students claim that they have to work hard for their credits. That is most likely true and they claim they work much longer hours than students in other faculties. This is possibly right. I don't think it is any more than in engineering but this is what they claim and they may well be right (22:11).

To survive the students have to put in effort but to be brilliant is more difficult. Some of the students can't take the strain and leave after the first year, often moving to engineering:

I think they need to put in more effort just to survive here. But in order to be brilliant then you have to be a fast learner because it takes a lot of effort to get the basics ... and how well they do ... we don't have any statistics but we always lose some students that decide to leave after the first year, possibly to enter engineering. But that may be a practical attitude that is behind that because the beginning there is not any easier (22:11).

Rafn claims that the message of the difficulty of physics is put clearly to students arriving at the programme. The tradition was to meet new students at the beginning of the school year with a 'fright lecture' with the following message: 'You idiots are here and will now be made to feel it. Now you better do well' (23:26). But this attitude of welcoming students, he adds, was discussed within the department and abolished. Yet he still feels that those students that don't fit the department standard are met with hostility:

G: How are students that don't do so well in the first year handled?

How do we handle them? With a total lack of mercy! This is a snob community that hates idiots (23:27-28).

Those who do get through and graduate are top quality students. The department has kept statistics on their graduate students for over a decade and are quite pleased with their progress. Most of their students have entered further graduate programmes and many have graduated with a PhD degree although one has to keep in mind the overall low number of graduates. But in the eyes of the teachers, the statistics reflect the quality of the programme and the stamina or resilience of the students that make it all the way:

We do have a difficult programme and we do make big demands and that means that some [students] are left off and can not finish. But on the other hand those that have graduated from here have done well (22:15).

The department wants to graduate students who have a strong and good foundation at the BS level and know their discipline and the skills needed and know where they want to go from there 'but it is what comes after the BS that matters most' (18:16). After the BS degree, students either go abroad for a further degree or attend the rather newly established graduate programme within the department. This creates turmoil between teachers' loyalty for the discipline and their ambition to expand the programme. Halldor claims that the majority of their students have gone to graduate studies abroad, which has made it difficult to develop the graduate programme within the department. Students are interested in going abroad and 'they all get funded in these US universities which is much better than what they can get here' (18:16). Tomas stresses the need for his students to go abroad above the need to further establish the graduate studies (22:5). In a small community as the physics department, the students' minds require more stimulation than a small group of teachers can possibly provide:

This is because I think that ... as this is not a larger society they [the students] will in three or certainly in five years ... the teacher will not be able to surprise them anymore. They will know in a sense ... all the ideas that this world carries within it. They know them and have become accustomed to them. And going somewhere abroad for your education ... into another world, another environment, is very important in order to increase their broadmindedness (22:5).

But this is also important for the healthy growth of the Icelandic science community that would otherwise be in danger of disciplinary inbreeding:

At least I feel that the Icelandic science society or community needs to be aware of not getting isolated in their own ideas or problems ... There is a danger of degeneration (22:6- 7).

New student identities

With the small number of students as the most pressing problem of the department, there is a perceived need to figure out means to attract more students into the programme (22:16).

In the interviews the teachers mention positive attempts made by the mathematics department in this regard. According to the teachers, the Department of Mathematics has recently changed their policy and goals in order to broaden their programme and attract more students. Having previously only accepted the very best students, the department has now decided to 'teach the whole group' with the goal of graduating 'useful' mathematicians as a reaction to a great need for mathematical knowledge and skills in society (23:28). To reach out to more students, the mathematics department has 'established more lines of study, made optional courses and done them in such a way that instead of taking very pure mathematics, students can take more practical mathematics' (22:16). The physics teachers may admire the mathematical department's strategies but find it difficult to make such changes within their own curriculum, stating that 'we of course don't do anything special [to recruit students]' (22:19). The mathematics department's strategy is though clearly reflected in Halldor's quest to attract more practically oriented and creative students to the programme (see section 6.4.2).

To recruit more students by the methods of the mathematics department would have to broaden the access to the programme and new student identities would need to be accepted.

The teachers find possibilities of student growth in two different sources, i.e. foreign students and females. Within the department there are quite a number of foreign students, mainly attending the graduate programme. The foreign students are welcomed and seen by Tomas as both adding something new to the discipline and

making it more international. Within geophysics there are specific courses taught in English and if foreign students attend reading courses they will proceed in English. At the undergraduate level the foreign students create a dilemma and the department is not keen on offering courses in English as it is seen essential that 'students can talk about their discipline and think about their discipline in Icelandic' as Tomas explains. If the courses are taught in English 'we are stuck with a group of Icelanders that have not studied their discipline in Icelandic' (22:22) and will thus not acquire an Icelandic disciplinary discourse.

The lack of female students within the programme is a more pressing problem that could partly solve the lack of students:

I mean we would like to have equally as many females and males and that would mean doubling our student number (18:20).

Within the Faculty of Science, female students have, in recent years, just outnumbered the male students and are steadily increasing their ratio. Within the physics department they make up around a quarter of the student number with only the maths department showing a lower ratio. The few women entering the programme usually decide to enter the geophysics line of study. Halldor thinks this may be because within geophysics they have a female research professor who attracts the girls into the discipline and has created 'a strong feminine group' (18:20). Thor claims that the department has been trying to 'help' female students to adjust to the culture of the discipline. The girls in the programme have decided to meet weekly for support and to share their work and experiences and the department has supported this attempt (17:18). Those female students who dare to enter the programme have faced more difficulties in their previous studies than the males (18:20) and thus stronger and are experienced as finding it easier to adhere to the strain of learning and fulfilling teachers assignments. They are in general thought to have 'better ways of working' (17:19) and being much more conscientious than their fellow male students (18:20). Thor finds the female students more passive, asking fewer questions in class and not as eager to participate in discussions but handing in their assignments 'dutifully' on time (17:18). The problem is nevertheless to get the girls to enter the 'last battleground' i.e. into the Department of Physics:

Maybe we are just so awesome...it is just that this is the last battleground that seems so inaccessible (18:20).

Discussing the attitude towards students, Rafn claims that the real difficulty of the discipline is somewhat based on myths. Those myths are used or have been used to repel some students, such as the females, from the discipline. Within the school system, the myth of the difficult discipline goes hand and hand with the idea that girls are less likely to succeed in science. This attitude, embedded in the regulative discourse of the science disciplines, steadily and often quite painfully, drives the girls away. This attitude towards women somewhat still exists within the department (or in its regulative discourse) explicitly or inexplicitly, he claims (23:25-26).

The passive student

The student identity least liked within the department is that of the passive, consumerist student. Those students that make it into the programme arrive with a clear notion of what it means to study physics, have clear recognition rules, but the physics teachers complain about their passivity. Thor, who has a long experience of teaching, finds the students different from what they used to be in 1970-80. At that time the students then didn't want to be spoon fed he claims. They wanted to understand and actively participate in classroom discussions. The students now are passive receivers and often it is difficult to know how much they actually understand:

Now it can be very difficult and I sometimes think they just don't understand what you mean ... You can see it in the student course evaluation that a large part of the 1st year students want the teaching ... to emphasise that it is easy to take notes (17:33).

Student passivity casts teachers in the role of knowledge providers rather than being able to carry out a dialogue with the small portion of students that still value that kind of tutoring. And the knowledge provision has to take place at a slow tempo to make sure that students have been able to copy down their notes:

They just show up in class, the teacher is supposed to write on the blackboard ... and his writing is supposed to be readable. He is not supposed to use overheads because if he has overheads then it is always the danger of him proceeding too quickly. He is supposed to talk rather slowly so they can write at the same time. Then there is a part of the group, 5% or so, that arrives with a good foundation and wants the teacher to carry on a dialogue (17:33).

Thor claims that student passivity is an issue that teachers in the department discuss, even though some claim it is just rumbling of the elders. On one hand he finds it interesting to see the changes in the student identity but on the other hand it can 'become tiresome when students really want to have something you feel they should not be asking for' (17:34). Thor also thinks teachers should not give into a passive mode of learning although it can be justifiable in the first year in the programme. But as the students progress, teachers do try to approach them using different instructional methods than lecturing and as the students' group usually get smaller this becomes easier (17:34).

Teaching the service courses

With the large number of service courses I am interested to know if the teachers find it different to teach their own physics students or students from other disciplines. After taking his time to contemplate the question, Tomas claims that teachers are not all fit to teach the service courses. Service teaching can be especially difficult for teachers who are highly interested in their subject or are 'fireballs':

Some only want to teach the physics students and are possibly fireballs; burning fireballs that get lost in the subject ... which can be a wonderful characteristic of a teacher if he manages to captivate his students ... but that may not be the best teacher for service courses (22:26).

Fireball teachers do not always have their feet on the ground and make too great claims on students' time and interest. Students in engineering see the physics courses as a necessary part of their engineering curriculum but are not always as interested in the physics discipline as the physics students – and their teachers:

I would say that most of the engineering students do like what they are studying, that's not the problem. But their main interest is not in physics and then they might see it as something that they have to learn ... see it as a necessary part (22:27).

6.6.3 The strong framing of pedagogic practice

The strong framing of the regulative discourse is reflected in a strongly framed pedagogic practice that does not give room for much speculation. Teachers are convinced of the good quality of their programme as they turn out good students and

that is seen as an indication that teaching is indeed working. Students' request for references is taken as a sign of good teaching:

G: How do you know when you are doing well in teaching?

I don't know, you kind of feel it. We experience that students are turning to us for references to get into other universities and then you know you have done well. And our students, they fly into the best universities, it is quite incredible! (18:36).

Halldor states that he is not a very good teacher, at least not when it comes to lecturing. He doesn't have any specific role models in teaching and claims he is in fact 'not very conscious about his teaching' (18:35). He just tries to do it as well as possible. With a long experience in teaching it is possibly not much to discuss, different from times when teachers were young and rebellious:

When I started here I was a young and angry man and rebellious and fought for all kinds of new things and I was interested in teaching (17:45)

Within the basics courses of the BS programme the pedagogic practice is strongly framed and has a 'fixed form' which could also explain the limited need to discuss pedagogic practice. The 'fixed form' of teaching is described as such by Tomas:

I mainly use lectures and then we have project classes ... in almost all of the courses that I teach ... usually there are tutorials and I give them problems or projects and they hand them in. This is in a very fixed form in this discipline. Weekly assignments and then tutorials and problem classes where the issues are covered and discussed (22:19).

The 'rational coherence-structure' that is seen as the backbone of the curriculum structure is also at work when it comes to the pedagogical practice of the courses. Halldor describes his lecturing as moving from simple things to more complicated issues and his teaching being 'all about explaining the things that are difficult':

When I do lectures I try to hold a red thread, some progression in the course. I may teach a course that starts with the basics and finishes in some complicated application. I usually try to teach the basics in those complicated things so that students can try to puzzle them together ... I try to have them see the basic a, b, c's but then I also strive to get into the x, y, z's.

Halldor prefers teaching laboratory courses over lecturing saying: 'I think it suits me well to teach man to man by showing students and talking to them and then I try to make it comfortable and simple' (18:29). He doesn't particularly like lectures and questions their usefulness claiming teachers 'are teaching straight from the textbooks and people can read' (18:29).

In the courses, teachers hand out rather detailed syllabuses which usually 'include the date and name of the lecture and the chapter that will be covered in the lecture, all published on the Internet' (18:36) and do not 'deviate from it more than one lecture' (17:42).

Teachers' freedom within the pedagogic practice seems to be limited to time rather than content and practice. They are able to either spread out or compact their courses and can come to an agreement of some kind of work exchange with their colleagues:

You do have a certain freedom; people that are much around [the world] may condense their lectures or extend them over a period of time. The rule seems to be that you get together with a colleague that is in a similar situation and they exchange, i.e. if a lecture needs to be cancelled.

G: But it is not like that you just say: Well I don't believe in lectures so I am going to increase the number of tutorials?

No! (18:33).

The instructional discourse of the reading courses provides the teachers with weaker framing and teachers' personal pedagogic theories become more visible. Halldor explains how he 'sacrifices' lecturing to give students more time for projects as it is his belief that 'it is the student that studies':

If we have a reading course ... I sacrifice the lecture but keep the same amount of problems and projects ... because I really believe that it is the student him or herself that does the studying. The teacher helps if he makes an effort but mainly it is the student that studies (22:19).

Halldor continues to explain that preparing and giving reading courses does not lessen his curriculum work and that sometimes the area of study is not well known to the teacher who may need to 'write up notes to get to grips with the material':

I put much more effort in creating notes and then summarise the material in about half an hour and then we may take one and half hour in the projects and problems (22:20).

6.6.4 Assessment

The regulative discourse as well as the strong framing of the pedagogic discourse is very visible in the assessment practice of the discipline. Within the programme the assessment practice is based on a long tradition. In most courses, students hand in their weekly assignments that are read over and graded by teachers but count for little in the final course grade. During a survey of the pedagogic practices of other universities, Rafn's teacher assistant looked at the organisation and value of assessment and found out that in many universities the final exam counted around 30 – 45% of the final grade. In the physics department this number is usually about 80–100% and Rafn claims 'you almost have to cheat to bring in other things' (23:13). By 'cheating' he is referring to the department's rules on assessment to which teachers are expected to adhere. Rafn thinks those rules are based on tradition that he knows from his own time of studying in UK and the belief that the students' ability to carry out such an enormous task is proof of their academic capability (23:13-14). The emphasis on the final exam is under scrutiny within the department and Halldor claims he is no longer allowed to practice what he has been brought up with and honestly admits he finds the least time consuming:

I am one of those who likes final exams as the only means of assessment but supposedly I am not allowed [to hold that view] any longer. So now we credit about 20% for experiments and sometimes the problems count for something so the final exams are not 100%

G: Why would you like that?

Well it is just something I was brought up with but I am getting milder. Possibly it is just because it is much more labour for yourself to be giving feedback all the time. It may be nothing nobler than that (18:37).

In accordance with ideas about the difficulty of the programme, students rarely receive high grades. In fact grades tend to be so low the department head feels the need to explain them when asked to write a letter of reference for a student going abroad:

I just tell them that the grades reflect the traditions and habits here and actually there is no point in paying attention to the grades overall per se as a number. It is more relevant to look at the student's place within the student group (22:15).

The division between the theoretical and the laboratory physics is reinforced by the different understanding or conception of assessment and grading. In the laboratory classes the teachers assess the practical work of students towards the final course grade and find it difficult to keep that stance against their more theoretical colleagues. Grades from the laboratory classes tend to be higher which is explained by the process of not accepting students' work unless it passes a certain criterion. Students are required to redo unsuitable assignments so in a way 'everyone' passes. Because of this, the laboratory teachers have 'found it very difficult to keep the value of this grade within the minds of our colleagues' that find it difficult to accept such high student grades for just 'lolling in the lab' (23:15).

With the high stakes of the final test there is a tacit contract or agreement between student and teachers regarding the assessment procedures. Fairness in assessment is stressed by teachers and reflected in the emphasis of coordination between student groups and years:

People here do emphasise that there is coordination between years and from group to group. This is what we see as most important about the assessment (17:46).

Differences in grading are compared and discussed and if someone is giving unusually low grades that is looked into (17:46). Students keep a keen eye on teachers' assessment practice and disapprove of any changes in content as well as methods. New assessment methods, as Thor's attempts to introduce multiple choice tests, were met with great resistance and have not been taken up by other teachers (17:49). The final tests are published on the University's website and are accessible to students who do not like any surprises in the test and look at such attempts as despicable deceit on behalf of their teachers:

I have tried to take into consideration or used as a paradigm what has been taught [to students] before. The kids pay good attention to the final exams and they become totally mad if there is something unexpected in the exam. The exam from previous years are published

within the university and students can access them anytime ... they think it is despicable if you betray them (18:34).

This common agreement among teachers and students is noticed in the final report of the External Evaluation Group. The group finds students' access to the final test worthy but nevertheless criticises the 'recycling' of exam questions:

Student access to old exams is commendable. However, student comments about recycling of exam questions were worrying to the PRG. The Faculty must make sure that students cannot, through studying older exams, anticipate certain exam questions year after year. Teaching staff must adjust to this reality when preparing exams (Menntamálaráðuneytið, 2006b, p. 19).

6.6.5 Going against the tide

With the strong framing of the pedagogic practice and students not willing to break the frame, instructional changes are difficult to make. Rafn has for a long time been keen on pedagogy, is affiliated with the Centre for Teaching and has no difficulties in discussing his theories on teaching and learning or explaining the rationale behind his teaching. He explains how he begins his course by focusing on concepts he knows are abstract and difficult for students to understand. In the early beginning he wants to accomplish two goals. The former one is to 'get them to talk' and the second one is to get his students 'to use their normal knowledge, their common judgement to tackle what they think are abstract concepts, which may not be so abstract after all' (23:10). He uses a specific method for the latter goal, asking his students to go back to the imaginary world of their childhood and visualise themselves as electrons travelling through matter (23:10). He finds that to begin with some of the students find this approach 'below their dignity' but do appreciate it in the long run (23:11). This is essential, he claims, because it is totally pointless to go far into this world of concepts if there are some basic ones that have never made it through (23:11). He encourages students to make use of their common knowledge, to use 'their world view' to tackle the basic concepts that students seem to fear and be in awe of (23:11-12). He does this by making the subject more approachable, showing his students how famous physicist and Nobel Prize winners have been given credit for work that now is just 'common sense' and a rational development of knowledge that everyone, including the students, can participate in. He finds that physicists are prone to overemphasise the difficulty of the discipline, putting it upon

a distant pedestal which at the same time makes student thinking more (and unnecessarily) difficult (23:12).

Rafn also claims that there is a historical problem in the pedagogic discourse which makes it unnecessarily difficult for students. The regulative discourse of physics is historically located and theories and knowledge that were once a part of certain worldview have earned their place within the curriculum and are still being referred to and used despite the changes in the world. This makes learning difficult for students and issues that would be rather simple to explain are not because:

Traditionally you get stuck in using something that in the light of today's world view makes life just difficult. And I don't think we in physics are free enough to tear ourselves from that and say: How am I going to transmit this knowledge in the world view of today? Why do I always have to go back and look at things in a historical context? (23:12).

With his pedagogic practice, Rafn is not only going against the pedagogic discourse of the department, but students as well find his approach at times both strange and even improper. The regulative discourse of the discipline does not suddenly appear in the University and students have been moulded by the disciplinary regulative discourse in the secondary school. The strong framing and classification of the discipline means that it is taught in similar fashion in secondary schools where the pedagogic practice of the University is imitated. Students arriving from secondary schools have acquired the recognition rules of the discipline and know what to expect. When these rules get violated, students are thrown off balance:

The question is where those expectations come from ... You know they have been taught this subject through their secondary school education and all the way up to us in a very traditional way. So really ... those are very normal reactions on their behalf when something comes up that is different than this traditional they have seen all the time – then it is strange (23:7).

Discussing the methods of teaching or the pedagogic practice, Rafn refers to the strict frames of the environment. Teachers that want to do something different are kept in their place by the tradition of the discipline's regulative discourse. He claims 'it is first and foremost the teachers that create this environment' (23:7-8).

Changes in the pedagogic practice are rare and the only major ones within physics have been the abolition of tutorial classes in the first year where students are now meant to use a computer programme that accompanies their textbook instead of participating in actual tutorials. This development, which has come about because of larger student groups and the lack of manpower and finance, is also an attempt to incorporate technology into the programme:

I have always enjoyed teaching in this way [small tutorials] because it allows you to come closer to the students. But we just don't have the manpower to teach in this way. It is because the student group is becoming larger and then we find out that there is this technology that has entered the market along with the textbooks ... where we use computers instead. And the students can sit by their computers and work on their problems ... and they even get some feedback if they do something wrong (17:28).

Even though the teachers find the use of the new computer programme interesting they are not all that eager to participate in its introduction themselves so it becomes the role of a newly hired teacher:

And we ... incorporated this technology at the same time ... and this teacher is ready to teach this with this new mode (17:29).

The new teacher, who is in charge of the first year courses within the department, has a rather unusual background. He has recently left a successful career within the scientific industry but has no experience in teaching. His hiring was controversial and to begin with the Department of Engineering was not at all pleased to have their students handed over to an inexperienced teacher in service courses. But the new teacher has proved to be full of ideas and so interested in his new role that 'he even likes to talk about teaching' (17:28).

Rafn explains how the new teacher, due to his previous career, has the status that gives him the strength to ignore the environment he has entered: 'He has quite a status and experience. So if a younger person would try to do this ... I am not sure they would ever dare' (23:8). The teacher is new within academia but arrived there from a 'hard world of physics so many of our people wouldn't dare to take him on' (23:8). Being a strong foreigner in a new environment, he is not bound by the discipline's regulative discourse and is 'ready to try out new methods and possibly has time to do so' (23:9). He finds teaching interesting and 'is a man that can not be

bothered to hang on to something that demands no thinking' (23:9). Although the new teacher does things that others would not see as appropriate, Rafn claims that because of his status he would have to stretch the pedagogic frames very much before others to have the nerve to find him odd (23:9).

Summary: The pedagogic discourse of physics

The curriculum structure of physics is like in engineering, characterised by a hierarchical knowledge structure that gives rise to an integrating code. The content of the curriculum (the knowledge) is strongly classified with each course seen as a necessary 'brick' in the whole and with straying teachers put 'back under control'. Students arriving from secondary schools hold strong recognition rules, i.e. are well aware what physics are and are not.

The discipline's characteristics as singular are demonstrated in the department's research emphasis with little, although increasing, interest in making the curriculum performatory.

The classification of engineering is strong and, as in engineering, the basic physics courses are strongly framed by the extensive use of textbooks and courses are easily rotated among teachers. The curriculum knowledge is seen as 'international' meaning that the strong classification of course content is seen as external and universal or global and having an international 'exchange value'. In the upper undergraduate level and especially at the graduate level the classification becomes more internal or local as teachers' research areas are introduced as optional courses. The curriculum is at that level mainly defined by the disciplinary research areas that the department has selected as a consequence of teachers' research strengths and the department's access and availability of resources.

The students' identity is strongly framed at the undergraduate level where students are seen as needing hard work and extensive intellectual ability to struggle through a difficult programme. At the graduate level students come to be more as teachers' co-workers than students, opening up a much weaker framing of the relationship.

The instructional discourse has a very strong framing at the undergraduate level and the rare attempts to change the instructional discourse are met with hostility by

students and only undertaken by the 'foreigner' in the department. Due to low student numbers, 'reading courses' are provided at the graduate level. The framing of the instructional level of the graduate programme becomes weaker with teachers having a more free hand in selecting topics of study and students taking more responsibility for the curriculum. A large part of the graduate curriculum involves students' research projects, where they usually assigned to teachers' research teams producing 'real' research. At that level the curriculum content is strongly related to teachers' participation in the field of reproduction, i.e. their research areas.

CHAPTER 7: DISCUSSIONS AND CONCLUSIONS

7.1 Introduction

In the previous chapters I have described the curriculum of the three different disciplines by creating a picture provided by the participating teachers, by my observations and document analysis. The pictures portrayed have to a certain degree been structured by the theoretical framework in which my research questions are embedded, but at the same time each discipline has been allowed to unfold in its own way. The emphasis given to different curriculum issues by the participants varied within as well as between disciplines; what was seen as an important issue for discussion within one was not experienced as such in another.

I began this study with two research questions (see Chapter 2.4):

- I What conceptions do teachers have of the pedagogic discourse of the three disciplines explored in the study (i.e. mechanical and industrial engineering, anthropology and physics)?

This question was further developed through the use of a theoretical framework provided by Bernstein:

- Ia How do teachers at the University of Iceland experience the regulative discourse of their disciplines? What is the 'moral order' within the disciplines, what are their aims and goals and what are the student and teacher disciplinary identities?
- Ib What conceptions do teachers have of the instructional discourse of their disciplines? What is the pedagogic practice of the disciplines and how is that seen as being related to the regulative discourse?

But I also argued in Chapter 2 that from a socio-cultural standpoint I needed to explore the context of the curricular discourse. In particular I wanted to explore how the teachers within different disciplines regarded their space and agency to make curriculum decisions and the second research question was as follows:

II How do teachers in different disciplines experience their space and agency in regards to curriculum decisions-making and development?

In this chapter the research questions will be revisited and reviewed in the context of the theoretical framework, other research and the research data. In section 7.2 the theoretical framework is revisited and the pedagogic discourse of the three disciplines summarised and presented in a table. In section 7.3 the focus is on the first research question, i.e. is there a specific pedagogic discourse to be found? The question will be addressed through the introduction of the local pedagogic discourse and its relation to its universal one. The strongest influence on the local pedagogic discourse, i.e. teachers' previous experience of study, will then be discussed. The focus then moves to the context of the local pedagogic discourse and different departmental cultures and organisation will be addressed along with the organisational saga of the discipline and the contesting ideologies within the discourse. Finally, the implications of the existence of a local pedagogic discourse on the regulative and instructional discourse will be discussed.

Moving to the second research question, on the teachers' experience of their space and agency in regard to curriculum decision making and development, section 7.4 revolves around the curriculum spaces and changes. After discussing the concept of power within curriculum development, I explore the different curriculum spaces awarded to teachers within the three disciplines. The curriculum spaces are explored through the classification of knowledge and the regulative and instructional discourse of the disciplines. Finally, the external influence of textbook publishers and the influence of the 'good teacher' discourse are examined.

Finally, in section 7.5 the different curriculum forces affecting the local pedagogic discourse will be explored and discussed using a framework provided by Becher and Barnett (1999).

7.2 Classification and framing applied to the pedagogic discourse

The disciplines explored in the study were selected on the grounds of their assumed epistemological and social differences as portrayed in the work of Becher and Trowler (2001). They were assumed to carry within them differences with regard to the aims of study, the organisation of the curriculum and the epistemological views

of the teachers. The departments were also considered to share some features as they are located within the same institution and obey the same institutional rules and regulative framework. As discussed in section 2.3.4, the disciplinary departments are embedded in a cultural and institutional context that controls and frames their fundamental being as educational units. So the aim of the study was not so much to see if and how the disciplines differed in terms of their curriculum but rather to make attempts, through a conceptual approach (Bernstein, 1996; Posner, 1998; Squires, 1990), to capture the complexity of the disciplinary pedagogic discourse through teacher conceptions of the curriculum-in-action (Barnett & Coate, 2005). To undertake this conceptual and analytical challenge, Bernstein's theoretical tools of classification and framing were used.

The pedagogic discourses of the three disciplines, as portrayed through interviews with teachers, their departmental discussions and different curriculum texts, have been introduced in Chapters Four to Six. It has been argued that epistemological and social characteristics of disciplines give rise to different curricula since the classification of the discipline and the framing or control of the selection of knowledge, sequence, rate of knowledge to be acquired and the assessment criteria and control over students (Bernstein, 2000, p. 13) varies from one discipline to another. Despite the institutional context, each department seems to some extent to live its own disciplinary life and create its own specific pedagogic discourse. It is this specific disciplinary 'life' and the space or agency it creates within the curriculum decision process that I wanted to capture and understand.

Bernstein's concepts of classification and framing have been used to explore and provide an overview of the essential structures and relations that underlie each disciplinary curriculum. The different pedagogic discourses of the three disciplines are summarised in Table 7.1. The presentation of concepts in the table follows the same line of order used to demonstrate the different pedagogic discourses of the three disciplines in the earlier chapters.

Table 7.1: Demonstration of the essential and distinctive features of the pedagogic discourses of the three disciplines

	Features	Engineering	Anthropology	Physics
1	Organisational structure of department	Integrated mode	Collection mode but changing towards integration	Strong collection mode
2	Knowledge structure	Hierarchical	Horizontal	Hierarchical
3	Curriculum structure	Integrated code	Collection code	Hierarchical, integrated code
4	Disciplinary changes	Regional being moved to more singular	Singular moving to more regional	Singular
5	Classification ('what') of knowledge within the undergraduate program	C+ Very strong grammar, globally determined	C- Weak grammar being made stronger by teachers' participation in the field of reproduction	C++ Very strong grammar, globally determined
6	Classification ('what') of knowledge within the graduate program	C- Weaker grammar, locally determined	C- Weak grammar, determined locally and by teachers' participation in the field of reproduction	C- Weaker grammar, determined by teachers' participation in the field of reproduction
7	Aims of program	Pragmatic skills, problem solving, utility of knowledge, performatory focus (acting and being)	Highly academic focus, critical thinking, recent performatory focus (knowing → being)	Highly academic with focus on research abilities, recent (reluctant) performatory focus (knowing → being)
8	Framing of student identity	F++ → F- From strong to weak framing. Students described in active terms. Students moved into the vocational field through graduate projects	F- Weak framing. Students described in active terms. The graduate program moves students further into academic practice.	F++ → F- Very strong framing at undergraduate level. At graduate level students participate in teachers' research and become legitimate practitioners in the production of knowledge
9	Framing of teachers' role	F+ → F-	F- → F+	F++ → F-
10	Framing of instructional discourse in the undergraduate programme	F++ Very strong framing	F- → F+ Weak but strength of framing increasing	F++ Very strong framing
11	Framing of instructional discourse in the graduate programme	F- Weaker framing	F- Weaker framing	F- Weaker framing

In Table 7.1 the pedagogic discourses of the three disciplines that have been analysed in previous Chapters Four, Five and Six, are illustrated. Within the disciplines (Table 7.1) the strength of framing and classification is relative but nevertheless gives an indication of the differences found between the disciplines. The pedagogic discourse of each of the three disciplines has a distinctive character which is made evident in the differences of the selected features. The first row of the table refers to the organisational mode of each of the disciplinary departments while rows two and three depict the structure of knowledge and thus the curriculum structure of the discipline. Row four refers to the ideological changes taking place within the discipline. Rows five and six refer to the classification of the disciplinary knowledge on the undergraduate as well as the graduate levels. In row seven the main aim of the discipline is demonstrated. Rows eight and nine refer to the manner of being; the former refers to the student identity while the latter one demonstrates the framing of the teacher role. Finally, the framing of the instructional discourse of the disciplines is stated in row ten, for the undergraduate programme and in line eleven for the graduate programme. Table 7.1 will be repeatedly referred to in the following sections.

7.3 The local pedagogic discourse

7.3.1. Introduction

The first research question of the study focused on the teachers' conceptions of the pedagogic discourse of their disciplines. Using Bernstein's theoretical framework, I have demonstrated the specific pedagogic discourse of each of the three disciplines, portraying a picture of three unique disciplinary discourses. Those unique local pedagogic discourses will be described and discussed in the following sections.

7.3.2 What is the local pedagogic discourse?

The pedagogic discourse is, according to Bernstein, made up of the regulative discourse and the instructional discourse, the latter being embedded in the former. The instructional discourse refers to the transmission of skills and their relation to each other and has features and practices that are relatively clear and observable. The regulative discourse, on the other hand, communicates to students the practices, values, beliefs, attitudes and principles of conduct, character and manner, relations and identity (Daniels, 2001) or the discipline's moral order (Ylijoki, 2000).

As can be seen in Table 7.1, the pedagogic discourse of the three disciplines is portrayed by demonstrating the distinctive features of each disciplinary pedagogic discourse. These characteristics indicate a unique disciplinary pedagogic discourse created in a specific social context. This uniqueness reveals the localisation of the pedagogic discourse and will therefore be referred to as *the local pedagogic discourse* of the discipline. The local pedagogic discourse is created when the pedagogic discourse of the discipline in the recontextualising field is transformed into a specific pedagogic setting or context. It is a *vertical* movement rather than the hierarchical movement from field to field as described by Bernstein (1996). The local pedagogic discourse is thus a recontextualised ‘universal’ discourse of a discipline. The transformation opens up spaces for ideologies to play. Those ideologies, arriving from the different communities in which the discourse is located, i.e. the society, the institute, department and teachers and students, together make up the ‘localness’ of the pedagogic discourse of the discipline.

Disciplinary pedagogic discourse is at the same time both local and universal with teachers (and departments) often in an ambivalent relationship between the two aspects. The ‘localness’ of the pedagogic discourse was stressed by Vitale (2001) in a comparative study of the sociology curriculum in six universities in three European countries. In his study he explained that ‘there are culturally different ways of doing sociology’ and concluded that the vagueness of official direction opened up the way for a locally variant curriculum. Vitale used the Greek concept of *Koïne* to express the disciplinary or culturally specific common agreement. It is the disciplinary *Koïne* I see as the local pedagogic discourse of a department or the discipline and have made this an issue to understand and explain.

7.3.3 The connection of the local pedagogic discourse to the universal discourse

The universal aspect of the disciplinary regulative discourse (or the relations of the local pedagogic discourse to its universal recontextualised discourse) is stressed by teachers in all three departments but to a different degree. Being a teacher of a discipline within the University also makes one a member of the universal community of that discipline or the universal disciplinary discourse. The closeness of the ties between the local and the universal is reflected in the disciplines’ classification where a strong classification of the discipline creates stronger ties to

the universal discourse. As can be seen in Table 7.1 (rows 5 and 6) the classification of the disciplines varies.

In physics, where the classification of knowledge is strong, the teachers stress that there is ‘nothing Icelandic’ about physics, neither as a discipline nor as an area of research. The universality of the discipline is emphasised in the global content presented in international textbooks that not only give the criteria for valid knowledge within the curriculum but also its mode of instruction. This is especially true for the curriculum at the undergraduate level. At the graduate level, research areas form the student curriculum and those research areas are ‘locally’ selected and aligned to teachers’ special fields of knowledge and available resources for research.

In engineering, the undergraduate curriculum is also seen as universal and the use of textbooks is stressed. Yet, the relation of the discipline and the department to its vocational field induces the teachers to take the needs of local industry into account and this weakens the classification of the discipline. Teachers are preparing their students for the engineering field in Iceland as well as for further academic work. Thus local ties become evident in the selection of course content where forestry and the car industry are not seen as relevant as geothermal heat and fishery, where new local and European standards of work methods need to be introduced and where teachers make ample use of their own experience in the field as an aid in teaching. At the graduate level, student projects undertaken within the field, are seen as valuable for the engineering companies and institutions and also seen as stepping stones for students into the field of practice. This relationship with the field opens up communication between the department and the outside world, thus weakening the classification of the discipline.

In anthropology, teacher research is a dominant part of the curriculum content. Emphasis on the disciplinary methodology is though always a strong thread within the curriculum and within all knowledge domains. At the establishment of the programme, the ‘local’ paradigm of teacher research was seen as differentiating the department from a more universal way of doing anthropology. Measures were taken to hire new teachers with a more ‘global’ research interest but paradigm changes within the discipline have put the department more at ease with their own ‘local’ situation. The weak classification of disciplinary knowledge means that there is no

knowledge that is seen as essential, aside from the methodology, but nevertheless there is an unspoken agreement that there is some knowledge that is 'traditional' and belongs to 'the major area' of anthropology that should be included in the curriculum. This agreement, although felt by all teachers, is tacit and rarely discussed and is weakly classified.

7.3.4 Teachers previous experience of university studies

The strongest source of influence on the local pedagogic discourse is the experience which teachers had while they were university students, i.e. the different 'local' pedagogic discourses they bring with them to the department. Teachers within the three departments are educated in various universities around the world. Some of them have received their undergraduate education within the University, their older colleagues being their previous teachers, but most of them have attended universities in Europe or the United States. As former students in different universities, each with their own local discourses, the teachers have been initiated into the culture of their discipline through its regulative and instructional discourse (Bernstein, 1990; Northedge, 2003a) and this has had a profound influence on their professional theories (Handal & Lauvås, 1990) as well as their curriculum and instructional ideas. The disciplines can provide teachers with strong and stable communities where identities are shaped and reinforced and where the language in which individuals understand themselves and interpret their world is communicated (Becher & Trowler, 2001; Geertz, 1983; Henkel, 2005) and this certainly is the case with the participants in the study. Again and again in interviews the teachers again and again refer to their own time of study as a source of curriculum ideas, curriculum structures or pedagogic practices. Teachers within the departments have studied at different institutions and returned from their studies at very different times. They bring to their departments their experience of various local pedagogic discourses, often experienced as an example of the universal one – the right way of doing engineering, anthropology or physics. These different 'universal' pedagogic discourses become the foundations for the local one. 'I think I teach in a similar way as I have been taught' was quite a common response from teachers when asked about the origins of their curriculum and instructional ideas. The conceptions of the pedagogic discourses encountered during their time of study are strong and 'has somehow put its mark upon you ... and it becomes the substitute for the universal one as 'you are stuck on

it being the only right thing'. In the case of engineering, the different pedagogic discourses teachers bring with them are explicit and form the basis of an ideological debate within the department, referred to as the European or American conflict (see Chapter 4.3). In engineering and physics, strongly classified courses that are referred to as 'classical' and 'standard' are claimed to be the same or similar to the courses that teachers themselves took during their time of study. In other cases, previous experience is mentioned as influential in regard to methods of instruction, ways of assessing students, and types of assignments given to students. How influential these discourses are within the culture of the department may on the other hand be related to classification and organisation of knowledge within the discipline, i.e. the stronger the classification of knowledge, the stronger the association with the universal discourse (see rows 5 and 6 within Table 7.1). In physics, where the classification of knowledge is strong and the structure of knowledge hierarchical, there is a strong agreement within the department on what knowledge should be included within the curriculum. In anthropology, where the classification of knowledge is weak and the structure horizontal, the universal pedagogic discourse has a weak classification and the pedagogic discourses teachers bring with them are varied. The variance is accepted and agreed upon; it is seen as an essential part of the discipline and clearly reflected in the 'academic freedom' that teachers within the department are awarded. Within engineering, the pedagogic discourses the teachers bring with them are seen as reflecting two different discourses that are ideologically different.

7.3.5 Departmental culture and structures

In this study the department is seen as the primary cultural context or 'the basic unit' of curriculum planning and development following the argument of Becher & Kogan (1992). This notion emerges quite clearly from the present data. The department provides the cultural context that is most influential for curriculum thinking and planning both in terms of disciplinary ideas as well as institutional responsibility. In that sense, the three departments are not only the basic units of curriculum practice and development in terms of the formal institutional responsibility but as the community in which the local pedagogic discourse is contextualised. As such the department is both the context of the pedagogic discourse and a part of creating its 'localness'.

The pedagogic discourse of the disciplines manifests itself differently in the three disciplinary communities, giving rise to their specific cultures and identities. Through interviewing teachers as well as observing their discussions at meetings, different disciplinary or departmental cultures become apparent and Beacher and Trowlers (2001) notion of tribes and territories were evident in the data. In a similar way to that demonstrated by Valimaa (1998) in his work, the disciplinary loyalty of the teachers in my study is clearly demonstrated. In the interviews, the participants frequently refer to ‘us’ as different from ‘them’. They explain their departmental way of doing things with phrases like ‘this is how we do it here’ or ‘different from what I hear in other departments’.

To explore and understand the departments and their different communities, the concepts of classification and framing are used to distinguish between two different types of establishments, the *collection code* and the *integrated code*. According to Bernstein, the community’s stability relies upon the strength of the classification which reflects power relations that are bound to change (Bernstein, 2000). The different establishments were discussed in Chapter 2.3.4 and demonstrate different organisational modes where the strength of classification and framing varies as shown in Figure 7.1.

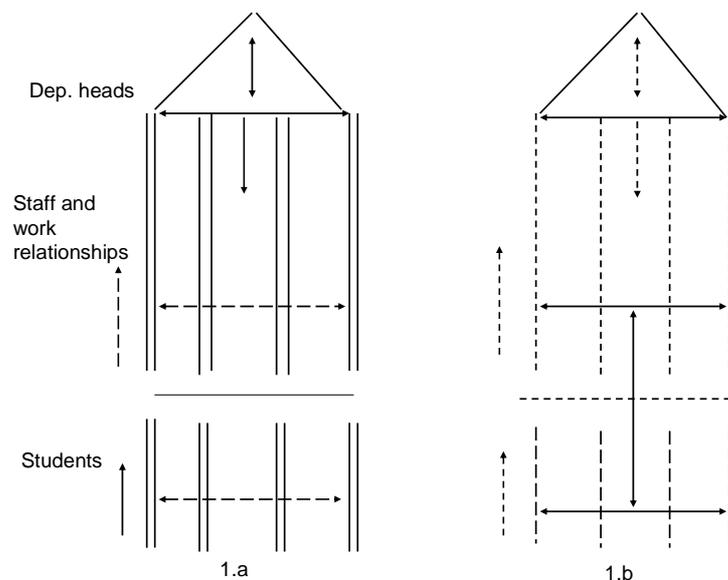


Figure 7.1: Different organisational structures (Bernstein, 2000)

These organisational structures 1.a and 1.b (Figure 8) demonstrate different modes of communication within and to and from organisations. The mode is strongly related to the image or conceptions that the teachers in the department hold of their own department. These conceptions reflect the pedagogic discourses and especially the regulative discourses of the disciplines and are influential in understanding both how curriculum decisions are made within them and the nature of the decisions. The organisational structure of the department (collection or integrated code) provides an insight into the mode and framing of communications characterising the regulative discourse. The regulative discourse of the discipline gives rise to a specific or local pedagogic discourse into which the students of the discipline are initiated and some of them will continue and transmit it to the discipline's future students. The regulative discourse is the social conduct of the curriculum, controlling the character and manner expected of teachers and students and reflected within the instructional discourse. From the student point of view, the disciplinary regulative discourse becomes the hidden curriculum (Margolis, 2001) into which students are initiated through texts (Ehrensals, 2001), discourses (Northedge, 2003a, 2003b) and dissertation writing (Acker, 2001). The regulative discourse creates organised spaces and networks for students (Nespor, 1994) and validates which of the students' previous learning and experiences will be sustained (Ahola, 2000), thus creating specific identities (Ahola, 2000; Harris, 2004). In the present data varying strengths of classification and framing of three different departmental cultures emerge. The organisational modes of the departments are affected by the classification of knowledge (see Table 7.1 rows 5 and 6) and the framing of the teacher's role and identities with regard to students (see Table 7.1, rows 8 and 9).

The culture of the Department of Mechanical and Industrial Engineering is characterised by the integrated organisational mode. The department's identity, portrayed by teachers, is that of a close-knitted, social community where teachers have easy access to each other. Classification of the departmental organisation is thus weak. The department's relation to the discipline's vocational field requires communication to and from the department. This makes the boundaries between inside and outside more permeable, as the communications flowing into the institution are not easily framed and controlled. Internally, new forms of knowledge organisation, such as the establishment of industrial engineering, requires greater

horizontal communication and differences need to be integrated and networked rather than becoming a source of specialisation and separateness. Within the department, social relations between the department members are stressed, strengthened by various social traditions and emphasis placed on straight forward social communication and easy access between the members of the department as well as between teachers and their students. This communal or social aspect is strongly presented to students as they get further into the disciplinary discourse and framing of teacher and student relations become weaker. Within the department, the classification between subjects and between students and teachers is weak, opening up possibilities for new kinds of communication and cooperation (Bernstein, 2000).

The anthropology teachers portray themselves as a part of a calm and tranquil community. There is a common agreement that academic freedom means that members should be trusted to carry out their work on their own and without interference from other members. The organisational structure of the department has, until recently, been characterised as having a collection code. Discussions on aims and goals of the programme have been rare and irregular, the criteria of knowledge are weak (i.e. teachers are free to select texts depending on their preferred gaze) and teachers do not share a place of work or office spaces. During the study, claims to organisational changes were made. In the wake of new methods of teaching, new relations and cooperation between some of the teachers and new leadership within the department, claims had been made for more communication and cooperation between members. This means movement within the culture towards a more integrated code, weakening the classification between teachers. This is a movement that signifies a change of power, moving the power from the position or location of an individual academic towards a more departmental or common location. While some teachers would like to hold on to previous modalities, others positively experience the move as going from repertoire to reservoir, changing the teachers' identity (Bernstein, 2000, p. 158).

The Department of Physics is an example of a collection code establishment. In such cultures or organisations, strong frames create strong boundaries between teachers that 'cannot relate to each other in terms of their intrinsic function, which is the reproduction of the *pedagogic discourse*' (Bernstein, 2000, p. 10). Such institutional

structures 'consolidate special identities through strong socialisation into strong subject loyalties' (1996, p. 25). The physics teachers are located in many different buildings related to their different type of research. Discussions on aims and goals of the programme have been rare and irregular. The teachers in the study portray themselves as individualistic but find the department free from disagreement over small matters. They see the department and the discipline as highly respected and have to remind themselves not to be arrogant. There is a strong loyalty to the discipline and research is highly emphasized. Because of the specificity of identities (strong research areas), there tend to be 'weak relations between staff with respect to pedagogic discourse' (Bernstein, 1996, p.25). There is a strong classification between the teachers who usually teach their specific disciplinary area. Collaboration between teachers and within the student group is weak in the undergraduate programme and the relationship between teachers and learners is characterised by strong framing. The framing of the teacher/student relationship changes greatly at the graduate level where the students and teachers work side by side.

7.3.6 Organisational saga

The organisational structure (collection or integrated) of the three disciplines discussed above can be described but does not on its own fully explain the identity of the department and the framing and classification within the local pedagogic discourse. The identity of the different departments is a part of its organisational saga which Clark (1983) has defined as a 'unified set of publicly expressed beliefs about the formal group that is a) rooted in history, b) claims unique accomplishment, and c) is held with sentiment of the group' (p. 374). The teachers in the three different departments relate the local existence of their departmental way of being (the regulative discourse) to various social factors, events and persons that are a part of the departmental saga. Academically strong founders are often mentioned by physicists, a charismatic previous teacher is given credit for having shaped the social atmosphere of engineering, and the societal situation at the time of the establishment of the programme is seen as influential in anthropology. Tribute is paid to older members of the department as well as the influence of the younger and newer ones. The curriculum is influenced directly by the appointment of teachers within certain research areas (physics and anthropology) and shaped by different leadership abilities and emphases of the sitting department heads.

7.3.7 Contesting ideologies within the disciplines

Much research on disciplinary differences tends to emphasise similarities within disciplines while glossing over differences. In this study the concepts of classification and framing have been used to analyse the curriculum in a way that goes beyond the determinism criticised in disciplinary research and capture structures and modes that are specific within the context of the disciplinary curriculum at a given place and moment in time. This not only allows an analysis or sensitivity towards differences between units such as the departments, but also the ideological debates taking place within the disciplinary communities and reflected in the curriculum. In this study, contesting ideologies were detected within all the three disciplines but those revolved around different aspects of the local pedagogic discourse.

a) Disciplinary ideologies

Teachers in the study demonstrate departmental or disciplinary loyalty and identity. When discussing the aims and goals of their discipline and the pedagogic discourse in general, they share a common understanding (see Table 7.1, row 7). Yet, the pedagogic discourse is neither stable nor without conflicting ideologies. The disciplinary curriculum evolves and changes, compelled by internal as well as external forces. The development of the disciplinary curriculum will be discussed in section 7.5 as intradisciplinary change but here the ideological disputes within the pedagogic discourse will be the centre of attention and analysed in terms of the disciplinary classification and framing.

Whereas ideological disputes over the curriculum can be found within each department, they centre on different issues and aspects of the pedagogic discourse of the departments. In engineering the strongest ideological dispute concerns the practicality versus the research orientation of the discipline, i.e. its strength of classification. Should engineering be seen and taught as an academic (pure) subject or should its practicality (application) be stressed? Within the department's weak framing of organisational structure, the dispute is openly or overtly discussed and has its own name, i.e. the American versus the European conflict. The term is related to the origin of the different universal pedagogic discourses the teachers claim can be found within the universal disciplinary discourse.

In anthropology the ideological dispute overtly concerns the instructional discourse where some of the teachers are interested both in greater standardisation of the instruction (i.e. strengthening the framing of instruction as can be seen in Table 7.1, row 10) but also suggesting more cooperation and collaboration within the discourse (i.e. changes in the organisational structure of the department, see Table 7.1, row 1). These claims go against the department's strong emphasis on academic freedom. Under the direction of a new department head, the collective organisational structure of the department has been giving way to a more integrated one where weekly meetings are now used for collaboration and discussion of curriculum and teaching. This is an attempt to move what has been seen as 'a private matter' or repertoire to a more common reservoir (Bernstein, 2000, p. 158) and is an excellent example of the interconnectedness of the instructional and the regulative discourse and the impossibility of dissociating the two.

In physics, the disciplinary debate revolves around the strength of the classification of knowledge, i.e. the dispute between theoretical physics (strong classification) and the experimental physics (i.e. weaker classification). In this sense, the dispute is related to the American versus European conflict within engineering but whereas the latter one revolves around the two different aims or purposes of engineering, the dispute within physics is about two aspects of the same disciplinary discourse. The teachers claim that this ideological dispute is a part of the universal disciplinary discourse where, despite the reciprocal relationship, experimental physics is seen as less prestigious and less 'pure' than the theoretical one. The strong classification of the discipline and the collection code organisation of the department are reflected in a strong regulative discourse within which disciplinary knowledge is portrayed as a difficult one for students to master. The student identity favoured within the pedagogic discourse is that of the intellectually strong student. One of the physics teachers participating in the study strongly voiced his opposition to this moral order of the discipline, and takes an untraditional and more student-centred approach.

b) Professional theories and identity of teachers

In the study, the focus was first and foremost on curriculum decision-making and development on a departmental or disciplinary level. The conceptions and ideas of teachers have been used to bring out common themes and aspects within the

department. In the last section, the ideas or the professional theory of one of the teachers was discussed as a part of an ideological debate within the physics department, demonstrating the difficulties caused by a small sample or community within the research. It is one instance of many where, in interviews and at the departmental meetings the teachers displayed different professional theories when discussing the pedagogical discourse.

The teachers in the study are in general very dedicated to their teaching and see their relationship with students as a highly important and pleasurable part of their profession. They frequently express the need to ‘connect’ to students in their classes and can articulate, to some degree, when teaching is going well and when not. Their experience of teaching ranges from six to 35 years. Only one teacher in the study holds a formal certificate in teaching and a minority have sought any in-service courses or workshops on pedagogic practice. Their expertise in teaching arrives first and foremost from their experience of teaching but also from informal discussions with colleagues and their own time of teaching and a few mention positive role models either from their time of study or time of teaching.

When questioned, the teachers within the study related their professional theories, aside from previous experience within the disciplines, to admired characteristics of previous teachers, to their own various personal life experiences and their experience of teaching and working with colleagues. Although professional theories will not be further analysed within the study, their differences could be discussed in terms of Bernstein’s theoretical framework of classification and framing. To take an example from engineering, the common attitude or the departmental attitude towards students would best be described as ‘caring’. This attitude is a strong part of the regulative discourse and reflected or made possible by the organisational structure and mode of communication within the community (see section 7.3.4). In interviews, all the teachers stress the importance of ‘connecting’ with students and being accessible to them at all times. The teacher and student relationship is described as being built on trust and mutual respect (see Chapter 4). In terms of Bernstein’s theory, the framing of the student-teacher relationship or identity within the department is weak. Yet within this weak framing of communication, teachers’ interactions vary, portraying their different personal and professional theories. Whereas Albert’s weak framing

makes his communication with students very personal, Gunnar claims his ‘personality’ makes him prefer a more distant and less personal relationship, i.e. stronger framing of conduct and manner.

7.3.8 Implications of the local discourse on the regulative discourse

a) Different student identities

As discussed above, the culture of the three departments is quite different, both in terms of the organisational structure as well as the local pedagogic discourse. Within the latter, the regulative discourse regulates the manner and conduct of teachers and students, determining specific identities in terms of the strength of classification and framing. The model of the student or the student identity reflects the aims and goals of the discipline and the ideological view of the pedagogic discourse (see Table 7.1, row 8). The student identity identified within the pedagogic discourse therefore not only demonstrates the values and beliefs within the discipline but the current pedagogic identity of the discipline itself. To comprehend the preferred student identity within a discipline is in a sense to understand the core of its regulative discourse. Here the disciplinary differences revealed in the data will be discussed along with female student identities and the identity of the passive student that was a source of concern within all disciplines.

Disciplinary student identities

Mechanical and industrial engineering is a discipline where two different disciplinary pedagogic discourses are at play at the same time. At the beginning of the undergraduate programme, students attend basic courses provided by other disciplines such as physics. In those service courses the students are encultured into a regulative discourse that has strong framing in regard to student conduct and manner at the undergraduate level. This regulative discourse is quite different from the one of engineering, where the mode of communication among teachers as well as students is based on weaker framing. Teachers within engineering stress the quality of the service courses within their curriculum but find the mode of teacher-student interaction within these courses going against their approved mode of interacting with their students. They find the teachers of service courses ‘arrogant’, ‘lacking humility’ and not too willing to suit the instruction to the needs of engineering

students. This can be understood as a clash of two different regulative discourses with different strengths of framing.

In engineering, the student identity is described in active terms, typical of weak framing. The ideal students are 'fearless' and 'daring' and able to attack new and unforeseen problems. They need to have 'stamina' to look for new solutions that often require an ethical stance. Students need to be 'creative'. Within the engineering curriculum, students are 'awarded space to acquire the practical grammar of their discipline' (Barnett & Coate, 2005, p. 62) and their activeness is a strong part of the required identity. These are quite different concepts than those used in physics where the emphasis is more on knowing than acting (Barnett & Coate, 2005). In physics the ideal student characteristics are a reflection of the hard pure nature of the subject (i.e. its strong classification) and cognitive strength is emphasised. Ideal students are described as having the ability to 'think logically', being 'intellectually strong', 'hard working for survival', and good at 'abstract thinking' and doing math. They need to be able to 'transfer knowledge', 'take nothing for granted', to be 'a quick thinker' and able to communicate the discipline.

Similar to engineering, the words used to describe ideal student identity within anthropology also indicate activity ones but as in physics there is a focus on knowledge. The ideal student within the discipline is 'active', 'critical' and 'academically well skilled' as well as 'reflective' demonstrating the weak framing of the discourse.

Female student identity

The different student identities within different disciplines can be explored through the way female students are discussed within engineering and physics. In both disciplines, the lack of female students is an issue for the teachers. In engineering the female students now make up to one third of student number but in physics the ratio is much lower. In both departments the female students are seen as academically strong students that have had to prove themselves earlier in order to enter the programmes. They are seen as neater and as more conscientious in their study habits than the male students but whereas the teachers in engineering describe female students in active terms the physics teachers see the female students as withdrawn

and passive. In physics female students need to be helped and the department has established a support group whereas the female students in engineering are seen as much stronger and more active than their fellow male students. Thus the weak framing of engineering seems to encourage female students to become active whereas the strong framing and hierarchical relations within physics creates more passive female identities.

The passive student

The identity of the passive student is found in all disciplines and is a source of worry for all the teachers – especially in the undergraduate level where framing is being made stronger. While the problem may be the same, the disciplinary discourses allow or open up different possibilities to address it. Some teachers struggle to figure out how students can be made more engaged and active in their learning. They wonder how they can ‘smear more honey on courses’ to better awaken student interests. Other teachers see this more as a problem of students than the responsibility of teachers.

The identity of the passive student could be created by stronger framing of the instructional discourse at the undergraduate level (see Table 7.1, row 10) which is a both a reaction to increasingly larger number within student cohorts but also an attempt to differentiate the undergraduate programme from the graduate one. The passivity of students could also be related to student attitudes towards higher education, often expressed as credentialism (Jónasson, 2004). Or it could be explained by today’s students holding multiple social identities which become more visible since the student body is increasingly heterogeneous (e.g. Haselgrove 1994, cited in Ylijoki, 2000) and the strongest one is not necessarily that of being a student.

Whatever the reason for the teachers’ conceptions of the passive student, this is a problem experienced within all three departments and within them teachers try different methods to address it. In engineering the teachers try reaching students and helping them to understand the disciplinary discourse through relating the subject to their own experiences, using concepts that students understand, bringing practical things into class, making classes fun with student competition, keeping a normal work load and trying not to leave students behind when covering topics in class. In

anthropology the teachers have tried to engage students in learning by giving them a more responsible role in class discussions (i.e. reducing the framing), enforcing them to participate on a regular basis and by making the curriculum more vocationally relevant. In physics teachers have made attempts to use information technology and visualisation to make the difficult subject more accessible to students.

b) Recognition and realisation rules

To understand the creation of student identities, rules of recognition and realisation within different disciplines need to be addressed. Another difference between the three pedagogic discourses is that the students entering the different disciplines will find themselves in pedagogic settings or situations with unfamiliar recognition rules. The weak classification of knowledge and the vertical knowledge structure within the curriculum of anthropology make it difficult for students to distinguish between academic criticality and everyday arguing. They are trained and required to reveal their knowledge and ability to think critically (i.e. to apply their realisation rules) through discussions and essay writing.

Due to the strong classification of physics, students within the discipline, unlike those in anthropology, arrive at a pedagogic setting where recognition rules acquired from their previous study of the discipline will be helpful. Students arriving from secondary school already possess recognition rules for physics which is a subject they have studied within the primary and secondary school curriculum, unlike engineering or anthropology which few of them have encountered beforehand. These previously acquired recognition rules make it difficult for teachers within physics to make changes within the instructional discourse. Attempts to stray from the discourse, such as including discussions in their classes, are frowned upon by students.

Students entering engineering from physics carry with them recognition and realisation rules acquired in physics and in fact need to unlearn them and take on new ones. Teachers in engineering explain how students must unlearn the rules and learn new ones where imprecision is incorporated into their thinking. The pedagogic discourse of engineering is based on weaker classification of knowledge and a

different curriculum emphasis where acting and doing is stressed over knowledge and students need to take up ‘engineerical imprecision’.

Within the disciplines, recognition and realisation rules are essential parts of the identity formation of students. They explain which experiences and previous learning are seen as valid within the disciplinary discourse and what kind of student conduct is accepted. The recognition and realisation rules are directly related to the assessment practice within the different disciplines creating an essential link between the field of recontextualising and field of reproduction, between transmission and acquisition, between the regulative and the instructional discourse (Bernstein, 2000, p. 37). The assessment practice will be further discussed in the next section.

7.3.9 Implication for the instructional discourse

a) Disciplinary instructional discourse

The instructional discourse is embedded in the regulative discourse although those two discourses do not always ‘move in complementary relation to each other’ (Bernstein, 2000, p. 13). The strength of framing can vary between the regulative and instructional discourse. This means that one could possibly find strong framing of the regulative discourse but weak of the instructional discourse. But where there is strong framing of the instructional discourse there must be strong framing over the regulative one (Bernstein, 2000). To take an example, the weak framing of the regulative discourse of anthropology gives teachers the possibilities of either structuring their instruction in a strict manner (i.e. applying strong frames) or to use more progressive modes of invisible pedagogy (i.e. applying weak framing of instruction). In physics, where the framing of the regulative discourse is strong, weakening of the framing of the instructional discourse is met with resistance by both the department and students.

Unlike the regulative discourse, the activities and characteristics of each department’s instructional discourse are easier to explore and detect. Teachers in all departments find it easier to discuss and describe their pedagogic practices than express the underlying and more tacit aims and goals of their programmes. The instructional discourse is also manifested in physical artefacts such as class schedules, syllabuses, written assignments, and the University’s course catalogue.

The instructional discourse of all the disciplines is formed by the institution's regulative framework such as the length of the semester, period of assessments and regulations about different categories of classes and their relations to the teachers' salary system. In this way the University provides an institutional framework to which the instructional discourse of different departments must adhere. At the same time the disciplinary discourses are deeply rooted and accepted within the institutional framework. Thus aspects of the disciplinary instructional discourse are rarely questioned or contested and they form the foundation of the University's finance distribution model.

As explained earlier (see Table 7.1, rows 10 and 11), the instructional discourse of each department can be described in terms of the strength of framing. The framing of the instructional discourse can in all disciplines be described as being the strongest in the first years of the programme and becoming weaker as students progress further in the programme. The framing of the criteria of knowledge is very strong in the undergraduate curriculum of physics and engineering where courses are seen as 'classical' and timeless and teaching is rotated between teachers.

In anthropology the organisation of the instructional discourse has been seen as the private matter of teachers but has nevertheless been strongly framed by tradition. As framing of the discourse gets weaker, the hierarchical relationship between teachers and students becomes less and less classified; teachers hold less of an authoritative role and the pedagogic practice becomes more invisible (Bernstein, 2000, pp. 109-110). In engineering students take on research projects in the field and in physics the students in the graduate programme move towards the production field doing research with their teachers taking up the role or the identity of a novice co-researcher. In anthropology there is a weak framing of student identity and teacher-student relations. Within the department, actions have been made to strengthen the framing of the instructional discourse making the invisible pedagogy more visible (Bernstein, 1990).

The embeddedness of the instructional discourse in the regulative one of each discipline is clearly reflected in pedagogic practice that is specific for the discipline. In physics and engineering teaching is structured with strong framing of a 'fixed form' of teacher lectures, tutorial classes and weekly problems. Knowledge

acquisition is assessed by weekly problems, final written exams and, in the case of engineering, vocationally related projects. In anthropology the pedagogic practice is structured through lectures and discussion groups and knowledge is assessed through essay writing and final written exams.

b) Disciplinary assessment practice

Students' recognition and realisation rules are directly related to the assessment practice within the different disciplines. Whereas the recognition rules are about distinguishing between contexts (is this anthropology or not?), the realisation rules arise out of the specific requirements within a context. Students may have acquired the recognition rules but be unable to produce the legitimate pedagogic texts, i.e. do not possess the realisation rules required within the discipline. Where the rules are clear and the framing strong, the students know what to expect.

In the three departments, different forms of assessment are practiced. These assessment forms are clearly aligned to the kind of knowledge and skills stressed within the pedagogic discourse. Assessment emphasises essay writing in anthropology, projects in engineering and problem solving in physics. The framing of assessment is relatively strong in all disciplines, i.e. students are made well aware what counts and what does not and in all disciplines examples of assessment are made available to students. In terms of assignments, framing is weak in anthropology where it is left to the students to read into the rather open descriptions of assignments.

In engineering the teachers claim that they know that their assessment standards are more firm than in departments in comparable universities in other countries (thus differing from the 'universal' pedagogic discourse) but put the blame on the rigid rules of the Faculty Council. Those rules are made to prevent students from cheating.

Within the instructional discourse, framing refers to the strength of control over pedagogical activities such as the selection, sequence and pacing of educational tasks, assignments and assessment as well as the criteria of knowledge. The strength of framing can vary between the pedagogical activities to create different pedagogies (see Morais, 2002; Morais, Neves & Afonso, 2005). In anthropology some of the teachers have tried innovations within the assessment practice, mainly in an attempt to enforce students to take a more active role in the instructional discourse, lessening

the framing of their conduct. In those attempts, assessment practice has moved from having students take a final test and write a large essay at the end of the course towards more distributed or continuous assessment, assessing more varied parts of student learning. In this way, the assessment practice becomes a tool to strengthen the framing of sequence within the instructional discourse.

The assessment in physics is very strongly framed. Strong emphasis is placed on final tests that make up to 80% of the course grade even though teachers know that this practice is no longer in line with assessment practices in other universities. The tests are difficult and there is a tradition of awarding low grades which are seen to reflect the strong quality of the programme and confirm the belief of the regulative discourse that the discipline is difficult and not for everyone to master. The content and form of the final tests are well-known to students and there is a common agreement about the evaluation criteria, what can be expected, i.e. realisation rules are clearly spelled out. Teachers that stray away from these rules are despised by students and frowned upon by the department as tests are seen as a method of coordination between groups of students. In experimental classes students usually receive higher grades as the assessment methods are more of a formative nature. This is not met with approval with some teachers who see it as an indication of the lower standard of that part of the programme.

7.3.10 Research question I revisited

In section 7.3 above, I have addressed the first research question on teachers' conceptions of the pedagogic discourse of their discipline. I have demonstrated how the local pedagogic discourse is created and explained its relation to its universal pedagogic discourse. I have shown that the teachers' previous experience of their discipline is influential for the creation of the local discourse but also how the departmental structure of the department and its organisational saga create the specific context for the local discourse, a context where contesting ideologies are at play. Finally I have explored the implications of the local pedagogic discourse of the three disciplines on their regulative and instructional discourse.

7.4. The teachers' space and agency within the curriculum practice

7.4.1. Introduction

The second research question of the study focused on teacher space and power to make curriculum decisions and to understand how teachers in different disciplines experience their agency in regard to curriculum decision making and development. In the light of Bernstein's theoretical framework, I explored whether teacher curriculum agency varied from one pedagogic discourse to another and, if so, in which way the different pedagogic discourses affected teacher space within the process of curriculum development.

7.4.2. The unproblematic curriculum

The original motivation for this study was my own experience of arriving at the University and taking on the role of making curriculum decisions in my courses. In 2005 it was reaffirmed that teachers are granted the 'academic freedom to treat his or her subject in the way he or she feels is reasonable with academic or disciplinary demands' (Háskóli Íslands, 2005a). This was a position I that experienced as a highly powerful, a notion rarely shared with the teachers in the study.

Despite their formal agency to make curriculum decisions, the teachers in the study neither perceive their agency in forming and influencing the curriculum as problematic nor as an act of power. Curriculum decision making is strongly embedded within the pedagogic discourse. It is a part of the normative practice that is rarely questioned. Teachers seem to experience their role of production (i.e. as researchers) and reproduction (i.e. as teachers) more strongly than their role as recontextualising agents within the curriculum. Their unawareness of their powerful role within the recontextualising field may be explained by their uncontested and secure dominance over the curriculum. Within the University, teacher agency with regards to the curriculum has rarely been questioned and, different from other countries (Karseth, 2005), few attempts are made to restrict it in Iceland. The State (as a part of the Official Recontextualising Field) has until recently had very little influence on the curriculum. A change is intended and recently the University along with all other universities in Iceland was required to formally apply for accreditation of its programmes and to provide learning outcomes for their lines of study (Menntamálaráðuneytið, 2007).

Another possible explanation of the indifference of teachers towards their agency with regard to the curriculum might be explained by Foucault's idea of power as circulating rather than being located in the hands of individual teachers. In this way the power relations are circulated within the disciplinary departments and embedded in the curriculum decision-making of the department where teachers act as vehicles of power. Action is only taken when the circulation of power is interrupted or attacked. Yet, power circulates differently within the three departments and is dependent on the classification and framing of the discipline and their relative strength at different levels of the programmes. Thus the integrated organisational structure of anthropology and the social culture of engineering provide spaces or nets where power can more easily travel than within the collective organisational structure of the physics department.

The most likely explanation for teachers having an unproblematic view of the curriculum is that the strong embeddedness of curriculum in the regulative discourse means that on a day-to-day basis the curriculum and its development is rarely questioned or seen as problematic. The regulative discourse is often implicit and the hidden moral order of the discipline only becomes visible when disrupted. Formal departmental discussions about the curriculum, the programme and its structure are rare aside from annual discussions about the publication of the University's course catalogue. Discussions usually revolve around minor organisational issues such as which courses to offer next year or how research leaves will be allocated. Decisions are made in order to ensure the continuity of the programmes and to run them without trouble, but issues such as curriculum aims and goals are rarely touched upon or contested. Departmental meetings usually have a full agenda of practical issues and teacher time is precious.

The recent work on the University's mission has provided all the departments with an opportunity to go beyond the practical level of discussions. Some of the participants claim a need for more dialogue but the reason for little discussion within the departments is explained by lack of time, the dispersed location of departmental members or the strong tradition of such issues being a private matter.

7.4.3 Curriculum spaces within different disciplines

Discussing curriculum development as the opening of spaces, Barnett and Coate (2005) strongly state that in the curriculum process “... *Each move on the part of the tutors should be seen as an intervention in spaces that are the students*” (p. 147). While my data supports this statement in general, the findings of this study indicate that within the curriculum process, teachers in different departments are allocated varied spaces for curriculum decisions. The teachers at least experience different flexibility to move within the curriculum spaces provided. The space provided is limited by the classification of the discipline, the strength (or nature) of the regulative discourse of the discipline, the strength of framing of the instructional discourse and the organisational structure and saga of the department.

Aside from different knowledge structures (hierarchical and horizontal) and curriculum types (collection and integrated), it is the different strength of classification of disciplines that influences teachers’ experienced space within the curriculum process. At the undergraduate level, physics and industrial and mechanical engineering share a strong classification of knowledge and strong hierarchical structure of knowledge within the curriculum (see table 7.1, rows 5 and 2). The teachers within those two disciplines feel that the criteria for the selection of knowledge lies outside the realm of their curriculum decision agency or is, at least, strongly limited. This is especially true within physics where knowledge is seen as pure, true and uncontested. Courses are arranged in sequential and hierarchical order and the content of knowledge or pedagogical texts covered within each are preset and highly structured and agreed upon by the department and ‘tradition’.

In anthropology, the weak classification of knowledge and the weak criteria for selection of knowledge (see Table 7.1, rows 5 and 6) allows teachers to use their ‘gaze’ when selecting knowledge or pedagogic texts for their courses. The horizontal knowledge structure (see Table 7.1, row 2) makes it difficult for teachers to expect students to arrive in their courses with preliminary knowledge except for that provided in a few introduction and methodology courses. Teachers make frequent changes of course texts and new courses can easily be established and approved providing the teachers with ample space to manipulate and control the curriculum process.

At the graduate level, teacher space within the curriculum expands. It remains similar within anthropology where few changes are made within the classification of knowledge (horizontal knowledge structure), but becomes much more open in engineering and physics (see Table 7.1, row 6). Within engineering, the classification of knowledge becomes weaker, allowing teachers more space and flexibility to construct their courses and adapt them to what they feel is important (based on their professional theories). The felt needs of the vocational field and the specificity of the local situation are taken into account and addressed. Even though the direct influence of the professional or vocational field can not be claimed to be strong, the connection of teachers to the field and final student projects undertaken there allow for flexibility and movement within the curriculum. In physics, the graduate programme is strongly structured around the final projects undertaken under the supervision of their teachers and often as a part of teacher research. Students move as apprentices to join their teachers within the field of knowledge production. In anthropology and physics, teacher research strongly influences the content of the curriculum as it is often the core of the course curriculum, but in engineering the relation of teacher to their research within the vocational field serves as support for the instructional discourse and establishes a stronger relationship between the curriculum programme and the professional field.

7.4.4 Implications of the regulative discourse on teachers' curriculum spaces

The regulative discourse regulates the manner and conduct of teachers and students, determining specific disciplinary identities and their moral order. The regulative discourse carries within it the framing of relations between teachers and students and their identities but is also affected by the classification of the discipline. Within physics and mechanical and industrial engineering, the classification of knowledge is strong but whereas the framing of teacher and students relationship is also strong in physics, it is marked by weak framing within engineering, thus reducing boundaries and giving teachers the space for more personal control (see Table 7.1, rows 7 and 8). Students are seen as becoming active and creative and their identity is more a question of being rather than knowing or doing (Barnett & Coate, 2005). With the weak framing of the regulative discourse, teachers within engineering enjoy a much greater freedom in their conduct than teachers in physics where the strong framing creates student identities that are more restricted. This is clearly demonstrated in the

way in which teachers in engineering feel free to behave according to their different professional theories. Within physics, the sphere for personal control is limited.

Aside from the weak classification of knowledge, the relational idea of a multicultural view and acceptance of different point of views create the weak framing of the regulative discourse in anthropology (see Table 7.1, rows 8 and 9). This opens up possibilities of communication and cooperation even though the teachers have in the past not made much use of the available space. The weak framing of the regulative discourse and the weak classification of the discipline provides the space to make curriculum changes and allows them, without much dispute, to move the discipline from being a classical singular to a more regional one.

7.4.5 Implication of the instructional discourse on teachers' curriculum spaces

The strength of framing of the instructional discourse determines the space teachers are given to influence or change the pedagogic practice (see Table 7.1, rows 10 and 11). In physics, where framing is very strong at the undergraduate level, straying from the fixed form is seen as wayward behaviour that needs to be corrected. Teachers' freedom within the curriculum is highly restricted and changes are only made by teachers at the margin. In engineering, the freedom of teachers is seen in the mixing and matching of pre-described pedagogic forms. In anthropology, the weak framing of the instructional discourse has opened up a space for debate or discussion between those teachers that want to make use of the weak framing and those that would like to hold on to more traditional ways of teaching. When framing becomes weaker at the graduate level (see Table 7.1, row 11), teachers in all disciplines are more likely to try out different pedagogic practices, often involving more student participation and authority.

7.4.6 The external influence of Pedagogic Recontextualising Field

The influence of textbook publishers

The 'universalness' of the local pedagogic discourse is revealed in the frequent use by teachers of the concepts 'standard' and 'classical' when referring to course content as well as instructional methods. 'Standard' and 'classical' knowledge is what is 'traditional' to teach and learn within the disciplinary discourse and there is a

common agreement, often unspoken and at times fuzzy, on what belongs in that category.

Much of the ‘traditional’ knowledge arriving from the universal pedagogic discourse of the discipline gets transmitted into the local one through the use of textbooks. Textbooks are an important part of selecting the *what* to teach – the content – in all the disciplines. They provide a feeling of standardisation, quality and universality. They frame the instructional discourse, especially in engineering and physics, where they not only provide the criteria of knowledge, the knowledge that is worthy, but also influence the sequence and pace of the instruction and provide learning tasks or projects for students to solve. In those disciplines the syllabi provided for students follow the order of the textbook, indicating the sequence as well as the pacing of the instructional discourse.

Teachers seem to select the textbooks by some pedagogic criteria but are vague in describing the criteria used. Strong international use, reflected in textbooks which have been reprinted over and over again, is seen as quality control. In anthropology, where the classification is weaker and the teachers’ gaze is more influential, teachers express stronger pedagogic ideas about the selection, but there the use of textbooks is much more limited than in engineering and physics.

The practice of the good teacher

In interviews, the teachers often apologetically, point out their lack of teaching skills and refer to the ‘good teacher’. The definition of the good teacher seems to be a part of the rhetoric of the University where ‘good teaching’ seems to be characterised or equated with the use of information technology, especially the use of Power Point presentations. The teachers’ experience this as an enforced view from the University’s policy and academic development field (the Pedagogic Recontextualising Field) – which I am seen as representing. In teaching, the good teacher is the one that uses Power Point slides. Although some teachers feel at ease with that technology many find it troublesome to incorporate the use of the technique in their disciplinary teaching or in the instructional discourse. The technology is often seen as being useless, not fitting the teacher’s role and at times harmful to the disciplinary context of teaching.

7.4.7 Research question II revisited

The second research question in study was how teachers within the three different disciplines experience their space and agency in curriculum decision making. In section 7.4 I have demonstrated why teachers rarely see curriculum decision making as problematic. The data shows that the strength of the classification of the discipline and the strength of the framing of the pedagogic discourse determines the space and agency teachers are awarded in the curriculum process. The strength of classification varies between and within the pedagogic discourse providing teachers within anthropology and engineering more space and agency than teachers in physics and all teachers more agency at the graduate level than at the undergraduate level of the curriculum programme.

7.5. Institutional changes and development of the disciplines

The focus of the study is on conceptions held by the teachers of the curriculum. In my analyses I conclude that teachers hold a central position within curriculum development. Nevertheless, as curriculum is created in a social context, the data shows that there are a number of other curriculum forces at play that turn out to be important in order to understand curriculum development within the local pedagogic discourses. Changes take place within disciplines and forces inside and outside the University influence the pedagogic discourse. Quite a number of researchers have studied changes taking place at the higher education level. Some have focused on the policy context or the system level of higher education (see Scott, 1995, 1998, Henkel & Little, 1999, Deem 2001) while others have scrutinised the institutional development, structure and management (see for example Ramsden, 1998; Deem 2001). Not much research is concerned with the interplay between external influences and curriculum development at the pedagogical level. The main focus of this study is not to look at the development of the three disciplines but, using Bernstein's theoretical framework of classification and framing, the data illuminates curriculum changes and stability that is interesting to explore further.

Becher and Barnett (1999) look at curriculum changes that have been introduced in universities in the United Kingdom by using a framework that distinguishes between subject-specific and cross-subject development on one hand and between intrinsic and extrinsic factors on the other. Their conclusion is that the same 'change label'

will often have different meanings within diverse disciplines and that curriculum change is determined by the type of institution it takes place in (the institutional context), whether it concerns science or humanities (the classification and framing), the purity of the discipline in question (the power relations in the classification), and the market position of the courses. In the following section, the disciplinary changes found in the study will be discussed using the framework provided by Becher and Barnett to structure the discussion but it is important to note that within this study there are clear interrelations between the categories. Furthermore, the categories have been given labels that are seen as reflecting the characteristics of the type of change and development:

Table 7.2: Matrix for curriculum development (based on Becher & Barnett, 1999).

	Subject-specific developments	Cross-subject developments
Intrinsic factors	1. Intradisciplinary change	2. Academic change
Extrinsic factors	3. Responsive change	4. Generic change

Intradisciplinary change

Intradisciplinary change refers to developments related to the disciplinary contexts that are generated largely by forces internal to the discipline itself. All the disciplines in the study are changing and evolving but their classification creates different space for change. Even in physics, a discipline with a very strong framing of knowledge, changes are strongly felt. New knowledge, moving from the production field (modern physics) into the physics curriculum around 1950, was not fully included in the curriculum until the latter part of the century. With the aid of technology, this previously abstract knowledge can now be related to students' daily life. Research models have also become more sophisticated, partly because of the use of computers.

Within engineering, the classification of knowledge is weaker than in physics. This weak classification explains the ease of the introduction of a new line of study (industrial engineering) within the programme in 1994. During the study I witnessed how new knowledge was discussed at a department meeting and the strategies employed to 'fit' the new knowledge into the curriculum programme. As discussed

above, teachers teaching 'real engineering courses' feel they do indeed have some curriculum space to select the knowledge and experiences included in the course curriculum. As an applied field, the engineering curriculum is developed or structured with relevance to the Icelandic context focusing on geothermal heat and fisheries rather than forestry or the car industry and some of the teachers feel strongly that their role is to prepare students for that field. The influence of the vocational field on the curriculum is indirectly established through teacher research and student projects within the vocational field. The direct influence of the field on the curriculum seems to be diminishing with the removal of 'adjuncts' from the department meetings and the strengthening of the 'American' (or a more academic) approach.

Within anthropology, teachers experience conceptual changes within the discipline where the key concept of *culture* has taken on new meanings. Studying culture is no longer restricted to studying 'others' far away but is foundational for understanding the multiculturalism of the post-modern world. The weak classification of knowledge within anthropology as well as the vertical knowledge structure of the discipline opens up much greater spaces for curriculum changes than within engineering and physics. New knowledge and issues within the field such as globalisation are easily incorporated into the curriculum and teacher space within the curriculum allows them to use their courses to look into new research areas. In this way the teachers enjoy the benefits of directly relating their work in the field of production to the recontextualising field (i.e. relating research and teaching). Aside from foundational and methodological courses, there is quite a movement of knowledge within the curriculum of anthropology. New courses are created as younger researchers arrive as part-time teachers, 'sleeping courses' are thrown out and interesting new areas are included. Within courses, teachers feel free to change the curriculum texts frequently.

Within each of the three disciplines internal changes and development of knowledge and technology is taking place and needs to be addressed within the curriculum process. The strength of classification of the discipline influences the possibilities of the disciplines to adapt to the changes, making it more difficult for strongly classified ones such as physics to change than those with a weaker strength of classification such as anthropology and engineering.

Academic change

Academic change includes items that are generated by the factors internal to the academic community but are more general and less subject-specific. This category includes institutional changes that are experienced by all three disciplines although they may hold different meanings or be reacted to differently by each discipline. The way the teachers in all disciplines feel they need to incorporate information technology into their curriculum is an example of an intrinsic development affecting all three disciplines in a similar way.

In the study, three other main forces were found that could be seen as belonging to this category, i.e. the attempts by disciplines to strengthen their existence, the reactions of disciplines to the establishment of the graduate programme within the University and the influence of the research mission of the University.

Strengthening the discipline

As could be expected, the three disciplines are all looking for ways to strengthen themselves and to ensure their status and being within the University. They are struggling within a system where financial resources are seen as lacking and where the smallness of departments calls for a serious attempt to find methods which make the most out of available assets. The existence of the disciplines depends strongly on student number and different means are used to ensure or increase enrolment. In these attempts, the disciplinary identity (reflected in the aims of the curriculum programme, see Table 7.1, row 7) may need to be addressed and reconsidered.

In anthropology different means are used to strengthen the disciplinary curriculum. By taking over previously shared foundational courses, the department is both attempting to strengthen the classification of knowledge within the curriculum and to gain financially from the increasing student number. Promising ways to attract more students to the programme are being discussed and involve actions such as establishing new lines of study (on multiculturalism) and making the discipline a more attractive minor subject option for students within other disciplines.

The Department of Physics is a very small one and different from the other two as it is difficult for them to increase their student number as recruitment is limited. The

department's survival is very much dependent on the service courses sold to other disciplines such as engineering. As long as an unwritten agreement or contract between the service course buyers and physics holds, the increasing student number in other disciplines will benefit the physics department. Other possible means to strengthen the discipline mentioned by teachers have to do with broadening the ideal student identity of the discipline such as increasing the number of female students, becoming more friendly towards students (applying a model from mathematics) and establishing a more practically oriented line of study (e.g. applied physics). Broadening the ideal student identity does go though against the regulative discourse of the discipline being 'difficult' and elite and makes it difficult to enact upon the ideas put forward. As a discipline, the teachers within physics do not experience strong motives for change and the discipline is seen as a respected discipline which produces graduate students of high quality who are highly demanded within society.

The engineering department enjoys a larger student number than their parallel engineering departments (Chemical Engineering, Civil and Environmental Engineering and Computer Engineering) and the status of the discipline both financial and in student number is seen as strong. The strengthening of the programme is experienced as taking place with the move from the 'European' mode of engineering to the 'American' one. This move will strengthen the classification of the discipline, moving it more towards being a hard pure discipline rather than applied.

Establishment of the graduate programme

The establishment of the graduate programme within the University affects all the disciplines in a similar manner, i.e. they are all looking for ways to strengthen the framing of their undergraduate programme in order to make the difference between the two programmes more clear. In all three disciplines, the strengthening of the framing of the undergraduate programme is seen as a rational curriculum development in reaction to rather newly established graduate programmes. This calls for a re-evaluation of the undergraduate programme and attempts are made to simplify its structure in order to strengthen the graduate one. This is done by strengthening the framing of the instructional discourse in the undergraduate curriculum and weakening it at the graduate level (see Table 7.1, rows 10 and 11).

The strengthening of the instructional discourse of the undergraduate programme takes on different forms and rationales within each department. In engineering this means an agreement over the adoption of the ‘American model’ of teaching over a rather romantic and possibly unrealistic ‘European model’. In anthropology the first year courses have been made larger and more inclusive, limiting possibilities for students of electing courses. In physics the teachers want to strengthen the framing of the undergraduate curriculum by making it ‘more general’ by limiting the range of courses offered. This action is also taken in the light of a lack of finances that makes it difficult to provide graduate level courses.

In anthropology the stronger framing of the first year is seen as an attempt to provide better control over an increasingly larger student cohort and to help student socialisation into the programme.

The research mission of the University

Recently the University has put forward a strong research mission, ambitiously striving to become one of the 100 best universities in the world. This mission has enforced a research-oriented discourse within the University, which although being lightly or half-heartedly treated by many teachers, strongly affects others. Lara as a new academic at the beginning of the study finds herself torn between teaching and research, claiming she is being forced to spend less time on her teaching than she preferred.

The research mission of the University does influence the disciplinary discourse enforcing some ideologies over others. Within engineering, the mission is seen as increasing the academic drift within the discipline, supporting its move from hard applied to more pure and by doing so, neglecting what some teachers see as the discipline’s moral purpose, i.e. that of solving the problems of daily life. The ideology of the research mission is aligned with the ‘American’ model of engineering and is seen as supporting it against the ‘European’ model.

In physics the research mission is well aligned with the regulative discourse and favoured and celebrated by most of the teachers, one of whom claims it finally makes it possible to create a ‘true’ university. Within the curriculum, teacher research holds a dominant role, especially at the graduate level.

In anthropology the research mission seems to have little effect on the curriculum. The curriculum is already strongly rooted in teacher research and the weak framing of the regulative discourse offers a performatory approach at the same time as the research orientation is strong.

Within the institution all three disciplines are making attempts to ensure their status and being, although different means are used in their attempts. All three disciplines react to the establishment of a graduate programme by strengthening the framing of their undergraduate programme and distinguish it more clearly from the graduate one. Institutional ideologies such as the research mission of the University affect the disciplines and their contesting ideologies differently, strengthening some while working against others.

Responsive change

In this category, Becher and Barnett (1999) refer to curriculum issues that are disciplinary but brought out by outside pressures. Here the classification of the discipline plays a major role. Within the higher education literature, the relation between the university and society as well as the knowledge discourse is characterised by a performative shift associated with an increased emphasis on efficiency and use-value (Gibbons, Limoges, Nowotny & Schwartzman, 1994; Lyotard, 1984). Such a performatory shift can clearly be felt within the anthropology curriculum. Having been identified as a classical, singular discipline, teachers are now looking more outward towards a tangible vocational field, finding relations to the field and providing their students with a broader curriculum focus that is not only confined to preparing them for academic research work.

Engineering as an applied discipline has as its essence a focus on efficiency and useable knowledge but, conforming to the research mission of the University, some teachers within the department feel that the discipline's curriculum is being forced to move away from its performatory emphasis to a more academic one. This shift is also visible in the diminishing influence of agents within the professional field on the formal curriculum.

In physics, where the classification is strongest, external influence is very limited and any attempts to meet the needs of the occupational field are seen as both unthinkable

and unnecessary and diminishing the status of the discipline. As in engineering, the research mission of the University has further strengthened the academic emphasis.

The disciplines' abilities to respond to outside pressures are strongly related to their classification as well as the organisational structure. Strong classification such as found in physics makes the discipline less responsive to external pressure than engineering and anthropology where classification is weaker. The discipline's responsiveness is highly relevant to its possibilities to address demands for interdisciplinarity and performativity.

Generic change

The fourth category within Becher and Barnett's model embraces general, non-subject-specific developments brought about by outside factors. Whereas it is difficult to distinguish between disciplinary and non-disciplinary factors (see above) this category is here seen as representing the pressures of the Official Recontextualising Field (ORF). As discussed earlier, this field has until recently had very little influence and power over the disciplinary curriculum of the University. This is however changing with the demand for accreditation of programmes, the influence of the Bologna agreement and the construction of a national quality framework against which the learning outcomes of different curriculum programmes will now be measured. There is no reason to doubt that the ORF in Iceland will follow a similar path and become stronger with the advent of new stakeholders as experienced by universities in other countries.

As can be seen, the three disciplines are developing and changing. During the time of the study the influence of different forces within as well as outside the disciplinary context made their mark upon the pedagogic discourse of the discipline and thus the curriculum process. Institutional changes and demands were being reacted upon (although not always in the same manner) and dominant ideologies (such as the research mission) support the local pedagogic discourses of some disciplines but not others. In general the curricula of the three disciplines seem to be moving closer towards each other and becoming more similar in classification than before.

The main forces detected and discussed above demonstrate the need to be aware of the multiplicity of such forces and their interaction with the ideologies underlying the

local pedagogic discourse. They do indeed affect the local pedagogic discourse (both the regulative as well as the instructional discourse) of the disciplines and thus teachers' conceptions of those discourses. Internal and external forces also affect the spaces and agency teachers experience within the pedagogic discourses, as has been demonstrated with the strengthening of the interference of the Official Recontextualising Field (ORF) or the dominance of the textbooks. Curriculum decision making is an act of power that lies not only in the hand of the individual teacher nor within the departments but is also embedded in the larger context of institutions, society and universal discourses.

CHAPTER 8: DRAWING THE THREADS TOGETHER

8.1 Summary of main findings

This study was intended to provide insight into university teachers' conceptions of curriculum development within their disciplines and an understanding of their role within the curriculum process. The research questions restated in the beginning of Chapter Seven have now all been addressed and elaborated upon. The findings demonstrate how each of the three disciplines carries within it a specific pedagogic discourse, a local curriculum, focusing on different aims and goals, different attitudes towards the roles of students and teachers and a specific instructional discourse where these regulative ideas are carried out. Despite being located within the same institutional framework, the use of classification and framing make it possible to demonstrate or reveal this specific local disciplinary discourse.

The local pedagogic discourse (or the local curriculum) is created when a universal pedagogic discourse is recontextualised within a local socio-cultural context. The transformation of the pedagogic discourse creates spaces in which different ideologies (personal, disciplinary, institutional and external) can interact. The spaces that open up within the local discourse are subject to the strength of the classification of the discipline. The stronger the classification, the more similar to the international disciplinary discourse the local one is and the less space there is for local ideologies or local development of the curriculum.

In the transformation of the local pedagogic discourse, the university teachers hold a significant and powerful role. The local pedagogic discourse is most strongly influenced by the teachers' conceptions of the discipline acquired during their own time of studying the discipline, their experience of teaching and the discipline's organisational saga or culture. The organisational culture of the discipline refers to what the teachers in the study see as the local speciality of the pedagogic discourse. It is explained by participants to be created and influenced by various internal and external factors such as the societal situation when disciplinary departments were established, changes within the discipline and the personal influence of founders. This disciplinary culture can also be described with reference to the varied strength of classification and framing which demonstrate different modes of interaction

within the disciplinary culture (its regulative discourse) and thus determines, to a certain degree, the possibilities of disciplines for adaptation and change.

The strength of the classification of knowledge within the pedagogic discourse of the discipline determines how teachers experience the possibility of adapting it to local situations and this determines the teacher experience of space, freedom and agency to make curriculum changes or put their personal mark on the curriculum. For example, teachers within physics see the local pedagogic discourse of their discipline as strongly corresponding to the international one, while local conditions and reality are experienced as having little impact on it. Weaker classification of knowledge as in anthropology or weaker classification of communication between discipline and field as in engineering, create wider or more varied spaces for teachers to act out different ideologies within the curriculum development. Different spaces are also apparent within the instructional discourse of the different disciplines. In this sense, teachers within anthropology and engineering experience much more freedom within curriculum development in the undergraduate programmes of their disciplines while teachers in physics feel the instructional discourse needs to resemble the international one. Within the graduate programme, both classification and framing of all the disciplines become weaker, allowing the teacher more personal as well as disciplinary freedom within the curriculum.

Within the disciplines different ideologies or conflicts arise, related to what is seen as essential or precious within the local pedagogic discourse. Conflicts concern the aim of the discipline (academic or practical within engineering), accepted student identities (physics) or attempts to move from making curriculum decisions as individuals towards increasing teacher cooperation (anthropology). Institutional ideologies such as the University's research mission influences the disciplinary ideologies in different ways, supporting some while weakening others.

Finally, the study shows that, within the University curriculum decision making and development is not experienced as troublesome or problematic or as a vehicle of change. While teacher identities as researchers (within the field of production) and teachers (within the field of reproduction) are clearly identified within the University, their role and identity within the recontextualising field is much less obvious and tacit.

8.2. The contribution of the research to the educational field

This study is located within the field of higher education curriculum which is a field that has received limited attention (Kelly, 2004), and in which research and writing lacks a more general overview or approach (Tight, 2003). This may be partly due to the complexity of the curriculum concept or it may demonstrate a lack of a more coherent curriculum concept of a young field, exemplified by its detachment from similar research at other educational levels (Knight, 2002). This study thus adds to the literature of curriculum studies providing understanding and insight into the complex curriculum processes at the higher education level. It illustrates how some teachers and departments think about the curriculum and gives insight into the curriculum processes but at the same time critically captures the power and agency of the individual teachers within the process.

Another often criticised characteristic of curriculum research at the higher education level is the theoretical isolation of the practice of teaching and learning and their detachment from other aspects of university practice such as disciplinary knowledge development. This is envisioned in many publications of 'how to' literature on teaching and learning (Tight, 2003). In the terminology of this study, this detachment reflects the separation of the instructional discourse from the regulative one, where the instructional discourse is experienced or treated like as a generic practice devoid of ideological, disciplinary and political connotation, illustrating a narrow, apolitical and technical view of the curriculum and the curriculum process (Barnett & Coate, 2005; Malcolm & Zukas, 2000b, 2001). In the present study this criticism is met with findings stressing the importance of a coherent and holistic view of the curriculum process and the strong embeddedness of teaching and learning (the instructional practice) within the local pedagogic discourse as well as within the larger social world. It also illustrates the central role the curriculum plays in the formation and function of the University (Conrad & Haworth, 1990) and the power and agency of the curriculum developers, thus indicating the need to adopt a more critical and political approach.

Bernstein's theoretical concepts and ideas have been used to provide an empirical and critical understanding of curriculum development of three disciplines within the University. Bernstein's theories have previously been applied successfully within

various educational research setting (Bourne, 2004; Daniels, Creese, Hey & Leonard, 2004; Ensor, 2004; Neves *et al.*, 2004). Researchers have applied this analytical framework to study development within teacher education (Morais *et al.*, 2005), to analyse teacher voice within the secondary school curriculum (Kirk & Macdonald, 2001) and to explore the contextualisation of sociology within universities in three different European countries (Vitale, 2001).

As in the above research, this study reveals the power and usefulness of Bernstein's concepts as analytical tools to analyse and understand the complex process of curriculum development and at the same time do justice to the socio-cultural context within which the process takes place. The aim of the study was to understand curriculum development in the larger context of the University. The generalness and overarching nature of Bernstein's concepts have allowed me to incorporate and develop other theoretical aspects within framework constructed here from his work.

In this study, the focus on the role of teachers within the curriculum process of higher education curriculum adds a new dimension to the empirical testing of Bernstein's theories. While the empirical study further strengthens the theoretical framework provided by Bernstein it also adds a new dimension to his work by providing the concept of a local pedagogic discourse of the disciplines. The idea of the local pedagogic discourse needs to be and will be developed further.

Within higher education, disciplines have mainly been examined through two analytical lenses, i.e. from an epistemological perspective and as a cultural entity. Studies within the former approach usually base their analysis on Biglan's categories of hard-soft and pure-applied discipline (Biglan, 1973) and have looked for and found differences in knowledge beliefs (Becher, 1987), validation of knowledge (Donald, 1995) or knowledge transmission (Hativa & Marinocovich, 1995). Neuman (2002) has summarised these main findings in regards to teaching, learning and assessment practices. In the cultural approach the discipline is seen as a cultural entity within which teacher values and identities are formed, and the teachers' intention is to initiate students into their culture (Henkel, 2000). Previous research underestimates disciplinary differences and the impact of local context and teacher agency towards the structures that frame their practice. This makes it problematic to

capture the changing landscape of the higher education curriculum. The current study attempts to remedy this.

The study has demonstrated how Bernstein's concepts of classification and framing make it possible to conduct an analysis of the curriculum that captures structures and modes that are specific within the context of the disciplinary curriculum at a specific time and place. These differences have been demonstrated (see Table 7.1) and portrayed as the local pedagogic discourse of each of the three disciplines. In this way the study has captured the differences between units such as the disciplines and departments, the varied context of the discipline and the way the organisational saga, the cultural structure and institutional context affects and constructs the disciplinary curricula. The study has shown in some detail how and where the local characteristics of the pedagogic discourse emerge and the moulding influence of different forces. Thus it requires that these levels of analysis be elicited in further research of the pedagogic discourse of higher education as well as opening up a rich field of further research. The analysis also invites a further theoretical discourse on the relationship between the pedagogic discourse and curricular innovation within the arena of higher education.

8.3 Strengths and weaknesses of the research

As put forth at the very beginning of the thesis, the aim of my research was to understand how university teachers in different disciplines go about making decisions about the curriculum and how their ideas about the curriculum affect the way they understand teaching and learning. I also wanted to understand which factors, internal or institutional, are perceived by teachers as important for their curriculum planning. The research thus aimed at understanding and shedding light on the complexity of curriculum development within higher education in an attempt to advance the existing knowledge of this important issue. Curriculum development was explored from the viewpoint of the teachers who were portrayed as holding the strongest responsibility of creating curriculum spaces for student learning within their disciplines.

The strength of the theoretical framework applied in the research lies in its capacity to explore curriculum development in its wider socio-cultural context, focusing on

teacher conceptions at the meso level and teacher attempts and agency in relating the field of knowledge production to the reproduction of knowledge in teaching. The framework thus both captures the teachers' agency and activities within the production of knowledge (macro) and their participation and ideas within the instructional discourse (micro) although the main focus is on their conceptions and agency at the level of curriculum development (meso). While it will be claimed that this theoretical point of departure has been most productive for the purpose of this research, it can be argued that the application of that focus has limited the macro and micro view. To work against this narrowness of focus, the findings have both been explored in the wider context of knowledge development and teachers have been given voice by a rich use of their words within the study.

Working from the research aims, qualitative methods were seen as a proper mode to gain understanding of the complexity of curriculum development. When using qualitative methods, the researcher's observations are one of the main research instruments (Bogdan & Biklen, 1998; van Manen, 1999). I have previously addressed the problem of doing research within the community I belong to and at the same time attempting to be critical of it (cf. Brewster, 2005). This dilemma was at times evident when participants responded to me as an educational developer rather than a researcher. Despite my membership in the community of the University, I had little knowledge of the disciplinary areas explored, especially of the departments of engineering and physics. On the other hand, belonging to the community privileged me with knowledge of institutional issues and structures I might have found difficult to understand as an outsider. To reduce biases analyses of the disciplinary curriculum were presented for checking as papers at local and international conferences and provided for key participants to read and react upon (Geirsdóttir, 2003, 2004a, 2004b, 2004c, 2005, 2007a, 2007b). One participant from each department read the final analyses for approval and suggestions. Finally, using data from different sources is seen as strengthening the research and enhancing its authenticity.

The findings of the research are based on case studies of three disciplines and cannot be transferred directly from one situation to another. Indeed, the main findings illustrate the importance of understanding and acknowledging the socio-cultural reality in which curriculum development and decision making is embedded. What

can be transferred from the study is this specific method of curriculum study, i.e. the approach and mode of analysing and understanding curriculum development. Also the similarities and differences found surely have a considerable general value. The data was collected over a period of four years and therefore captures the ever changing situation of the teachers and the curriculum during that period. I claim that the ability of the theoretical framework to capture the changes taking place within the curriculum should be seen as a token of the strength of its analytical power.

I argue that in spite of limitations the research has accomplished the aims put forward and that it does indeed add to the understanding and knowledge we have of curriculum development within higher education. Its findings will be of interest in Iceland where there are no published studies within this area but I am also optimistic that they will have wider applications, as curriculum development within higher education has not received the attention it certainly deserves given its importance for student learning.

This study has clarified many important issues in disciplinary curriculum development but also opened up a plethora of questions to which answers need to be sought. Curriculum development must be given more attention than it has received until now and the ideas which have emerged from this study need further investigation and closer scrutiny.

At present it would be interesting to see how the theoretical lens or approach provided in this study can be applied to other disciplinary areas, within universities with different organisation modes and governance, and in new local and global situations. Such research would further develop the idea of a local pedagogic discourse. It will also be interesting to see if the changes captured within the curriculum of the three disciplines in the study will mature in the direction predicted. International changes, such as the implementation of the Bologna process that has recently been introduced into the higher education field in Iceland, have already made their mark on curriculum development within the University. It will be of great interest to explore how such influences will affect the curriculum of different disciplines in the nearest future.

More research is needed to understand how the main stakeholders in the curriculum process, the students, conceive of the disciplinary curriculum and their spaces within it. Research indicates that within the different disciplines different pedagogic discourses are strongly formative and influential for student learning (Costello, 2001; Nespor, 1994) but research is limited. Approaching the curriculum from the viewpoint and experiences of students would add a fuller dimension to understanding the curriculum process.

8.4. Recommendation for practice and further research

My research interest was originally rooted in my practical attempts to make curriculum decisions in a scholarly way and, later, in my quest to understand curriculum processes within different disciplines in order to enhance educational development of teaching and learning.

The findings of the research indicate that while the curriculum process is highly complex and the decisions made within the process have strong implications for student learning and being, the process and development is in general treated by teachers in an unproblematic way. That means that within the University curriculum decisions are seen as technical and value neutral rather than an act of power and agency. The main practical implication of the study is therefore to suggest a more scholarly engagement and enactment within the curriculum process at all levels of higher education.

The landscape of higher education in Iceland is changing rapidly and is, as in many other countries, facing and addressing 'supercomplexity' (Barnett, 2000) and experiencing internal and external pressure to change. Institutional discourses carry within them notions of increased local and international competition, globalisation and standardisation brought about in the name of Bologna and national quality frameworks. Within the universities, these changes may carry with them pressures to change the curriculum, the teaching and learning processes, the student identities, the role of teachers and staff, the organisational structures and the procedures for decision-making (Ensor, 2004a; van der Wende, Beerkens & Teichler, 1999). Although it may be claimed that universities have never been free from addressing contradicting and competing external and internal influences (Lattuca, 2004), they

are cultures that need to have the flexibility to change in order to survive (Barnett & Griffin, 1997). To apply an enacted perspective to the curriculum process at this level means to become critically aware of the influence of such global discourses for curriculum development at institutional as well as departmental levels.

The findings of the research demonstrate how different pedagogic discourses exist within the same institutional framework. They further indicate that institutional policies and changes need to address these different pedagogic discourses and be aware that they may be affected differently. While different disciplines may at times be attending to similar curriculum tasks and problems, such as the strengthening the undergraduate curriculum in the light of the establishment of graduate programmes, other issues will be disciplinary specific. At the institutional level the enacted curriculum perspective would enforce institutional leaders to realise the coherence and complexity of the curriculum and, by acknowledging different pedagogic discourses, try to critically anticipate the effects of proposed and enacted changes. Curriculum development and reforms that do not address the local disciplinary pedagogic discourses will not necessarily have effects that were intended or anticipated (Fullan, 2001; Merton *et al.*, 2004).

The institutional awareness towards local pedagogic discourses suggested here does not imply that departments and disciplines should be free from critically engaging with their curriculum. Indeed, this study demonstrated that the department provides the central context of curriculum decision making. The research findings also show that at the disciplinary level curriculum decisions are not seen as problematic and departmental engagement in curriculum issues is pragmatic rather than critical. Pragmatic curriculum issues are rarely contested and debated. This uncritical approach to the curriculum is explained by strong disciplinary traditions or habits, modes of communication and structures of departments that do not encourage much cooperation and collaboration. The departmental level, as well as at the institutional one, is characterised by a lack of curriculum 'agora', a space open for discussion where different voices are heard and shared (Barnett & Coate, 2005) and thus possibly moving the curriculum dialogue from repertoire to reservoir. The research indicates that such spaces can be established but require leadership, both departmental and institutional, of those interested.

Parker (2002; 2003) has suggested a model in which the disciplinary communities take up a more critical and creative approach towards the disciplinary curriculum to secure their agency to define and determine the core and characteristics of the discipline. Parker points out that unless improvement comes from shared and critical reflection with others firmly located in the discipline, the agency to make curriculum decisions may be conceded to outsiders. In the light of the findings of my research I agree with Parker that in order to survive and change, disciplinary departments need to address and critically question their curriculum practices. The research findings and the theoretical concepts derived from Bernstein could provide a fruitful platform or framework for a critical disciplinary curriculum dialogue where I suggest the following questions should be addressed:

- What is the local pedagogic discourse of the discipline? What is its strength of its classification? Is the local pedagogic discourse changing? To what extent might the classification of the discipline encourage or hinder its renovation, development or responsiveness?
- What is the organisational saga of the discipline? What is seen as important and valued within the disciplinary saga?
- How can the organisational mode of the department be described and how is that mode reflected in teachers' roles and student identities? What kind of curriculum discussions and procedures does the organisational mode support or suggest?
- What are the aims and goals of the discipline and how have they been arrived at? Is there a consensus within the department over the aims and goals of the disciplinary programme? Should there be consensus?
- What are the contesting ideologies found within the discipline and how are they supported or diminished by other curriculum forces?
- What are the curriculum forces (intradisciplinary, academic, responsive and generic) acting upon the local pedagogic discourse and how should they be addressed within the discipline?

- How is the regulative discourse of the discipline reflected in the instructional discourse? What student identities are accepted and emphasised within the discourse? What is the framing within the instructional discourse? What are the recognition rules and the realisation rules required of students and how are they presented in the assessment practices?

Finally, the findings of the research hold implications for educational development within higher education. They suggest and stress the importance of seeing teaching and learning as embedded in the disciplinary discourse and acknowledge the different boundaries or spaces teachers experience within the curriculum. The findings suggest that the narrow and technical conception of the curriculum often found within higher education must be presented within its cultural and social context (Malcolm & Zukas, 2001).

From my diary

The sun is shining and through the bars of my basement office window, I can see the top of the trees in the park. Someone shouts and a roar of laughter floats in the air. The students must be playing a game. I let my longings take over, close the laptop and with a touch of guilt head out for the park grabbing a book from the desk to make the break look less frivolous. With the sun in my eyes I open the book and cited in a chapter on educational development is this poem:

There are three conditions which often look alike
 Yet differ completely, flourish in the same hedgerow:
 Attachment to self and to things and to persons, detachment
 From self and from things and from persons; and, growing between
 them, indifference
 Which resembles the others as death resembles life ...

T. S. Eliot, Four Quartets, Little Gidding, III

I read it slowly and then again even slower. And at that point I realise that this is what I want to accomplish with my work and with my study. I set forth to try to understand which issues within the curriculum are cherished by the teachers in the study, providing security and meaning to their thinking and teaching. And while I want to respect those attached elements, I also find it important to see where teachers and departments can and need to be detached from their cherished ideas in order to

develop and change. Engaging in a critical dialogue about the higher education curriculum may prevent us from being permanently caught up in our own world.

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Appendix I: Examples of the interview protocols for open-ended interviews

The curriculum of the University
Interview protocol
Engineering
(October 2002)

General information

- Education, background?
- Time at the department?
- Courses taught?

Conceptions of teaching

- What do you emphasise in your course? What aims and goals do you want to reach? Can you name me two or three main goals you would like to reach in your teaching? What do you find most important?
- What is your role as a teacher? What would you like your students to be able to do?
- What knowledge and skills does a good engineer graduating from your course need to acquire?
- What do you do in your teaching to reach those goals?
- Why do you teach the way you teach? Do you have any role models?
- How would you describe the qualities of a good university teacher?

Course planning

- Have you made any changes to the course or courses you teach?
- What kind of changes?
- Why did you make them?
- What influenced your actions?

- Imagine you are planning a course you have never taught before or one that has never been taught before? How would you do it?

- How long does it usually take you to plan your courses? Can you describe the methods you use to plan your courses? What do you have in mind in planning (content, student needs, teaching methods, external demands, and assessment)?

- Is the planning your responsibility? Do you cooperate with others? Do you share your ideas with your colleagues?

- Do you teach your courses alone? If not – how do you organise the planning? Do you find it different to plan courses with other than alone?

- What is the topic/content of the course? Why have you selected this content?

How do you choose?

- The content of the course?
- The course material?
- The teaching methods?
- The assessment methods?

- Do you seek assistance when you plan or change courses? If so – to whom?

- What influences the way you plan your courses (internal/external factors, students, teachers, tradition, resources, the vocational field, the university governance)?

- Do students influence the way you plan courses? Do you take the student group into account?

- How do you inform your students about the course plan? Do you create teaching plans for students? Do you make lesson plans for each lesson? Do students know what your ideas and aims are? How?

- What teaching methods do you use in your courses? Can you describe a traditional lesson? Why do you select this mode of teaching?

- How do you know when your course plans are successful? Do you have any methods of assessing your plans (student attendance, participation, facial expressions, assessment, student interviews)?

The planning of the programme;

- Can you name any curriculum decisions that have been made recently within the department?
- How are organisational curriculum decisions made within the department? Who decides what and how to teach?
- Describe the curriculum decision process
- What affects the process?

The curriculum of the University
Interview protocol
Engineering
(January 2006)

General information

- Education, background?
- Time at the department?
- Courses taught?

The department has recently finished the SWOT analysis – was there anything that came as a surprise?

About the department:

- The history of the discipline within the University – origins – development-changes?
- The department – how would you describe it? **The status within the institutional community?** Status within the faculty? Hostility towards the department?
- What characterises the department and sets you apart from other departments within the faculty? Outside the faculty?
- The organisation of the programme? The weight of required courses and optional courses? Why more optional courses?
- Number of teachers and students?
- Supply of courses

Aims of the discipline and epistemological basis

- What is engineering? What characterises that discipline? How would you describe it?
- What are the aims of teaching the discipline?
- What kind of students would you like to graduate?
- Where do the disciplinary ideas come from? Are they discussed [in the department]?

Organisation of the programme

- Can you name me any curriculum decision made recently on teaching within the department?
- How are decisions made regarding the organisation of teaching and learning within the department? Who decides what and how matters will be taught? Where do the ideas arrive from?
- How are decisions made?
- What influences those decisions?

Organisation of courses – what knowledge is worth the most?

- What courses do you mainly teach?

- What are the topics/contents of the course? Why have you selected this content? Where do your ideas come from?
- What do you emphasise in your courses? What aims do you want to reach? Can you name two aims you would like to reach in your course? What is most important to you?

Conceptions of teaching

- What do you emphasise in your course? What aims and goals do you want to reach? Can you name me two or three main goals you would like to reach in your teaching? What do you find most important?
- What is your role as a teacher? What would you like your students to be able to do?
- What knowledge and skills does a good engineer graduating from your course need to acquire?
- What do you do in your teaching to reach those goals?
- Why do you teach the way you teach? Do you have any role models?
- How would you describe the qualities of a good university teacher?
- What knowledge and skills does a good engineer graduating from your course need to possess?
- What mainly influences the way you plan your courses (internal/external factors, students, teachers, tradition, resources, the vocational field, the university governance)?
- Do students influence the way you plan courses? Do you take the student group into account? In which way?

Relationship between research and teaching

- What kind of research do you practice?
- How do you experience the relationship between research and teaching?

Changes

- Have you changed your course/courses?
 - In what way?
 - Why did you change the course?
 - What influenced the changes made?
- How long does it usually take to prepare courses? Can you describe the methods you use when planning your course? What factors do you have in mind (content, students' needs, teaching methods, external pressure, and assessment)?
- Is the planning your responsibility? Do you cooperate with others? Do you share your ideas with your colleagues?
- Do you teach your courses alone? If not – how do you organise the planning? Do you find it different to plan courses with others than alone?
- Do you seek assistance when you plan or change courses? If so – to whom?

Teaching methods

- What do you do in your teaching or in planning your courses in order to reach your aims?
- What is your role as a teacher? What do you want your students to accomplish? What is a good student?
- What teaching methods do you use in your courses? Can you describe a traditional lesson? Why do you select this mode of teaching? What do students have to do?
- Why do you teach the way you do? Do you have any role models?
- How would you describe the qualities of a good university teacher?

Informing students

- How do you inform your students about the course plan? Do you create teaching plans for students? Do you make lesson plans for each lesson?
- Do students know what your ideas and aims are? How?

Course evaluation

- How do you know when your course plans are successful? Do you have any methods of assessing your plans (student attendance, participation, facial expressions, assessment, student interviews)?

Appendix II: An example of the interview protocol for semi-focused interviews

Curriculum development in the University of Iceland

Interview protocol in part two
University of Iceland in January 2005

General information about the course selected:

- Which course and where [in the programme] taught?
- Required course/optional course – undergraduate/graduate?
- Restricted admission or open for all students [requirements]?

Course selected for discussion:

- Which course or courses have you selected for discussion?
- Why did you select this course?
- How often have you taught the course and why do you teach it?

Planning of the course:

- How does the course start? Why does it start in that way?
- What are your main tasks as a teacher [of the course]?
- What are students' main tasks?
- What is the topic of your lectures and/or students' discussions?
- What are the main topics of the course?
- What are the aims of the course – what would you like your students to take from the course?
- Do you plan this course in a similar manner as other teachers within the department [plan theirs]?
- Do you include topics or issues that other teachers may not? Which? Why?
- What is the assessment practice within the course?

Relations to the discipline:

- How do your students learn to work as specialists in the discipline or in the disciplinary area?
- Does the course apply the methodology of the discipline or the disciplinary values? In which way?
- Does the course address matters of disciplinary dispute?

Connection to other courses:

- How is the course connected or related to other courses taught within the discipline?
- Does the course provide a foundation for further courses of study?
- Does the course rely upon students' previous knowledge? Does the course address issues that are in conflict with what is taught in other courses?

Students' attitude towards the course:

- What do think will be of special interest to your students?
- Are there any specific issues you think they might have trouble with understanding or becoming interested in?
- How does the course topic relate to what students have previously learned or experienced?

- What do you think your students will mainly question in the course? How will you answer these questions?

Changes:

- Has your course plan changed or developed since you first taught the course?
- Where do the ideas behind the course plan arrive? Why do you plan the course in this way?
- Do others enter the planning of this course?

Appendix III English and Icelandic quotes used in Chapters Four, Five and Six

The Department of Mechanical and Industrial Engineering

English	Icelandic
So when I arrive [in Iceland] on the 17th of September 1972, I still didn't know if I had the position or not ... So I called [the head of the faculty]. This was on a Sunday as far as I remember and he said: Come right away tomorrow. You have already missed one week of teaching. And I just started teaching thermodynamics (25:5-6).	Svo þegar að ég kem heim 17. september 1972, veit ég ekki hvort ég er búinn að fá starfið eða ekki ... Svo ég hringi í [deildarforseta]. Þetta var á sunnudegi minnir mig og hann segir við mig: Komdu strax á morgun, þú ert þegar búinn að missa eina viku úr. Og byrjaði bara að kenna varmafræði.
So the greatest problem to begin with was to translate an international language [of mechanical engineering] into Icelandic. Those are international concepts that we use in the discipline in other places, in the Nordic countries as well as in English speaking countries (25:7).	Svleiðis að það var mesti vandinn fyrst til að byrja með var að íslenskusera alþjóðamál. Þetta eru alþjóðaorð sem að við notum í þessum fögum annars staðar. Bæði á Norðurlöndum og enskumælandi löndum.
We decided from the very start that the programme would have to be so broad that they [the students] would be able to enter every school possible. That was our goal (25:25).	En við ákváðum alveg frá byrjun að námið hjá okkur yrði að vera svo breitt að þeir gætu komist inn í hvaða einasta skóla. Það var okkar markmið.
I am a member of staff; I am not only here to serve them. I also have to feel good in my job. I have to be here and this is my environment (4:57).	Ég er starfsmaður hérna. Ég er ekki bara hérna til að þjóna þeim. Mér þarf líka að líða vel í minni vinnu. Ég þarf að mæta hérna og þetta er mitt umhverfi.
I just don't think we have such great ambitions for ourselves. More that we want to stick together ... even though we don't work together we do respect each others successes (25:29).	Ég held bara að við séum ekki með það mikinn metnað fyrir okkar eigin hönd. Heldur viljum við bara standa saman ... þó að við vinnum ekki endilega saman þá samt virðum við hvers annars velgengni.
I have not experienced in our department that there are any unsolved matters between colleagues ... people just talk straight out ... people spend quite a lot of time here and often meet for the coffee break and communicate outside the department. Go hunting together and so on (9:30).	Ég hef ekki orðið var við það í okkar skor að það séu nein óleyst mál milli manna ... menn bara tala út um það ... menn eru hérna mikið, hittast mikið í kaffitímanum og samskipti þar fyrir utan mikil. Fara saman í veiðiferðir o.þ.h.
Going out for a weekend into the country ... with our families ... that makes a difference. It makes a difference that the last weekend this winter was a Teacher Celebration where the 3rd year students with the master's students take care of buying food and a hall is rented and we do some show. And they have some show making jokes about us. This means everything! (4:57).	Það skiptir máli að við erum að fara eina helgi saman í Brekkuskóg ... með fjölskyldunni. Það skiptir máli að seinustu helgi í vetur var Kennarafagnaður þar sem nemendur á þriðja ári og meistaranemar sáu um að kaupa mat og það er leigður salur og við erum með skemmtiatriði. Og þau eru með skemmtiatriði og gera grín að okkur og svona. Og þetta skiptir öllu máli!
We are a bit cocky about our department ... some teachers in other departments might claim it is to much of a community of buddies ... and it might be true that it possibly retrain us from being critical enough towards each other...but from a human point of view ... it is quite a cosy place of work (9:30).	Við erum dálítið montnir af andanum í skorinni ... sumir myndu kannski segja og segja eflaust í öðrum skorum að þetta sé of mikið svona kunningjasamfélag ... og það getur eflaust verið eitthvað til í því að það hefti okkur stundum að við séum ekki nógu krítískir á hvern annan ... en bara svona frá mannlegu sjónarmiði þá ... þá er þetta bara huggulegur vinnustaður.
Because of the smallness here, I actually have had only one [teacher] to talk to. Because when I start talking to others here in the department I am	Það er náttúrulega mikil smæð hérna þannig að ég hef í raun og veru ekki haft nema kannski einn annan til að tala svona við. Af því að strax og ég

discussing a totally different course. This [field] is so special that one should first and foremost be teaching or talking to one's colleague in that field (9:21).	fer í að tala við aðra hérna í skorinni þá er ég kominn með allt öðruvísi námskeið. Þetta svið er svo sérhæft að maður ætti fyrst og fremst að kenna eða tala við kollega sína á sviðinu.
We taught a lot together. Split the courses between the two of us, sometimes taking turn in teaching to break it up a bit. At that time there was quite a lot of discussion about those syllabuses (9:13).	Við kenndum mikið saman. Vorum að skipta námskeiðum milli okkar, kenna jafnvel til skiptist til að brjóta þetta aðeins upp svona og þess háttar. Þá var mjög mikið talað um þessar kennsluáætlanir.
But this is something old in me. Just to think of something new and try it out without sharing the idea with others (10:24).	Þetta er bara eitthvað gamalt í mér, að hugsa bara um eitthvað nýtt og reyna það án þess að deila hugmyndinni með öðrum.
Everyone knows what natural sciences are so it is a good point of departure. And the difference between engineering and natural sciences is that the natural sciences analyse problems but do not enter the synthesis, which is to design. But that is the specialisation of engineering. It is not sufficient for us to analyse and understand the problem; we have to provide a solution. The solution is the big word (9:4).	Það vita allir hvað raunvísindi eru þannig að það væri ágætt að taka útgangspunkt í því. Og munurinn á verkfræði og raunvísindum er sá að raunvísindi fást við að greina vandamál eða analísera, en fara ekki út í syntesiuna, þ.e.a.s. að hanna. En þar í liggur sérstaða verkfræðinnar, að getum ekki látið okkur nægja að greina eitthvað og skilja eitthvað vandamál, við verðum að koma með lausn. Lausnin er stóra orðið.
Because we are thinking how we will do things tomorrow ... we can take any problem there is, dissect it and make solvable G: And would you have to foresee the problems of the future? No not necessarily, but after maybe four or three years you might come up on a problem you simply haven't solved before (6:14).	Því við erum að hugsa um hvernig við gerum þetta á morgun ... við getum tekið hvaða vandamál sem er og svona brotið það niður og analíserað Og gert það leysanlegt. G: Og þarftu að sjá fyrir þá kannski hvaða vandi ... er þá í framtíðinni? Nei, ekki endilega það, en eftir kannski fjögur ár eða þrjú ár þá lendirðu í einhverju verkefni sem þú hefur einfaldlega ekki gert áður.
Then we have what we sometimes call the 'synthesis courses' when you are entering the world of design where nothing is right and nothing is wrong but the solutions are yet of a very different quality (2:8).	Þá komu þessir sem við kölluðum stundum „syntesukúrsar“ þar sem verið að fara inn í þennan hönnunarheim þar sem ekkert er rétt og ekkert er rangt en lausnirnar eru hins vegar mjög misgóðar.
In the course you begin by doing approximations ... making the problem manageable. You try out different solutions, one by one and you assume it's like this or that. In practice I know this doesn't quite do this ... but I just say: Ok, I will just assume this is straight but I know at the same time it is a bit off. But possibly I will get a solution that is simple and good and works so I can see how much [weight] it can take. And this is what I mean by engineerical imprecision. In the problem you don't include all those details that you will later on in their study and you make the problem simple enough that those kids can bring in some math to solve it (6:10-11).	Og maður byrjar alltaf þarna í fyrsta námskeiðinu að gera einhverjar nálganir ... gera dæmið viðráðanlegt. Maður prófar einhverja aðferð á þessu og ég myndi gera ráð fyrir þetta sé svona og svona. En í praksís, ég veit að það er ekki alveg lóðrétt. Heldur einhvern veginn svona ... en ég segi bara ókey, ég geri bara ráð fyrir að þetta sé beint, en ég veit að það er kannski eitthvað þínku vitlaust. En kannski fæ ég bara nógu gott svar sem er einfalt og gott og virkar til að ég geti ákveðið hvað þetta þolir mikið. Og það er það sem ég meina með svona verkfræðilegri ónákvæmni. Þú gerir dæmið kannski ekki alveg og ekki alla þessa detail sem þú gerir síðar á efri árunum og gerir dæmið nógu einfalt til að þessir krakkar geti komið með einhverja stærðfræði til að leysa það.,

<p>I experience a great fracture ... in some sense it is old Europe versus America ... in some sense it is engineering as a technical subject or engineering as science. There are some people here that have never seen anything else than a classroom ... they arrive straight from the books ... have never worked as engineers and of course they experience engineering as pure science (2:16).</p>	<p>Ég skynja hérna mikinn klofning ... að einhverju leyti er þetta gamla Evrópa versus Ameríka ... að einhverju leyti er þetta verkfræðin sem tæknileg grein eða verkfræðin sem vísindi. Það er hérna fólk sem hefur aldrei séð neitt annað en annað en skólastofu ... kemur hérna beint frá bókunum ... hefur aldrei unnið sem verkfræðingar og það náttúrlega skynjar verkfræðina sem hrein vísindi.</p>
<p>The turmoil is ... some say: This is not a graduate study; this would never be approved of [elsewhere]. This particular course could never be a part of graduate studies in the US. But then other would say that in Europe where this course is originated it would be a part of this five year programme and there you would not have any clear cut distinction [between BS and master's level] (6:27).</p>	<p>Togstreitan er sko ... sumir segja hérna: Þetta er ekkert graduate nám, þetta myndi aldrei líðast. Þetta ákveðna námskeið gæti ekki verið graduate nám í Bandaríkjunum. En svo segja menn aðrir sko í Evrópu sem þessi kúrs er sniðinn eftir þá var þetta inn í þessum fimm ára pakka, þá er engin raun og veru skil þarna á milli.</p>
<p>Not in the department ... but within the Faculty of Engineering. There you have two poles. One of the pole, we as engineers in quotation marks, see as too scientific. It is such that you are first and foremost in an academic area. You are publishing a great deal, highly connected outwards to the international science community. Not very vocationally related and not much teaching your students [true] engineering in the sense I am talking about, more just some analytical techniques (9:27).</p>	<p>EKKI í skorinni ... en það er innan verkfræðideildarinnar í heild. Þar eru tveir pólur. Annar póllinn sem að okkur verkfræðingum í gæsalöppum finnst vera of raunvísindalegur. Hann er sá að þú ert fyrst og fremst í einhverju, á einhverju sviði. Þú ert að birta þar mikið, ert mikið tengdur út í alþjóðlega vísindasamfélagið. En eru kannski ekki mikið atvinnulífstengdir og ekki mikið að kenna nemendum sínum verkfræði, ekki í þeim skilningi sem ég er að tala um, heldur meira einhverja analísu, tækni.</p>
<p>It is without doubt a student that is so confident that he does not buy any nonsense even when he is told to so. And then Ingvar says: The book I am teaching [in the course] is so bloody good because it has such a lot of wrong answers in the answer sheets. And it suddenly dawned on me that this was probably the definition we had been looking for! The student starts to tackle the problem. He has the answers at hand and looks them up. And he needs to make a decision and say: O.k. the answer is wrong – not me. And a student that has gained that confidence he is able to go out and participate in designs that have to do with human lives. A student that fiddles with the problem until he gets the solution provided in the answering sheet, he is not able to (2:23).</p>	<p>Það er alveg klárlega nemandi sem er það öruggur á sínu fagsviði að hann kaupir ekki vitleysurnar þó honum sé sagt að kaupa þær. Og þá segir Ingvar: Bókin sem ég er að kenna [í kúrsinum] hún er svo helvíti góð því það er svo mikið af vitlausum svörum í dæmasafninu. Og allt í einu rennur upp fyrir mér að þarna er komin kannski í mjög stuttri lýsingu áherslan sem við erum að leita eftir. Nemandinn fer að streða í að reikna eitthvað dæmi. Hann hefur svör við dæminu, flettir upp í svörunum. Og hann þarf að taka ákvörðun og segja: Ókey, svörin eru vitlaus- ekki ég. Og nemandi sem er kominn með þetta öryggi hann er fær um að fara út og taka þátt í hönnun með mannlífi á. Nemandi sem fitlar í dæminu þar til hann fær niðurstöðuna sem er í svörunum, hann er ekki fær um að hanna með mannlíf í huga.</p>
<p>Maybe one has stopped noticing this big difference. Like this morning when I was teaching. I was teaching in the 2nd year. There are that many girls that you don't see such a gigantic difference even though I know they are fewer in number. But when you look over the group (4:20).</p>	<p>Maður er kannski hættur að finna svona mikið þennan mun. Eins og núna þegar ég var að kenna í morgun. Ég er að kenna á 2. árinu. Það er það mikill fjöldi af stelpum og sko maður sér ekkert svona gígantígskan mun þó ég viti að það eru færri. En þegar maður horfir yfir hópinn.</p>

<p>But then you come to the master's programme. That's that course I am teaching. There is only one woman and overall in our master's programme here they are less likely to show up. I am not sure that if you did a statistical research you would find that they are in showing less up in the master's programme in general. They might be going abroad ... they just show less up in here ... I hope they are just going somewhere else (4:20).</p>	<p>En síðan kemurðu í meistaranámið. Þar er einmitt þetta námskeið sem ég er að kenna. Þar er bara ein kona og bara yfirhöfðuð í okkar meistaranámi hérna þá eru þær að skila sér mikið verr. Ég er ekki endilega að segja ef maður færi að gera einhverja tölfræðilega rannsókn á þessu að þær skili sér endilega verr upp í framhaldsnám. Þær eru kannski líka bara að fara út. Þær bara skila sér verr hérna hjá okkur ... Ég vona að þær séu bara að fara eitthvað annað.</p>
<p>Over all the girls are very strong students and they also participate more [in class]. They are more open but these are special type of girls that come ... They have to be so to have made the decision to enter the field. We only get the top 25 (6:31-32).</p>	<p>Yfirleitt eru stelpur mjög góðar og þær spyrja líka meira. Þær eru svona opnari en þetta eru ákveðnar tegundir af stelpum sem koma ... þær þurfa að vera það til þess að taka þessa ákvörðun að koma hingað. Við fáum bara svona topp 25.</p>
<p>He shows me the bridges the students have made. There are many types and some obviously have been given more thought and work in details. He points out a bridge and says: There you see a typical girl's bridge</p> <p>G: Is this a girl's bridge?</p> <p>You see the guys' bridges.</p> <p>G: Wait, are girl bridges ... what ... prettier?</p> <p>Prettier, much more puttering and prettier, much more messing around them (6:8).</p>	<p>Hann sýnir mér brýrnar sem nemendur hafa búið til. Þær eru af ýmsu tagi og í sumar hefur verið lögð meiri vinna og þæling. Hann bendir á eina brúna og segir: Þarna sérðu dæmigerða stelpubrí.</p> <p>G: Er þetta stelpubrí?</p> <p>Þú sérð strákabryrnar.</p> <p>G: Bíddu eru stelpubryrnar svona ... fallegri?</p> <p>Fallegri, miklu meira dundur og fallegri, svona dúllerí í kring um þær.</p>
<p>Because ... it helps if your can say a joke in a lecture. Even though it isn't a very special one (20:23-24).</p>	<p>Því það hjálpar ef maður svona sagt einhvern ... einn brandara (hlátur) í fyrirlestri. Þó að hann sé ekki merkilegur.</p>
<p>I try not to be only instructive and the carrier of knowledge, rather to be broadening an educative in this ... then I try to smear a little honey on the course ... to make it more accessible (11:16).</p>	<p>Ég reyni að vera ekki bara að fræðandi og boðberi þekkingar, heldur að reyna að vera breikkandi og menntandi í þessu ... og ég reyni nú líka svolítið að smyrja hunangi á kúrsinn ... til að gera hann aðgengilegri.</p>
<p>I feel that you should try to get them to participate more in the discussion, to get them thinking more (11:9).</p>	<p>En mér finnst nú að maður þurfi að reyna að ná því að fá þau til að koma meira í umræðuna, meira að hugsa málin.</p>
<p>You see, sometimes they just sit there totally blank. I try to ask them questions and get them involved. It varies. It also depends on how geared up I am. I do feel it differs from one day to another how well I manage to get them along ... It becomes more and less a lecture and I ask questions but no one answers ... and I end up answering the questions myself (4:35).</p>	<p>Sko stundum sitja þau bara blank! Ég reyni að spyrja dálítið spurninga og reyni að fá þau svona involveruð. Það er misjafnt. Stundum bara ... það fer líka bara eftir því hversu vel upplögð ég er. Ég finn að það er dagamunur á mér hversu vel mér tekst til að svona fá þau með mér. Það verður kannski meira fyrirlestraform og ég spyr en það svarar aldrei neinn sko. Af því að ... og þá er ég sjálf búin að svara</p>
<p>You are dealing with real things and can visualise them. And it is practical and you see the point and why you are doing what you are doing (13:30-31).</p>	<p>Þetta eru raunverulegir hlutir sem þú ert að fást við og eitthvað sýnilegt. Og þetta er praktískt og menn sjá svona pointið og maður sér hvers vegna maður er að hlutunum.</p>
<p>What inspires students? To gain an understanding of the things that they have in their hands on a daily basis – to realise it is no black magic – it is understanding of the system that we live within day by day (11:24).</p>	<p>Hvað hrífur nemendur? Þau fá aðeins meiri skilning á hlutum sem þau eru búin að vera daglega með í höndunum sjálf – að sjá að þetta er ekki svartigaldur - það er skilningur á þessum kerfum sem við erum að lifa í dag fyrir dag.</p>

<p>I don't believe in showing up in class to discuss something very theoretical with the students that nobody understands ... so I try to think ... practically: What would be good to know? And in which areas did I feel like an idiot when I stared to work after graduation? (4:46).</p>	<p>Ég trúi ekki á þetta að mæta í tíma og tala eitthvað voða fræðilegt við þau sem enginn skilur hvað þú ert að tala um ... svo líka reyni ég að hugsa það svona praktískt. Hvað væri nú gott að vita? Og á hvaða sviði fannst mér ég vera alveg eins og auli þegar að ég fór að vinna eftir skóla.</p>
<p>Because you learn so much – the lectures are of course a certain form of transmitting the subject but it is totally different ... I want them to be able to see it ... today I took a piece of turbine with me to class and rims made of magnesium and they get to hold it. (Hold it?) Yes magnesium is the lightest metal there is so ... You see you remember that if you have held a magnesium and aluminium rim ... that there is a difference ... You always remember the feeling (4:25).</p>	<p>Vegna þess að þú lærir svo mikið sko ... fyrirlestrarnir eru náttúrulega ákveði form af því að miðla efni en það er bara allt annað ... ég vil að þau fái að sjá þetta ... í dag fór ég til dæmis með hreyfilblað í tíma og leg ... nei felgur úr áli og magnesíum og þau fá að handa ... (Handfjatla?). Já magnesíum er léttasti málmurinn ... Sko þú veist að ... þú manst ef þú hefur haldið á magnesíum og álfelgu ... það er munur ... Þú manst alltaf tilfinninguna.</p>
<p>If you have the connection to the students and make sure you are progressing at their speed through the curriculum ... you are not leaving anyone behind. And naturally the connection is different because the students differ. And I try to ... you don't just take the fastest or the best into account. Because even if this is a university, it still is a bit like elementary school. It is the breath, especially when I am teaching at the 2nd year and I have such a large group of students. (4:21).</p>	<p>Ef þú hefur tenginu við nemendur og þú ert að fara á þeim hraða í gegnum námsefnið að þú haldir tengingunni ... þú ert ekki að missa neina. Og auðvitað náttúrulega er tengingin misjöfn af því að nemendur eru misjafnir. Og ég reyni svona að hafa ... sko maður miðar ekki bara við þá hæfustu eða hröðustu. Því þó þetta sé í háskóla þá er þetta svona þínu svona eins og grunnskólinn. Þetta er breiddin, sérstaklega það sem ég er að kenna á 2. ári og ég er með það mikinn fjölda nemenda.</p>
<p>Students attend many courses – I try to keep a normal load. I don't believe in that teaching method of having too much load. I have never seen the point in that (4:34).</p>	<p>Þau eru í mörgum námskeiðum - ég reyni svona að hafa það þannig að mér finnst vera eðlilegt álag. Ég trúi heldur ekki á þá kennsluáferð að hafa of mikið álag. Ég hef aldrei séð pointið í því.</p>
<p>I am trying to reach to the student. The connection between students and the teacher ... that means a lot to me. I just can't talk to a group of students if I feel I don't have connection to them ... it is both I think something personal as well as professional (4:21).</p>	<p>Sem sagt ég reyni að ná til nemenda. Tenging nemenda og kennara ... það skiptir mig gífurlegu máli. Ég bara get ekki verið að tala við hóp ef mér finnst ég sko ekki hafa tenginguna ... það er svona bæði held ég alltaf eitthvað persónulegt og prófessjónalt.</p>
<p>You just feel it. I can't explain it, it's just a feeling. You simply feel it, there is this atmosphere in the student group ... it is more difficult in the first year courses, in the classed of 100, 150 students. But, yet, even there I think you can feel it too. When you stand up there in the lecture theatre, then you feel a bit how the audience is.</p> <p>G: And is this an important feeling?</p> <p>Yes, definitely. I am sure that I teach this first year course much better if I can feel I have the audience with me.</p> <p>G: How do you know you have them?</p> <p>Well, maybe there are some questions, a little chat and a little joke is told and a little laughter and such. And you feel it quickly and then you have the attention and you come up with a small example from the field and find an interesting side to the issue (9:26).</p>	<p>Það finnur maður alveg hreint Ég get ekki lýst því það er bara tilfinning. Maður finnur það einfaldlega, það er bara einhver andi ... í nemendahópnum ... það er erfiðara í fyrsta árs námskeiðinu í 100, 150 manna bekk. En samt finnst mér jafnvel að maður finni það líka. Þegar maður stendur þarna uppi í Háskólabíói þá finnur maður svona þínulítið hvernig salurinn er.</p> <p>G: Finnst þér skipta máli ... að finna þessa tilfinningu?</p> <p>Já, alveg hiklaust. Ég er alveg handviss um að ég kenni þetta fyrsta árs námskeið miklu betur ef að ég finn að ég hef salinn.</p> <p>G: Hvernig áttarðu þig á því að þú hefur salinn?</p> <p>Já, það kannski koma spurningar, það er smá spjall og smá brandari sagður og smá hlátur og svona. Og maður finnur það fljótlega og þá er athyglin í lagi og maður finnur einhverja dæmisögu úr atvinnulífinu og finnur áhugaverða hlið á þessu.</p>

<p>Being a good teacher has much to do with attitude and teachers' manner towards students; a teacher that is just benevolent towards students and is there to help them succeed and they can feel that ... then I think you have come a long way. If there is a flaw in that, the student gets the feeling that the teacher is more there to set them up ... or doesn't treat them warmly ... I think that can be a very tricky situation. So while you have this ... positive attitude, helpfulness ... I think the rest more and less happens naturally (9:10).</p>	<p>Að vera góður kennari snýst dálítið mikið um viðhorf og þar með viðmót kennarans til nemandans. Kennari sem er bara einfaldlega góðviljaður nemendum og er þarna til að hjálpa þeim að ná árangri og þau finna það ... þá held ég að það sé mjög mikið unnið. Um leið og einhver brestur verður á þessu, nemandinn fær eitthvað á tilfinninguna, kennari sé meira að leggja gildirur fyrir nemendur eða ... mæti þeim ekki með hlýhug eða þessháttar þá held ég að sé mjög erfitt að vinna sig út úr því. Þannig að meðan þú hefur þetta ... jákvætt, hlýtt viðmót, hjálpsemi ... þá held ég að mjög mikið annað komi af sjálfu sér.</p>
<p>How the strain of school was a concurrent factor driving the student to this act. How they were in actual danger because of the enormous strain and didn't know how to cope with this feeling when you have had enough and there is no time to live the life and this is disgusting and I hate this and I have dreams about it at night and so on ... And I am sure I am the only teacher who did this. But I had to (2: 36).</p>	<p>Hvernig álagið í skólanum væri samverkandi þáttur í því að drengurinn hefði fyrirfarið sér. Hvernig þau væru í raun og veru í hættu öll af þessu ofboðslega álagi sem þau væru undir og þetta að kunna ekki að takast á við þessa tilfinningu þegar þú ert búinn að fá herna upp og það er enginn tími til að lifa lífinu og þetta er viðbjóðslegt og ég hata þetta og mig er farið að dreyma þetta á nóttinni og fleira þvíumlíkt. Ég er alveg klár á því að ég er eini kennarinn sem gerði þetta. En ég varð.</p>
<p>Four lectures a week, three lab hours, exercises, a steadfast treadmill, never relaxing, turning in homework, and so on. It guarantees that the kids are working at their maximum performance. And they never have time to study! (2:12).</p>	<p>Fjórir fyrirlestrar á viku, þrjú dæmatímar, verkefni, stöðug mylla, aldrei slakað á, skila heimaverkefnum og svo framvegis. Það tryggir það að krakkarnir vinna á alveg hámarksafköstum. Og þau hafa aldrei tíma til að læra!</p>
<p>This method of teaching is great in the undergraduate courses – no loose ends, no dilemmas. No ethical, financial or technical problems – that's how we should teach the basics. This is a thousand times more effective a way to get the surgical tools into the kid's toolboxes. Rather than the German method where Herr doctor professor walks into the audio and sings his aria and three hundred students are practicing the ancient Chinese bookmaking art of writing down their notes (11:42).</p>	<p>Þessi kennsluáfer er frábær í BS náminu – engir lausir endar, það eru engin álitamál. Það eru engin siðferðileg, peningaleg eða tæknileg vandamál - þannig eigum við að kenna grunnfræðin. Þetta er svo þúsund sinnum effektívvari leið til að koma, skurðlæknaverkfærunum í verkfæraboxið hjá krökkunum. Heldur en þýska leiðin, þar sem, þar eru Herr doktor professor gengur inn í fyrirlestrasal og syngur sína aríu, og þrjú hundruð nemendur eru að iðka hina eldfornu kínversku bókagerðarlist að skrifa niður nótur.</p>
<p>I usually have a book and on the first day I hand them how I am going to go through this book, chapter by chapter, page by page. It is a kind of overview, just a table and on the right hand side are the problems they have to hand in (25:32).</p>	<p>Ég er vanalega með bók og síðan á fyrsta degi þá afhendi ég þeim hvernig ég fer í gegnum þessa bók, kafla fyrir kafla og síðu fyrir síðu. Það er svona yfirlit, bara tafla svona og hægra megin er svo dæmi sem þau eiga að skila.</p>
<p>I always start the first lesson by introducing the topic that we will be studying and why we are studying it ... and then I ask them: What do you want to know? What are your expectations ... what do you feel you should learn? I find it important that they understand the goals ... that they understand that they are not only my goals for them but that they themselves have their own goals (4: 37).</p>	<p>Þannig að fyrsta tímenn hef ég alltaf notað tíma í að kynna hvað erum við að fara að læra, til hvers erum við að læra það ... síðan spyr ég þau: Hvað viljið þið kunna? Hvaða væntingar hafið þið? ... hvað finnst ykkur að þið ættuð að kunna? Mér finnst mikilvægt að þau átti sig á markmiðunum. Að þau skilji að það sé ekki bara ég sem er með markmið fyrir þeirra hönd heldur þau sem séu með markmið.</p>
<p>This has naturally to be clear from the start and it can't be changed in the middle of the course. They must know what to expect (9:23).</p>	<p>Þetta verður náttúrulega að sjálfsögðu að liggja fyrir alveg frá byrjun og það þýðir ekkert að breyta þessu á miðju námskeiði. Þau verða að vita að hverju þau ganga.</p>

<p>I do think this method is suitable there. It is control because they are in the 2nd year and you know if you start to give them a free rein nothing comes out of it ... which you might be able to do more of when you are gone further and in a different course. And I have weekly assignments and you know you can't turn it in late – they have to hand it in on time. That's how the course wheels on. They are always in the clear beforehand what is expected of them (4:27).</p>	<p>Mér finnst það henta þarna. Það er aðhald af því að þau eru líka á 2. ári og þú veist ef þú ferð að gefa frjálsari hendur þá kemur ekki út úr því sem þú getur kannski gert meira af þegar þú ert kominn lengra og í öðru vísi námskeið. Og þarna hef ég svona vikuleg skil og þú veist það má ekki skila of seint – þau verða að skila á þessum tíma. Það er þannig sem að námskeiðið svona rúllar. Þau vita alltaf nákvæmlega fyrirfram hvers er vænst af þeim.</p>
<p>The teaching technique we use ... we assign them problems and ... maybe first in a course we naturally use the lecture to show how we would attack the problem and then we assign them problems to solve so this is in some sense ... to some extent ... in quotation marks the workmanship of the master that is suppose to pass on and then guidance. And yes then we are waiting to see if they haven't got the hang of it and are able to solve the problem (9:7).</p>	<p>Hvaða kennslutækni við notum ... við erum að leggja fyrir þau verkefni og ... kannski fyrst í einhverju námskeiði þá erum við náttúrlega í fyrirlestri svona að sýna hvernig við myndum ráðast á viðfangsefni og síðan að leggja fyrir þau verkefni, þannig að þetta er svona ... að einhverju leyti, í gæsalöppum handbragð meistarans sem á að smita þarna af sér og leiðsögn já. Og já síðan erum við að sjá til hvort þau hafa ekki náð tökum á þessu og leysa verkefni.</p>
<p>I don't need the same honey, I can be more impertinent there ... it's not the same broadening, I am going deeper... I call it quagmire thinking ... I have never known a real problem that fulfils all the requirements for the equation you want to use. And that all the data you need for the solution is available. I have never known that to happen in reality ... I am trying to get them into the quagmire (11:17).</p>	<p>Ég þarf ekki sama hunangið, ég get verið ósvífnari þar ... það er ekki sama breikkun, ég er að fara niður ... ég kalla það kviksyndishugsun ... ég hef aldrei vitað raunverulegt vandamál uppfylla allar forsendur fyrir jöfnunni sem þú ætlar að hafa. Og öll gögn sé til staðar sem þú þarft til að geta leyst vandamálið. Ég hef aldrei vitað það koma fyrir í raunveruleikanum ... en ég reyni svolítið að koma þeim út á kviksyndið.</p>
<p>I always have them go out themselves and find their own project ... I say to them: Just go and find your own projects to work on, I will hold your hand, you show me your idea and I will possibly guide you elsewhere or find a new approach if this one doesn't work. And then they go out to the companies to talk to people ... (Why do you find this important?)... I just find it important that we are not putting a list of problems in front of them and then their task is just to select from it ... because there is a great difference in getting an assignment where you do your calculations and solve it or to really go into the company and try to figure out the problem and be good enough in the methodology as to be able to solve it (9:15).</p>	<p>Ég læt þau alltaf fara sjálf á stúfana, finna sér verkefni ... svo segir maður bara nú finnið þið ykkur sjálf viðfangsefni. Ég held í hendina á ykkur, þið sýnið mér hugmyndina og ég leiðbeini ykkur með að fara kannski úti eitthvað annað eða finna annan flöt á því ef það hentar ekki ... (Og af hverju finnst þér þetta skipta máli?) ... Ja mér finnst skipta bara máli að við séum ekki að setja upp fyrir þau lista af verkefnum og svo bara velji þau ... af því að það er mikill munur á því að fá lagt fyrir mann eitthvað dæmi og svo reiknar maður og leysir það, heldur en virkilega fara bara í fyrirtækið og reyna að finna hvað er vandamálið og vera nógu vel að þér í aðverðafræðinni til að geta leyst þetta vandamál.</p>
<p>I think – Hey – where is the initiative ... I don't think those kids should be fed. Because they do need to show some initiative. I want them to show imitative. It is difficult to find the balance and sometimes it just doesn't work ... I tell them: You are in the master's programme! This is what it is all about (4:33).</p>	<p>Ég hugsa: Bíddu, hvar er frumkvæðið? Mér finnst ekki mega mata þessa krakka. Því þau verða að sýna frumkvæði. Ég vil að þau sýni frumkvæði. En það hefur gengið svona og svona. Það er erfitt að finna balansinn í þessu og stundum hefur þetta bara engan veginn virkað ... ég segi bara: Þið eruð komin í meistaranám! Það er nefnilega það sem þetta gengur út á.</p>
<p>What I try to tell them over and over again is that what looks for in a test solution is not what they don't know, but what they do know. They draw on this and try to answer as much as possible (11:13).</p>	<p>Ég reyni að hamra á því við þau að það sem maður leitar að í í úrlausn á prófi er ekki hvað þau kunna ekki heldur hvað þau kunna. Þannig að þau ganga á þetta og svara, alveg eins grimmt og öllu því sem að þau kunna.</p>

<p>I have always been considering, should I have a final test? Do I need a test to assess if the student can really tackle the task or not And [in the projects] I think I have a good indication of students knowledge (11:38).</p>	<p>Maður hefur alltaf spáð í það á ég að hafa próf? Þarf ég að hafa próf til þess meta hvort að nemandi geti í rauninni tekist á við þetta eða ekki? Og [í verkefnum] finnst mér ég fá ágæta kynningu á því hvort að nemandur náí þessu.</p>
<p>It is much easier for us to get some realistic or real projects for our students from the professional field. You only have to pick up the phone and call someone. Possibly a partner in Bridge ... [Doing the projects] is one of the important things in engineering. There would be little use of us teaching them by the book. They would hardly be prepared to take on and solve some projects in the field (9:15).</p>	<p>Það er miklu auðveldara fyrir okkur að ná í raunhæf verkefni fyrir nemendur úr atvinnulífinu. Það er ekki annað en lyfta síma og hringja í einhvern. Hugsanlega bridds féлага sinn ... Að vinna verkefni er eitt af því sem er svo mikilvægt í verkfræði. Það væri til lítils fyrir okkur að kenna þeim alltaf bókin hérna. Þau væru afar illa í stakk búin að leysa einhver verkefni út í atvinnulífinu.</p>
<p>It surprises me more and more how those years you spent in graduate school ... from 25 to 30 or there about ... somewhere around the age of 25, how really formative they are in this regard.</p> <p>G: What do you mean? What opinion you have .../</p> <p>What my opinion is on the structure of the programme and how things are suppose to be. And when people say: Well in America it is like this – it really should be read: In my school in America.</p> <p>G: Yes and there is a difference between .../</p> <p>And there is a difference between schools. So it's not only that people are comparing themselves to each continent but comparing themselves between schools within the states.</p> <p>G: And stick to?</p> <p>And stick to what it was like in my school</p> <p>G: Because they are coloured by ...?</p> <p>Yes, because it has somehow put its mark upon you ... you are stuck on it being the only right thing</p> <p>G: Which complicates the discussion a bit?</p> <p>Yes ... God created the man in his image and it can't be expected that we do otherwise</p> <p>G: No, and in other word, so many have started to create man and that makes many Gods?</p> <p>Then you have too many Gods and that's the problem (6:28-29).</p>	<p>Ég er alltaf að verða meira og meira undrandi á þessu hvað þessi ár sem maður var í framhaldsnámi, sem er kannski frá 25 til þrítugs eða tuttugu ... svona öðru hvoru megin við 25 árin, hvað þau eru virkilega mólandi á mann í þessum eignum.</p> <p>G: Hvað áttu við með því? Hvaða skoðun þú hefur á.../</p> <p>Hvaða skoðun ég hef á svona uppbyggingu á námi og hvernig hlutirnir eiga að vera. Og þegar menn segja sko í Ameríku er þetta svona þá lesist það í raun og veru í mínum skóla í Ameríku.</p> <p>G: já, og það er mismunandi á milli .../</p> <p>Og það er svo mismunandi á milli skóla. Þannig að hér er ekki nóg með það að menn séu að bera sig við sitt hvora heimsálfuna heldur eru bera sig milli skóla innan Bandaríkjanna.</p> <p>G: Já, og halda fast í .../</p> <p>Og halda fast í eins og þetta var í skólanum hjá mér.</p> <p>G: Af því að þeir eru litadír af því ekki af því að það er .../</p> <p>Ja, af því að maður er bara einhvern vegin svona stimplaður af því ... maður er fast inn á því að það sé hið eina rétta.</p> <p>G: Já ... það getur gert umræðuna dálítið .../</p> <p>Já, ég meina, já, já, ég meina guð skapaði manninn í sinni mynd og það er ekki hægt að ætlast til að við gerum neitt annað</p> <p>G: Nei, svona með öðrum orðum - margir farnir að skapa sama manninn og þá eru það nú margir guðir .../</p> <p>Þá eru orðnir margir guðir, sko það er vandamálið!</p>

<p>They are called Leitmotif by Wagner. Yes, by Wagner. If you listen to operas by Wagner, there is always a Leitmotif underlying the whole opera (12:18).</p>	<p>Þau heita Leitmotiv hjá Wagner. Já, hjá Wagner, ef þú hlustar á Wagner-óperur þá er eitthvað Leitmotiv sem er undir niðri í gegnum alla óperuna.</p>
<p>You see when you start teaching for the first time you have to have a bit of ... a model to follow. One is not confident enough to incorporate [into the course] your own things you feel you can transmit. That comes later. I find that I am getting a bit more relaxed, you know, more confident. Then you can start to impart more from yourself. One can start to change a bit from this predominant way.</p> <p>G: Do you feel you dare to be more yourself?</p> <p>Yes, and you know you might think: It would be nifty to have this and then you don't see at as a risk anymore. Because you know when you are teaching for the first time you want to be sure that they are definitely learning the basics. And you don't want to ... you know it is often a bit of an experiment of what works and what doesn't (4:28-29).</p>	<p>Sko fyrst þegar að maður er að kenna þá náttúrulega verður maður að hafa þetta dálítið ... eftir smá fyrirmynd. Maður er ekki nógu öruggur til að taka inn í sitt svona eigið sem manni finnst maður geta miðla meira. Það kemur seinna. Ég finn það að ég er kannski aðeins svona farin að ... maður er aflappaðri, þú veist öruggari. Þá fer maður líka að miðla meira svona sjálfur. Maður getur farið að breyta aðeins út af þessu niðurnjörvaða fari.</p> <p>G: Finnst þér þú þora að vera meira þú sjálf?</p> <p>Já og svona þú veist maður kannski hugsar: Það væri sniðugt að vera með þetta og þá finnst manni það ekki nein áhætta lengur. Því þú veist þegar að maður er að kenna í fyrsta skipti vill maður nú vera viss um að þau læri örugglega grunninn sko. Að maður vill ekki vera ... þú veist þetta er oft svona smá tilraunastarfsemi sko hvað virkar og hvað virkar ekki.</p>
<p>Nobody controls what I put into my courses ... But of course I have my models. I am not inventing this myself. These are all courses I have taken myself. And I have as a model the teacher who taught the course before me and I talked to him ... I also built my course much on the course I took in my study ... I leaned on her [her former teacher] ideas a lot ... and I have been in touch with her. But now there is so much on the Internet so I knew precisely how she builds up her course ... I also talked to my friends that are academics and that have taught that course and asked them what textbooks they were using (4:22-23).</p>	<p>Það er enginn sem stjórnar því hvað ég set inn í mitt námskeið ... en náttúrulega hef ég mína fyrirmynd. Þú veist ég er ekki bara að finna þetta upp hjá sjálfri mér. En þetta er náttúrulega allt námskeið sem ég hef sjálf gengið í gegn um. Ég hef náttúrulega fyrirmynd af þeim kennara sem hafði kennt námskeiðið hérna áður og ég ræddi við hann ... Ég byggði líka námskeiðin mikið á þeim sem ég tók í mínu eigin námi ... ég studdist mikið við hennar [fyrrum kennari] hugmyndir og ég hef verið í sambandi við hana. Og nú er þetta orðið líka mikið á Netinu en ég svona vissi nákvæmlega hvernig hún byggði upp sitt námskeið ... Ég talaði við vinkonur mínar sem hafa kennt þessi námskeið og spurði þær: Hvernig kennið þið? Hvaða bækur hérna notið þið?</p>
<p>I really enjoyed watching this [the course] and actually watched him while he was teaching the course, actually he was teaching me too. And there were many things that I found excellent but I think it might be a bit a question about characters. I tend to like to have things more organised and I felt it was all a bit loose but it was clear that many students really liked it (11:7-8).</p>	<p>Það var ofsalega gaman að fylgjast með þessu, og ég í raun fylgdist alveg með honum sko, þegar hann var að kenna þetta, í rauninni var hann nú að kenna mér líka. Og margt sem að mér fannst mjög frábært en ég hugsa það líka að þetta sé líka svolítið spurningin um karaktera. Ég hef hlutina í fastari skorðum heldur en hann og mér fannst svolítið losarabragur á þessu, en það var alveg ljóst að mörgum nemendum líkaði það mjög vel.</p>
<p>You see because one hasn't learnt how to teach I think I might have chosen certain [previous] teachers as role models, indirectly, and adhered to their ways of teaching (10:12).</p>	<p>Sko af því að maður hefur ekkert lært að kenna þá hugsa ég að ég hafi valið ákveðna [fyrrri]kennara mína sem ákveðna fyrirmynd, ómeðvitað og svona haldið mig við þeirra hátt að kenna.</p>

<p>You can find similar courses in other universities. That's what I mean by standard. There is nothing unique in that sense. Nothing that is built on the specific Icelandic situation ... Like in this course ... you have <i>Analysis</i> one, two, three, it continues on and on, increasing the theoretical part but none the less rather standard. You can find the same course in other universities. Even though this is very theoretical; the textbooks are more and less the same (13:3).</p>	<p>Þú getur fundið svipuð námskeið í öðrum skólum. Það er það sem ég meina með standard. Þetta er ekkert sem er svona unique þannig lagað séð. Ekkert sem byggir á séríslenskum aðstæðum ... Þannig að þetta er svona í þessu námskeiði ... þú ert með <i>Greining</i> eitt, tvö, þrjú, það er alltaf áfram með meiri og meiri fræði en tiltölulega staðlað. Þú getur fundið samskonar námskeið í öðrum háskólum. Þó að þetta séu mjög fræðilegt; þá eru þetta samt meira og minna sömu kennslubækur í þessu.</p>
<p>I am teaching one of those courses [classical] that I took myself here for about 20 years ago. Basically the course is the same aside from new software that allows for more flexibility (20:16).</p>	<p>Ég er að kenna eitt slíkt námskeið sem ég tók sjálfur hérna fyrir kannski tuttugu árum. Í grunninn er það eins en það eru náttúrulega komin önnur forrit og svona, það er hægt að leika sér meira.</p>
<p>Well you can change the methods of teaching infinitely but the content as such is very standard.</p> <p>G: You say you can change the teaching methods?</p> <p>Yes you know, should we have math problems, should there be reports, should there be discussion groups, should there be cooperative groups or individual tasks.</p> <p>G: And when you make those decisions – what affects them?</p> <p>I don't know, what you feel or what you see as essential (6:23).</p>	<p>Já, það er náttúrulega endalaust hægt að breyta svona kennsluháttum en efnið sem slíkt er mjög standard.</p> <p>G: Þú segir hérna ... maður getur breytt kennsluháttunum?</p> <p>Já, það er þú veist á þetta að vera dæmareikningur, eiga þetta að vera skýrslur, á þetta að vera umræðuhópar, eru sameiginleg verkefni eða einstaklingsverkefni?</p> <p>G: Já, þegar þú tekur ákvörðun um þetta hvað ræður því þá?</p> <p>Ég veit það ekki, hvað manni finnst eða hvað maður leggur til grundvallar.</p>
<p>There is a certain frame we have. I know approximately how much burden I can put on students within this frame. Then I know which projects I can include. Sometimes I have few problems and one big design project. Or I might have three smaller design projects. It depends a bit on the material I cover but the quantity of work I but in is based on experience (10:15).</p>	<p>Það er ákveðin rammur sem við höfum. Ég veit svona nokkurn veginn hvað ég get á lagt á nemendur innan þeirra. Þá veit ég hvaða verkefni ég get tekið með. Stundum er ég með fá verkefni og eitt stórt hönnunarverkefni. Eða að ég er með þrjú minni hönnunarverkefni. Það fer svolítið eftir því hvaða efni ég þarf að komast yfir en vinnumagnnið byggir ég á fyrri reynslu.</p>
<p>You see, this is kind of fun ... once in a while someone like you arrives to shake one up but the thing is that one gives much to little taught to teaching and teaching methods (9:32).</p>	<p>Sko það er nú dálítið gaman að þessu ... við og við kemur einhver svona eins og þú og hristir upp í manni en tilfellið er að maður eflaust hugsar allt of lítið um kennsluhætti og kennsluáferðir.</p>
<p>I have five or six universities in the US and Canada as a comparison. You look at which courses they are teaching there and so on. But then it always has something to do with the uniqueness here. You do take into account that here is no car industry but rather something else.</p> <p>G. So you are preparing them for the vocational field here rather than elsewhere?</p> <p>There is at least very little in the curriculum about forestry [laughs out loud] (9:16).</p>	<p>Eg hef svona fimm eða sex skóla í Bandaríkjunum og Kanada svona dálítið til hliðsjónar. Maður horfir á hvaða námskeið þeir kenna o.s.frv. En síðan kemur alltaf að þessari sérstöðu hérna. Maður er að horfa á að hér er ekki bílaiðnaður og þessháttar, heldur eitthvað annað.</p> <p>G: Svo þú ert þá að undirbúa þau þá undir atvinnulífið hér fremur en einhvers staðar annars staðar</p> <p>Það er voðalega lítið hérna námsefni um skógarhögg til dæmis (hlær).</p>

<p>It is much more complicated like in the master's course ... because there I am teaching my research area and there is no textbook available and I am distributing articles to them [the students] and assigning them problems (2:10).</p>	<p>Það er miklu meira mál með meistaranámskúrsinn ... því þar er ég að kenna það sem ég er að rannsaka og þar er engin kennslubók til þannig að ég er dreifa til þeirra greinum og finna til verkefni fyrir þau að leysa.</p>
<p>The subject is very plain and it is taught in a similar manner all over the world. So it is no big issue to decide how it should be taught and what ... You might have to select a textbook, you rotate it, mostly for oneself when you become tired of teaching in the same way ... so you don't fall asleep (6:23).</p>	<p>Viðfangsefnið er mjög plain og er kennt á mjög svipaðan hátt út um allan heim. Þannig að þetta er ekkert mál að ákveða hvernig á að kenna þetta eða hvað. Maður þarf kannski að velja kennslubókina, maður svona róterar henni meira til fyrir sjálfan sig líka þegar maður er orðinn þreyttur að kenna alltaf eins ... svo maður sofni bara ekki.</p>
<p>I taught the 5th edition last year and ordered a new one and according to the Student Book Shop this was the only edition available. Then it turned out that there was a 6th edition ... it was quite similar to the previous one but with a few extra problems. But enough so everybody had to get the new one ... and the kids were worried as some had already bought the older edition. I told them it didn't matter as I was still teaching the 3rd edition anyway [laughs out loud] (13:6).</p>	<p>Ég kenndi fimmtu útgáfu í fyrra og pantaði nýja og samkvæmt upplýsingum frá Bóksölu var bara þessi útgáfa í boði. Svo í ljós kom að það var komin sjötta útgáfa ... hún er eiginlega alveg eins og þessi fimmta, það er bara sko búið að bæta við einhverjum nýjum dæmum. En nóg til þess að allir þurfa að kaupa nýju bókina ... og krakkarnir orðin áhyggjufull því sumir voru búnir að kaupa notaða bók, frá því í fyrra. Ég sagði að það skipti engu máli, ég væri hvort sem er að kenna þriðju útgáfuna. [hlátur].</p>
<p>A book like this [holds up a thick textbook] is something you might read at the speed of a paperback ... a good student reads this book for the first time on about 40-60 pages an hour.</p> <p>G: Yes, because it a kind of a student friendly book?</p> <p>A student friendly book. It starts by dead simplifying the whole stuff into total basics that can be understood as you read on. And they load you with more and more complex items and the simplifications are recanted and the case made more and more complex, page by page. The result is a book that is over eleven hundred pages</p> <p>G: Oh, it looks a bit formidable</p> <p>Yes and an extreme number of calculated page problems, so this is a book you can plainly sit down and read (1:8-9).</p>	<p>Á meðan bók eins og þessi [heldur uppi stórri og mikilli kennslubók] er eitthvað sem þú lest nánast á reyfarahraða ... góður nemandi les þessa bók í byrjun á einhverju fjórtíu til sextíu síður á klukkutíma.</p> <p>G: Já, af því að þetta er svona nemendavæn bók?</p> <p>Nemendavæn bók. Það byrjar á því að það er búið að dauðeinfalda allt draslið niður í algjörlega grunn sem hægt er að skilja og síðan lestu og það er hlaðið utan á þig flóknari og flóknari atriðum, og dregnar til baka einfaldanirnar og málið gert flóknara og flóknara, síðu fyrir síðu. Niðurstaðan er sú að við endum hérna í bók sem að er ellefuhundruð síður.</p> <p>G: Ó, þetta lítur nú dálítið óárennilega út.</p> <p>Já og alveg ofboðslega mikið af reiknuðum síðudæmum, þannig að þetta er bók hreinlega sem hægt er að setjast niður og lesa.</p>
<p>The textbook publishers are increasing their service enormously ... there are Excel sheets that are included, there are Power Point overhead, there is ... you name it! There are CD's with maybe short videos about something that is happening in the firms and is relevant to the topic (14:23-24).</p>	<p>Námsbókaútgefendur eru að auka þjónustu sína gífurlega ... það eru hérna excel skjöl sem að fylgja með, það eru power point glærur, það er allur fjárin. Það eru CD-diskar með meira að segja stuttum videóum af einhverju sem er að gerast í fyrirtækjum og snertið efnið.</p>
<p>There is one thing I have to ask you about ... and that is ... what I like best is to use the blackboard and write and talk around my writing. I kind of use the overheads but I do not base my lectures on them and ... doesn't this make me old fashioned? (11:40).</p>	<p>Það er eitt sem mig langar til að spyrja þig um ... og það er ... ég kann best við að nota töfluna og skrifa og tala um kringum það. Ég einhvern veginn nota glærurnar en ég byggi ekki fyrirlestrana á þeim og ... er ég þá ekki gamaldags?</p>

<p>Very often there is an incident where you have some discussion and then I can take an example to explain. But on the other hand I feel that when I use the overheads I don't get as much discussion and participation (11:41).</p>	<p>Það er mjög oft sem koma tilvik þar sem kemur umræða um eitthvað og þar kem ég með dæmi til skýringar. En mér finnst aftur á móti þegar ég er með glærurnar ég ekki fá jafnvel eins mikla umræðu og þátttöku.</p>
<p>They get the overheads before class. But the overheads are not always fully developed because I feel ... I use them in the teaching. I write on them. But it is a lot of pictures and I am lousy at drawing so it would take all my time to draw all those crystals and atoms and all that. So in that subject it is very helpful to use the overheads. I almost teach solely with the overheads using the blackboard for explanations if I need to write something more or draw up extra explanatory pictures (4:24).</p>	<p>Þau fá glærurnar fyrir tímenn. En glærurnar eru kannski ekki alltaf alveg fullunnar af því að mér finnst ... ég nota þær í kennsluna. Ég skrifa inn á þær. En sko þetta er svona voða mikið af myndum og ég er svo léleg að teikna að það færi nú allur tímenn fyrir mig að teikna alla þessa kristala og atóm og allt þetta. Þannig að sko sérstaklega í svona fagi er svo gott að nota glærur. Ég kenni eiginlega eingöngu af glærum með töfluna svona til útskýringar ef ég þarf að skrifa eitthvað meira eða teikna eitthvað aukalega skýringamyndir.</p>
<p>The basic course in thermodynamics ... was way too theoretical for the industrial engineers. It is ridiculous to have [them] take physical thermodynamics as a foundation that they will never build up on. So the resolution was to go over the sphere, take those four courses, pick out of them the practical aspect, those things that they need to know and understand and then I am trying quite a lot to connect those thermodynamical principles to the world of money and the IT field so they will get to see that the first law of thermodynamics is in plain language: You get nothing for nothing and very little for six pence (12:5-6).</p>	<p>Grunnkúrsinn í varmafræði ... var allt of fræðilegur fyrir iðnaðarverkfræðinema. Það er alveg út í hött að láta [þá] taka eðlisfræðilega varmafræði sem grunn sem þau byggja aldrei ofan á. Þannig að niðurstaðan var sú að fara yfir sviðið, taka þessa fjóra kúrsa, taka úr þeim svona hagnýtu hliðina, það sem þau þurfa að vita og hafa skilning á og ég er heilmikið í því að reyna að tengja þessi varmafræðilögmál við bæði peningheiminn og upplýsingageirann, þannig að þau sjái það að fyrsta lögmál varmafræðinnar heitir á mannamáli: You get nothing for nothing and very little for six pence.</p>
<p>This is a bit new ... well this a totally new approach in modelling and it is often most difficult when you are introducing a new approach when you have to rethink everything ... and possibly also one hasn't figured out the right method to teach it (11:30).</p>	<p>Þetta er svolítið ný ... þetta er sko alveg ný nálgun að svona líkangerð og það er oft erfiðast ef þú ert að koma með nýja nálgun þegar þú þarft að hugsa hlutina alveg upp á nýtt ... og kannski er maður líka ekki búinn að finna kannski alveg réttu aðferðina til að kenna það.</p>
<p>We are caught up in our own world. How do new courses get introduced into the programme? In the meeting, Gísli, a relatively new teacher in the department, introduces a new course he wants to incorporate into the programme. Explaining its importance he tells his colleagues that the course is taught at MIT and all around the world. This is an interdisciplinary course he is designing with a teacher that is (I think) in Biology. He thinks the course should be at a master's level but open to students from different disciplines. He suggests a name for the course but the department does not find it quite fitting and in the discussion that follows they make various suggestions. It is clear that by coming up with names they are at the same time trying mentally to understand the essential of the course and come to terms with what it is all about. Gísli nods or shakes his head and tries to explain the true nature of the course. Someone claims: <i>We are caught in our own world!</i> Thus referring to their difficulties in incorporating something new and different into the curriculum. They figure out obvious overlaps</p>	<p>Við erum fastir í okkar eigin heimi Hvernig komast ný námskeið í námskrána? Gísli sem er nokkuð nýr kennari við skorina, kynnis á fundinum nýtt námskeið sem hann hefur áhuga á að koma inn í námskrá verkfræðinnar. Hann segir sem rök fyrir mikilvægi þess að þetta námskeið sé kennt í MIT og um allan heim. Þetta sé þverfaglegt námskeið og að hann sé að undirbúa það með samkennara sem kenni þetta fag innan líffræðinnar (heyrist mér). Telur að það þurfi að hafa BS sem skilyrði fyrir námskeiðinu en vill að það próf sé óháð greinum og þannig megi opna þetta nemendum frá öðrum skorum. Hann stingur upp á námskeiðsheiti sem skorinni finnst ekki passa og það skapast talsverðar umræðu um nafnið eða heitið á námskeiðinu og margir sem blanda sér í þær og koma með uppástungur. Með þessu er eins og þau séu um leið að reyna að átta sig á því um hvað námskeiðið sem Gísli er að kynna fyrir þeim snýst og átta sig betur á því. Er þetta það sama og þetta eða hitt? Gísli ýmist kinkar kalli eða hristir höfuðið og útskýrir og rökræðir sérstöðu námskeiðsins. Einhver segir meira að segja: Við erum fastir í okkar eigin</p>

<p>between the new course and other courses in the programme, trying to place it within familiar context and further their understanding of the new topic. But at the same time I feel that they are making the strange familiar. Trying to place a new piece of knowledge and skills into their own context, adding to it a new dimension. Someone stresses the relation of the topic to Economics but another states: <i>No, this is our way of thinking.</i></p> <p>By the end of the discussion the department seems to have adopted the new field and figured out that after all it fits well into their way of knowing and thinking and that it can be approached from many different angles already used in other courses. Gisli wants to keep the course open and does not want to make any engineering courses prerequisite as that would make it difficult for students from other disciplines to attend it. The final blessing comes when it is suggested that those teachers teaching (what is now seen as) related courses will visit the new course and give lectures that stress the relations (26:9).</p>	<p>heimi! Og meinar þar að það er þeim að einhverju leyti erfitt að taka inn eitthvað nýtt og öðru vísi í námskrána. Þau benda á greinileg overlapp við önnur námskeið og reyna að finna því góðan stað og átta sig betur á því þessu nýja viðfangsefni. En um leið eru þau að gera hið framandi að sínu. Reyna að finna nýrri þekking og hæfni pláss á þeirra sviði og þar með að bæta við það. Einhver bendir á tengingu við hagfræðina enda er þetta að hluta einhvers konar stjórnun en annar segir: Nei, þetta er okkar þankagangur.</p> <p>Undir lok umræðunnar virðist skorin hafa komist að þeirri niðurstöðu að þetta nýja svið sé hið besta mál, það fellur vel að þeirra þankagangi og við það má finna ýmsar góðar tengingar við það sem er verið að kenna í öðrum námskeiðum. Gísli vill halda námskeiðinu opnu og tilgreinir að hann vilji ekki að önnur námskeið verði gerð að nauðsynlegum undanfara því þá útiloki það svo marga úr öðrum greinum. Lokahnykkurinn er að einhver bendir á að þeir sem eru að kenna kerfisstjórnina (sem virðist vera álitin tengdust) ættu að koma inn á nýja námskeiðið hans Helga og halda þar fyrirlestra til að tengja efnið sem best.</p>
<p>So I just took <i>Thermodynamics 1</i> and <i>Thermodynamics 2</i> and kept them unchanged but made the courses more practical and started early on to teach geo-thermodynamics and fishing or marine engineering techniques. Those, of course, were very practical disciplines for Iceland (25:15).</p>	<p>Svo ég tók bara <i>Varmafræði 1</i> og <i>Varmafræði 2</i> og hélt því óbreyttu en breytti greinum í meira praktískar greinar og byrjaði fljótlega að kenna jarðavarmafræði og fiskiveiðar eða sjávarútvegsfræði. Þetta voru náttúrulega mjög praktískar greinar fyrir Ísland.</p>
<p>So I add to it from home [something related to Iceland] and then I try to make use of my own experience. One's own experience is always present, you know. From the engineering firm. What will they need to know in [this subject] when they start working in the firm. So I introduce the European standards (4:24).</p>	<p>En þannig að ég bæti við svona hérna heima og þá reyni ég að nýta reynsluna mína. Þú veist reynsla manns kemur alltaf inni. Af verkfræðistofunni. Hvað þurfa þau að vita í efnisfræði þegar að þau fara að vinna á stofunni. Þannig að ég kem inni með þetta evrópsku staðlana.</p>
<p>And no matter how we look at it, if we are going to be doing something reasonable in science oriented education here, it is quite clear we will never compete with MIT in status except in geothermal heat and fish ... I would think for the faculty as such, ok I will broaden this and include civil engineering and say: Geothermal heat – fish- earthquakes (knocks on the table emphasising each word). Finido. In other fields we don't stand a chance (12:34).</p>	<p>Og alveg sama hvernig við lítum á það, ef við ætlum að vera að gera eitthvað af viti í einhverju vísindatengdu námi, þá er alveg ljóst að við munum aldrei geta keppt við MIT um status nám, nema í jarðhita og fiski ... Ég myndi halda það fyrir verkfræðideildina í heild, gott og vel, ég skal víkka þetta út og taka hluta af byggingamálanum inn og segja: Jarðhiti – fiskur – jarðskjálftar, [bankar í borðið með þessum þremur orðum]. Búið. Á öðrum sviðum eigum við ekki möguleika.</p>
<p>I have given some continuous professional development courses which have been attended by engineers from the field and there I have felt what they want ... and the actual reason for giving the courses is to connect to those engineers (10:39).</p>	<p>Ég hef verið með endurmenntunarnámskeið þar sem starfandi verkfræðingar hafa komið á, og þar hef ég fundið hvað þeir vilja ... og það er eiginlega ástæðan fyrir því bara að ég er með þetta endurmenntunarnámskeið er að tengjast þessum verkfræðingum.</p>
<p>Our relationship is based on respect and trust – as would the relationship between a middle age couples (30:2).</p>	<p>Samband okkar og þeirra byggir á virðingu og trausti - eins og samband miðaldra hjóna.</p>

<p>[The adjunct] points out that there are only two courses that don't cover very much and possibly not what is most important to know. In the engineering companies much of this is done by computers. Now the students don't get to try those new tools and only see pictures of them instead of learning how to use them. Lara responds right away and says: Must be allowed to answer this. Of course the courses are supposed to focus on using the tools not only looking at them in pictures but we just don't have any tools! (1:23).</p>	<p>[Aðjúnktinn] bendir á að námskeiðin séu bara tvö og ná yfir svo lítið og kannski ekki það sem mikilvægast að kunna. Á verkfræðistofum sé svo margt svona unnið í tölvum. Núna fáir nemendur ekki að reyna neitt þessu nýju verkfæri og sjái bara myndir af tækjunum í stað þess að læra á þau. Lára bregst hratt við og segir: Verð að fá að svara þessu! Hún segir að þau eigi engin tækni og það sé vandamálið! Námskeiðin eigi auðvitað að beinast að því að nota tækin en ekki skoða myndir af þeim en við eigum bara engin tæki!</p>
<p>Possibly you are teaching something that is not needed? You might be teaching something you like to teach rather than what the vocational field needs (7:16).</p>	<p>Hugsanlega eruð þið að kenna eitthvað annað en þarf. Þið eruð kannski að kenna eitthvað sem þið viljið fremur en atvinnulífið þarf?</p>
<p>The adjunct claims calmly that the relationship towards the vocational field need to be inspected and adds: But you are just not in the clear. You don't know what is happening in the vocational field (7:19).</p>	<p>Aðjúnktinn segir rólegur að það gildi um þetta eins og annað að það þurfi að skoða tenginguna við atvinnulífið og bætir við: En þið eruð bara ekki með það á hreinu. Hvað er að gerast í atvinnulífinu</p>
<p>This is the way I see the teaching. We are preparing the students for the engineering field here in Iceland. We are preparing the students for further studies here and abroad. You know, we are preparing them in such way that they can learn theoretically and go on into the master's or doctoral studies. Here or there. But, we also have to keep in mind ... I see it as a part of our ... I also see it as my role to serve the economy. We are graduating people that are able to go to work. For people out there (4:50).</p>	<p>Ég lít á kennsluna þannig. Við erum að undirbúa nemendur fyrir atvinnulífið hér á Íslandi. Við erum að undirbúa nemendur fyrir framhaldsnám hér og erlendis. Þú veist, við erum að undirbúa þau þannig að þau geti tileinkað sér nám sem sagt fræðilega og farið í meistara- og doktorsnám. Hvort sem það er hér eða annar staðar. Nú en svo verðum við líka að hafa í huga skov... mér finnst hluti af okkar ... mér finnst líka vera mitt hlutverk að þjóna atvinnulífinu. Við erum að útskrifa fólk sem er hæft til að fara að vinna. Hjá fólki þarna úti í bæ.</p>
<p>They totally changed the direction and started to look at the production, how functional is it. It doesn't any longer make a difference how you go about producing or the method of producing, just how the production functioned. And here I am referring to students as products (13:40).</p>	<p>Þá bara gjörbreyttu þeir stefnunni og eru farnir að skoða sko vöruna, hvernig nýtist hún. Það skiptir engu máli hvernig þú framleiðir þetta eða framleiðsluáferðin, bara hvernig varan virkar. Og nú tala ég um vöru sem nemendur.</p>

The Department of Anthropology

English	Icelandic
<p>It all started in the wake of the '68 uproar. The students on campus in the fall of '69 demanded a larger menu and to have access to more disciplines including social studies or social sciences. And they succeeded! Unbelievable but within one year the programme had started (15:6).</p>	<p>Já þetta kom allt til í kjölfar '68 látanna. Stúdentar hér á kampus haustið '69 heimta að breikka matseðilinn og fá fleiri greinar dagskrá þar á meðal þjóðfélagsfræði – félagsvísindi. Og það tókst! Merkilegt nokk – á bara einu ári var farið að kenna.</p>
<p>And the same thing happens here that the cooperation quickly diminishes and people start to strengthen their <i>own</i> discipline within quotations marks (15:7).</p>	<p>Og það sama gerist hér að samvinnan minnkar og menn fara að efla <i>sína</i> grein innan gæsalappa.</p>

<p>I feel that within the department there is a bit of emphasis on teachers' freedom to decide what is taught in their courses and even in courses as <i>Introduction</i> where we try to incorporate permanent teachers, we are not interfering, and we trust him or her to do this (16:19).</p>	<p>Mér hefur fundist það í skorinn, að það sé svolítið svona áhersla á það að kennarar hafi mikið frelsi til að velja hvað er kennt í námskeiðunum, meira að segja í námskeiði eins og í <i>Innganginum</i>, sem að við reynum reyndar að hafa fasta kennara í að við séum ekki að skipta, hver kennari, honum sé treyst til að gera þetta.</p>
<p>No, no very little. Well, when we established the graduate programme we of course had to sit down and ask: What do we want? What rules apply generally within the faculty? So there is not a lot of discussion going on (15:17).</p>	<p>Nei, nei það er lítið. Að vísu þegar að við tókum upp framhaldsnámið þá náttúrulega urðum við að setjast niður og spyrja; Hvað viljum við? Og hvaða reglur gilda almennt í deildinni og skólanum. Þannig að það fer ekki mikið fyrir slíkri umræðu.</p>
<p>I find it very uncomfortable, when you are starting and about to get to know people. I feel it has hindered me in getting to know my colleagues from other... or especially from my own department (16:6).</p>	<p>Mér finnst það mjög óþægilegt, svona þegar maður er að byrja, maður er farinn að kynna fólki. Mér finnst það hafa hamlað því að ég hafi getað kynnst kollegum mínum úr öðrum ... þá sérstaklega, auðvitað fólk úr minni skor.</p>
<p>I, on the other hand, enjoy talking [about teaching] to others. I don't really think that I want to interfere in what others are doing, I just think it is fun and that I learn from it (16:20).</p>	<p>Mér sjálfri finnst gaman að ræða um þessi mál við aðra, mér finnst í rauninni ekki það að ég vilji endilega vera að skipta mér af því sem hinir eru að gera, mér finnst þetta bara gaman og mér finnst ég læra af því.</p>
<p>Personally, because those weekly meetings are my idea, I feel they have reunited us. But of course it may be that the department head at each time ... has stronger relations to others. So maybe I don't experience us as so disperse anymore (27:13).</p>	<p>Persónulega kannski bara af því að ég stóð fyrir því að hafa þessa vikulegu fund en mér finnst það hafa tengt okkur meira saman. En auðvitað er það þannig að ég held alltaf að sá sem er skorarformaður á hverjum tíma ... þá hefur maður sjálfur alltaf tengsl við alla. Þá kannski upplifir maður þetta ekki eins mikið eins og við séum aðskilin.</p>
<p>I guess that anthropology is relatively flexible compared to other disciplines. It lays within the nature of the discipline a certain heritage that is widely arrived at. So we haven't had reasons to close the doors and say: Here you go, this is what is required (15:10).</p>	<p>Ég býst við því að mannfræðin sé svona tiltölulega sveigjanlega miðað við margar aðrar greinar. Það liggur í því hvers eðlis greinin er. Ákveðinn kenningarlegur arfur sem er víða. Þannig að við höfum ekki talið ástæðu til að loka dyrunum og segja bara þetta er skyldan veskú.</p>
<p>We are building on a certain heritage... a holistic viewpoint. We are taking a little part from the society but we are relating that part to the society as a whole ... you try to understand the meaning of certain phenomena in relation to the society. That doesn't mean you say everything is just fine, but you try to understand: What is this, what is going on, what does this mean? (16:14)</p>	<p>Við erum að byggja á ákveðnum svona arfi. Við erum að taka lítinn þátt úr samfélaginu en við erum að tengja hann við semsagt samfélagið í heild ... maður reynir að skilja merkingu ákveðinna fyrirbæra í samhengi við samfélagið. Það þýðir ekki að maður segi að allt bara sé bara gott og blessað, en maður reynir samt að skilja, „hvað er þetta, hvað er í gangi, hvað þýðir þetta?“</p>
<p>There are two things [that distinguish the discipline]. One hand it is the comparison. We are always looking at two or more societies. Even though we are looking at our own society we are holding it up against a mirror, reflecting it. How are comparable issues, in quotations marks, in other societies? This is something that is essential to the discipline always those spectacles on</p>	<p>Það er tvennt held ég ... Annars vegar er það samanburðinn. Við erum alltaf að horfa á tvö eða fleiri samfélög í rauninni. Þó að við séum að skoða okkar eigin samfélög þá erum við alltaf með einhvern spegil á það. Hvernig eru sambærilegir hlutir innan gæsalappa í öðrum samfélögum ... Eflaust er þetta eitt sem að markerar greinina – að vera alltaf með þessi gleraugu á nefinu.</p>

the nose (15:13).	
We got a grasp on things ... and spent some time discussing where we were heading. And I remember that we took the stand that the anthropology should face more outward than it had done previously (15:7).	Við tókum tak fyrir nokkrum árum og ég hugsa að það hafi nú verið áður en skorarfyriirkomulagið var til – og svona eyddum svolitlum tíma í að ræða hvert við værum að halda. Og ég man að þá tókum við þá afstöðu að mannfræðin að ætti að horfa svolítið meira út en hún hafði gert.
It relates to disputes about the discipline ... is it the discipline's freshness and strength to go away – to explore with the eyes of the guest? Or is that just an old romantic notion? That is the latest idea of many (15:9).	Það svona tengist bara rifrildi um greinina. Á greinin að ..eða er ferskleiki hennar og styrkur í því fólgin að fara eitthvað annað - með gestsauga. Eða er það gömul rómantik? Það hafa margir sagt það á síðustu árum.
It has for long be said ... that the aim of anthropology is to communicate cultural codes to ease interaction and multicultural relations and decrease conflict and collision and this is what we have been doing all along ... but lately it is as anthropology has lost the privilege of doing this. Which is fine (15:15).	Og það hefur lengi verið sagt að mannfræðin sé ... að miðla einhverjum menningarlegum kóðum sem að auðveldar samskipti og fjölmennningarleg tengsl og dregur úr árekstrum og hnjaski og þetta höfum við alltaf verið að gera ... En á hinn bóginn er kannski eins og á síðustu árum hafi mannfræðin misst einkaréttin á þessu. Sem er bara fínt!
While some anthropologists study cultures that are far way, others study those that are closer. And at the same time you want students to acquire a certain tolerance, and to know about issues far away; you don't want to stress this image that what anthropologists do is to go far way and look at strange people ... we need to show them that this methodology can also be applied in our own environment and see that our way of doing things is not normal, it can be analysed (16:38).	Sumir mannfræðingar þeir rannsaka eitthvað sem er langt í burtu, aðrir sem að er nær. Og hérna, á sama tíma og maður vill að nemendur læri ákveðið umburðarlyndi, maður vill að þeir læri að vita eitthvað um hluti sem eru langt í burtu, þá vill maður samt ekki einhvern vegin bregða upp þessari ímynd að það sé það sem mannfræðingar fara og gera, að við förum og skoðum eitthvað skrítið fólk ... svona sýna þeim að við getum beitt þessum aðferðum líka á okkar eigið umhverfi og líta á það líka, að það sem við gerum er ekki bara eitthvað venjulegt, það er líka hægt að greina það og analísera.
Yes this is all anthropology and then students themselves have to elect their own line of study. But we could easily offer a minor with emphasis on multiculturalism. We do have some really great courses there (24:16).	Já þetta kallast mannfræði og svo velja nemendur sér sjálfir ákveðna línu. Við getum alveg sagt aukagrein með áherslu á fjölmenningu. Við erum með ferlega flotta kúrta.
'You know what. If you [the department of anthropology] are not going to offer multiculturalism as a line of study, we will. Because it is needed and demand for that kind of studies and if no one is going to create a package called multiculturalism we will do it'. And it is just obvious that this is ours (24:16).	Veistu - ef þið bjóðið ekki upp á línu í fjölmenningu þá kennum við það. Af því að það vantar þannig, það er eftirspurn eftir því og ef engin setur upp einhvern pakka sem heitir fjölmenningu og þá tókum við það. Og það er einhvern veginn augljóst að við eigum þetta.
We don't have any common stated goals but I suppose we all share similar values about general humanistic education – and that people are aware of different cultures and that this will decrease prejudice and ease the way for multiculturalism and interaction across borders and globalisation. I suppose we are all somewhere on that wavelength (15:14).	Það eru engin yfirlýst sameiginleg markmið en ég geri ráð fyrir að öll deilum við svipuðum gildum um svona almenna húmaníska menntun – og að fólk sé upplýst ekki síst um ólíkar menningar – og að þetta dragi úr fordómum og auðveldi fjölmenningu og samskipti þvert á múra og hnattvæðingu. Ég geri ráð fyrir að við séum öll einhvers staðar á þessari bylgjulengd.

<p>If there is anything that I would want my students to walk out with it is critical thinking and that they have mastered a certain way of working, in the way they approach things (16:15).</p>	<p>Ef það er eitthvað sem mig langar til þess að nemendur labbi með út úr grunnnáminu, þá er það svona svolítið þessi gagnrýnni hugsun og að þau hafi tamið sér svona ákveðin vinnubrögð í að nálgast hlutina.</p>
<p>But of course I expect students in the first year to really learn the main concepts – it is not our role to teach them facts but how to acquire knowledge on their own. But of course I expect them to learn the concepts really well, and remember them and all that ... I can't expect them to come and criticise without understanding what they are criticising. I want them to understand the basics (16:15).</p>	<p>En auðvitað ætlast ég til þess á fyrsta árinu og svona að þau læra ofsalega vel hugtökin - mér finnst að okkar hlutverk sé ekki að kenna þeim staðreyndir heldur frekar að afla sér þekkingar sjálf. En auðvitað ætlast ég til þess á fyrsta árinu og svona að þau læra ofsalega vel hugtökin og muni og allt það. Ég ætlast ekki til þess að þau komi og gagnrýni án þess að skilja hvað þau eru að gagnrýna, ég vil að þau skilji fyrst grunninn.</p>
<p>They may not feel they have learnt much but they are able to make use of their skills in learning, writing and discussing knowledge. And possibly they have learnt anthropology at the same time (16:15).</p>	<p>Þeim finnst þau kannski ekki búin að læra mikið en í raun og veru eru þau líka að læra svo mikið um vinnubrögð, læra að tileinka sér þekkingu, skrifa um það, fjalla um það. Þau kannski læra líka mannfræði í leiðinni.</p>
<p>You take this foundational knowledge one step further, to be able to enter a dialogue on theoretical concepts and take what you have been studying and criticising it even further (16:16).</p>	<p>Fólk þurfi að taka þennan þekkingargrunn og fara með hann einu skrefi lengra, að geta semsagt verið í samræðum um kenningarleg hugtök og taka svona það sem það hefur verið að læra og já, svona gagnrýna það enn frekar.</p>
<p>It is always the question of when something is practical and when not. Because our students seem to be putting their education very much into practice in reality ... of course there are some that can't get a job but you just see them using their education in various places (16:40).</p>	<p>Svo er líka spurningin, hvenær eitthvað er hagnýtt og hvenær ekki hagnýtt. Vegna þess að þessum nemendum okkar, þeir virðast bara vera að hagnýta sér þessa menntun rosalega mikið bara í veruleikanum ... auðvitað eru sumir sem fá ekki vinnu en það eru, maður er bara að sjá þau svo víða að nýta sér þessa menntun.</p>
<p>I think we are realising that the master's studies within anthropology is aimed at preparing students more for a research degree than preparing them to take part in the economy. And it is my opinion that we need to think this over. We have to understand that we could have different aims in the programme. That the students, most of the students, see this [the master's study] as additional education that will ease their way into the economy. They are not planning on entering the PhD level but in the organisation of the programme we, the teachers, are very much preparing them to do as we have done (23:33).</p>	<p>Ég held að við séum aðeins að vakna til meðvitundar um það líka að mastersnámið gengur dálítið, í mannfræðinni þá, út á það að undirbúafólk undir rannsóknarnám mikið meira en að undirbúa fólk undir atvinnulífið. Og það er mín skoðun að við þurfum að hugsa meira um það. Við þurfum að átta okkur á því að við gætum haft mismunandi markmið með náminu. Að flestir nemendurnir líta á þetta nám sem viðbótarnám sem mun auðvelda þeim að komast út í atvinnulífið. Og ætla ekki í doktorsnám en í raun og veru kannski í skipulagi námsins þá erum við kennararnir voða mikið að undirbúa þau undir að gera eins og við hefðum gert.</p>

<p>It was decided at a department meeting that [the course] was to cover the former part of the 20th century. Well, I couldn't change that. I became tired of teaching it because of this. Of course I could just have said at the meeting 'I don't want to teach the former part of the 20th century' and added: 'I want to teach something new'. But I just wasn't interested in familiarising myself with the most recent development; you can't be everywhere (16:30).</p>	<p>Það var ákveðið á skórarfundi, að þetta átti að vera svona fyrri hluti 20. aldar. Meina, ég get náttúrulega ekki breytt því. Ég var orðin svolítið leið á að kenna þetta þess vegna. Auðvitað hefði ég getað sagt bara á skórarfundi „Ég vil ekki kenna bara fyrri hluta 20. aldar“ og eitthvað svona „Vil kenna eitthvað nýtt“, en ég hafði ekkert svo mikinn áhuga á að kynna mér það nýjasta í þessu, maður getur ekki verið í öllu.</p>
<p>Maybe this is different in other departments but I think for us it is quite normal, if we take for example this course, I think everyone would find it quite normal if I had other perspectives or emphasis than [other teachers] as long as there was some similar basic foundation (16:22).</p>	<p>Kannski er þetta öðruvísi í öðrum skorum en ég held að okkur finnst eðlilegt að eins og til dæmis ef ég tæki núna [ákveðið námskeið] ég held að öllum þætti eðlilegt þótt að ég væri með aðrar áherslur en [aðrir kennarar] svo framarlega sem það er svona einhver grunnur sem væri eins.</p>
<p><i>Introduction</i> that is just that kind of course that I think everyone thinks its fine to rotate a bit, if they want to teach something new they just bring it up at the departmental meeting (16:9).</p>	<p>Eins og með <i>Imganginn</i> sko, það er nú bara svona námskeið held ég sem að öllum finnst gott að rótera svolítið en síðan leggur fólk bara fyrir, ef það hefur áhuga á því að kenna eitthvað nýtt, að þá er það bara lagt fyrir skórarfund.</p>
<p>It is quite clear who will teach some of the courses. Because this person has created the course and suggested as a new course in this area ... then of course it is yours. But then of course there can be situations, especially concerning the compulsory courses, that they must be taught even though the person is on research leave and so on. And then people experience a different ownership towards one compulsory course than another (23:8).</p>	<p>Það er náttúrulega ... sum námskeið er alveg augljóst hverjir hafa. Bara af því að viðkomandi hefur búið til námskeiðið og stungið upp á því einhvern tímann og lagt til að þetta yrði sem sagt nýtt námskeið á þessu sviði og þá er það þitt. En svo náttúrulega geta komið upp aðstæður og sérstaklega í skyldunámskeiðunum að þau verður að kenna þó að viðkomandi sé í rannsóknarleyfi og svo framvegis og síðan kannski finnst fólki það eiga mismikið í sumum skyldunámskeiðunum.</p>
<p>G: I am trying to understand this ... there are certain courses that you claim are essential ... who decides that they have to be part of the anthropology curriculum? K: It is possibly rather that there is a tradition for the courses and this is one of the major areas of anthropology. U: And when you look to other countries they are also taught there (16:11).</p>	<p>G: Það sem ég er þá einhvern vegin líka að átta mig á þessu ... síðan eru svona einhver ákveðin námskeið sem þið segið að verða að vera ... hver ákveður að þetta verði að vera í mannfræðinni? K: Það er kannski meira bara að það er hefð fyrir því, og þetta er svona eitt af meginsviðum mannfræðinnar U: Og þegar þú lítur til annarra landa þá er það líka kennt þar.</p>
<p>At department meetings then, you know, someone is needed to teach that course. It isn't stated directly but it is clear that everyone feels that ... there is no one who says: Hey, let's just drop this course, just stop giving it! Don't you agree? [asks Urdur] This is never said directly but people just want to include this course in the programme (16:12).</p>	<p>Á skórarfundum þá þú veist, vantar einhvern til að kenna þetta námskeið. Það er kannski ekki sagt beint, en það finnst greinilega öllum, sem sagt, það er enginn sem segir: „Heyrðu þá bara sleppum við þessu námskeiði, bara hættem að bjóða upp á það.“ Ertu ekki sammála því? Þetta er kannski ekki sagt alltaf alveg beinum orðum, heldur að fólk vill bara halda þessu námskeiði inni.</p>
<p>Some courses are taught by two teachers, <i>Theories</i> for example. But most courses belong to someone and then you are alone (15:19).</p>	<p>Nokkur námskeið eru kennd af tveimur – sum kenninganámskeið til dæmis. En flest námskeið eru svona svið einhvers og þá er maður einn.</p>

<p>I have always seen it such that the courses are the driving power for me and if I am going to look into a certain area then without further notice I will set up a course. And I really find it rewarding – it kind of forces you to dive into certain literature which then sparkles ideas and dialogue with students. I have always seen an extremely strong feedback between teaching and research and I don't think it is healthy for me or other academics to be away from teaching for too long because then you need that speed (15:19).</p>	<p>Ég hef yfirleitt litið svo á að námskeiðin drífi mann áfram og ef ég er að fara að skoða eitthvað viðfangsefni þá umsvifalaust set ég upp námskeið. Og mér finnst það rosalega gefandi – það svona þínir mann til að hella sér út í ákveðinn litteratúr – þá kvikna hugmyndir og samræður við stúdenta og ég hef alla tíð séð rosalega sterka – sterkan feedback á milli kennslu og rannsókna og ég held að það sé ekki hollt fyrir mig eða aðra akademikera að vera fjarri kennslu lengi – því þá vantar mann þetta speed.</p>
<p>But of course it happened during your career that your interests change. I spent twenty years studying [an area] which was the topic of my PhD. And it was fun and I had plenty to do and taught courses on the issue every second or third year. But now I am fed up and have moved to another area (15:19).</p>	<p>En svo náttúrulega gerist það á ferli manns að áhugamálin breytast. Ég var til dæmis í tuttugu ár að rannsaka [ákveðið svið]sem ég skrifaði doktorsritgerð um. Og það var gaman og hérna ég hafði nóg að gera og kenndi námskeið um [það] annað hvort ár held ég eða þriðja hvert. En nú er ég alveg búinn að fá mig fullsaddan af því og farinn í annað.</p>
<p>Some courses relate directly to my research area, like [names a course]. But it wasn't always like that, I had started to teach the course long before [the research] (16:10).</p>	<p>Sum náttúrulega eins og til dæmis [ákveðið námskeið] tengist beint mínum rannsóknum, innflytjendamálum. En ekki áður, ég var byrjuð að kenna námskeiðið löngu áður.</p>
<p>I also find it important that we reflect what is in the discussion at the moment like with our course on globalization. It's not only fashionable to talk about globalization, but it is an emergent issue in the discussion and students need to get insight into those issues that are being taught. It may not be a relevant topic in the years to come, but at the moment it is something that shapes theories, shapes the dialogue and what people is publishing in journals. And then I think is natural to reflected that in our teaching (16:12).</p>	<p>Mér finnst mjög mikilvægt að við endurspeglum svoltið líka hvað er í gangi núna, eins og með hnattvæðingarnámskeiðið okkar. Að það sé ekki bara tíska að tala um hnattvæðingu, heldur þetta er voða mikið í umræðunni og nemendur þurfa að fá innsýn inn í það sem er verið að kenna. Og svo getur líka vel verið að það verði ekki relevant eftir nokkur ár, en núna er þetta það sem mótar mikið kenningar fólks, mótar mikið umræðuna, mótar mikið hvað fólk er að skrifa í þessi tímarit og þá finnst mér eðlilegt að það endurspegli það að einhverju leyti í kennslunni.</p>
<p>Then you change the course and update it in alignment what is happening today and then somehow you feel that it must be included. For a while people were wondering - should this be included or not and? – Now one feels it is quite a must (16:12).</p>	<p>Þá náttúrulega breytir maður námskeiðinu og aðlagar því að því sem er að gerast í dag og þá finnst manni einhvern vegin aftur að það þurfi að vera. Á tímabili þá var fólk svona, „á maður að hafa þetta? Á þetta að vera ennþá inni?“ og svona, nú finnst manni að þetta verði að vera.</p>
<p>We have often been restricted by financial resources but we have tried to open up possibilities for part time teachers – people that are arriving home with their PhD. And as we are a small discipline we have tried to keep this open ... to show the variety within the discipline. And usually it happens that the newly graduated bring in a suggestion ... feeling that their area is missing (15:11).</p>	<p>Við höfum oft verið bundin af fjárhagnum en við höfum reynt að skapa tækifæri fyrir stundakennara – fólk sem er að koma heim með doktorspróf. Og þetta er ekki það stór eða fjölmenn grein – við erum ekki það mörg – og höfum viljað halda þessu svoltið opnu þannig sko að sýna fjölbreytnina í greininni á landinu Og yfirleitt gerist það þannig að þeir nýútskrifuðu koma tillögu – finnst sitt svið vanta.</p>
<p>Maybe because I had been a part time teacher and had taught certain courses as such, I kind of got stuck with them (16:9).</p>	<p>Kannski af því að ég var að koma, bara búin að vera stundakennari og hafði þá kennt ákveðin námskeið sem stundakennari þá sat ég svoltið uppi með þau.</p>

<p>I think it is a strength of a little university like ours that academics are forced to have a couple of areas of interest – well maybe you don't have to have it as your interest (laughs) – but you have to teach different courses and that I find quite fulfilling ...What you learn in one course generates into another. That came as a surprise when I started teaching. I saw this as totally different slots...but soon you see that what you reading or studying for one course ... there are new and new connections (15:20).</p>	<p>Þetta er einn styrkur held ég – lítils skóla eins og okkar að menn eru neyddir til þess að vera svolítið með nokkur áhugamál –eða menn þurfa kannski ekki að hafa þetta sem áhugamál (hlær) – en minnsta kosti kenna nokkra ólíka kúrsa og það hefur mér alltaf fundist rosalega gefandi. Að það sem maður lærir á einu námskeiði það skilar sér inn í önnur námskeið. Það kom mér á óvart þegar að ég var að byrja að kenna. Ég leit á þetta sem algjörlega óskyld slott –en fljótlega sér maður að það sem maður er að lesa eða skoða í tengslum við eitt námskeið það bara það koma nýjar og nýjar tengingar.</p>
<p>But then there are other courses where the teacher may say: Well now I am going to rest this course for a while. It isn't related to my concurrent research. Those will be courses that are not as related to the foundational areas... [but they are] still included in the course catalogue (16:12).</p>	<p>Já svo kannski önnur námskeið, þá segir kannski kennarinn: Ja, ég ætla nú aðeins að hvíla þetta námskeið, þetta tengist ekki alveg mínum rannsóknum núna. Þá eru það oft námskeið sem kannski eru ekki alveg eins mikið tengt þessum undirsviðum ... en það er samt inni í kennsluskránni.</p>
<p>They ['sleeping' courses] give the wrong impression that there are more optional courses than there actually are. Rather we should emphasise the courses that part time teachers bring in which are more exciting than listing something that isn't really taught (27:5).</p>	<p>Þau gefa rangar hugmyndir um að það sé eitthvað meira val en það raunverulega er. Frekar þá að flagga þessum námskeiðum sem að stundakennarar er að koma með sem eru svona spennandi heldur en að vera að koma með eitthvað sem er ekkert kennt hérna.</p>
<p>But now I find students are much more passive. The system and the whole framework are just given. And they are just thinking about maximising their own performance within this framework. But this is just a subjective evaluation, you get older and more distant from students (15:24).</p>	<p>En núna finnst mér stúdentar miklu passífari. Kerfið og allur ramminn er einhvern veginn bara gefinn. Og þeir þá að hugsa um að hámarka sína frammistöðu innan þessa ramma. En svo er bara líka súbjektivt mat – maður eldist sjálfur og fjarlægist stúdentana.</p>
<p>I would like the students that graduate from anthropology to know the history of the discipline and main issues, perspectives, theories and methodology. But most important is of course to have people that are able to read and write well i.e. people that are ... when faced with a task to quickly get references, find the substance, can write, clearly organise their text and are able to present the issue well (23:29).</p>	<p>Ég vil sem sagt að þeir nemendur sem útskrifast úr mannfræðinni þekki sögu greinarinnar og allar helstu bæði hvað varðar ... viðfangsefni, áherslur, kenningar og aðferðafræði. En mikilvægast náttúrulega er að hafa bæði vel skrifandi og vel talandi fólk þ.e.a.s. fólk sem að veit alveg um leið og það fær eitthvað viðfangsefni þá er það fljótt að draga fram heimildir, vinna úr þeim aðalatriðin, getur skrifað, sett upp skýrt og skipulega fram og líka getur kynnt efnið vel.</p>
<p>So they are in a certain package and do not have to make many options ... both to increase the unity within the group, so they feel that they belong to a group (27:12).</p>	<p>Að þau séu í einhverjum föstum pakka og þurfi ekki að vera að velja mikið ... bæði upp á að skapa einhverja svona samheldni í hópnum og fólk tilheyri einhverju hóp.</p>
<p>Of course I expect them in the first year to learn the concepts extremely well ... and that they are not critical until they understand what they are talking about ... Thinking critically is just not ... well sometimes they think they can just come right away and say: No, well I disagree! ... Without any rational (16:15-16).</p>	<p>En auðvitað ætlast ég til þess á fyrsta árinu og svona að þau læra ofsalega vel ... ég ætlast ekki til þess að þau komi og gagnrýni án þess að skilja hvað þau eru að gagnrýna ... en þau halda stundum að þau megi bara strax koma og segja bara „nei þarna“... og hafa engin rök.</p>

<p>The thing is, if you find it difficult to write, and have problems with the essay as a form, it will be difficult for you to do anthropology... you are in the wrong place. And you have to have some imagination but also to be critical and deliberate, and take nothing for granted (23:32).</p>	<p>Það náttúrulega ef þú átt erfitt með að skrifa og átt erfitt með ritgerðarformið þá áttu erfitt með mannfræði ... þá ertu á vitlausum stað. Já og líka hafa svolítið hugarflug og en vera gagnrýnin og velta öllu fyrir sér, taka ekkert sem sjálfssagt.</p>
<p>If I teach my courses alone they are my private matter. There is little tradition for us talking together unless there is a possibility of overlap... but aside from that I think we are single workers [einyrkjar] (15:26-27).</p>	<p>Ef ég kenni það einn þá er nánast algjört einkamál. Það er lítil hefð fyrir því að við séum að tala saman um ... ekki nema að það sé augljós möguleiki á skörun ... En að öðru leyti held ég að við séum miklir einyrkjar.</p>
<p>It helps that we have courses taught by two teachers and then they have to cooperate. As in the master's courses we are forced to work together and that is fine (16:20).</p>	<p>En svo náttúrulega það sem hjálpar er það að við erum svolítið með námskeið þar sem eru tveir saman og þurfa þeir að vinna saman. Eins og með MA námskeiðin, þá neyðumst við til að vinna saman og það er ágætt.</p>
<p>No she wasn't there herself and somehow as it is the task of the permanent teachers to make the course catalogue and everyone just thinks about his or her own courses ... so her course was not included (23:23-24).</p>	<p>Nei hún var ekki sjálf og bara einhvern veginn það eru fastráðnu kennararnir sem vinna í kennsluskránni og það hugsar hver um sitt námskeið ... svo hennar námskeið datt út.</p>
<p>There was no system. It was so ridiculous ... there was no coordination because when the things are not discussed they little by little just happen (27:6).</p>	<p>Var bara ekkert system. Sko þetta var svo fíranlegt ... það var ekkert samræmi hjá okkur vegna þess að smá saman þegar að hlutirnir eru aldrei ræddir (já) þá bara gerast þeir einhvern veginn.</p>
<p>G: Is this what the temporary teachers wanted to discuss? Yes and were asking: What really applies? (24:12).</p>	<p>G: Og það voru svona atriði sem að stundakennaramir vildu fá að ræða? Og voru einmitt að spyrja. Hvað gildir.</p>
<p>G: What would you like your students to take from your course? I haven't thought about this consciously – I would like to see that I have trained them in thinking critically about a certain area and enkindled research questions and [trained them to] follow them through and acquire standard knowledge in the field, certain literature. Yes, I think this is the cocktail (15:22).</p>	<p>G: Hvað svona viltu þú að nemendur þínir komi út með úr þínu námskeiði? Það er nú ekkert rosalega útpælt – maður vill sjá fyrir sér að maður hafi þjálfað þau í hugsa krítískt um eitthvað ákveðið svið og vekja rannsóknarspurningar og fylgja þeim eftir og tileinka sér standard þekkingu á sviðinu, ákveðnar bókmenntir. Já ég hugsa að þetta sé svona kokteillinn.</p>
<p>There is usually always a written test and an essay. And the test counts for two-thirds of the grade. In some courses, mainly at the master's level there are just projects and essays, But in 90% of the courses I teach this within fixed form and I have actually never changed it (15:31).</p>	<p>Það er yfirleitt alltaf skriflegt próf og ritgerð. Og prófið er svona tveir þriðju af einkunninni. Og í einhverjum námskeiðum eru bara verkefni – eins og í MA námskeiðinum. En í 90% af þeim námskeiðum sem ég hef kennt eru með ... mjög svona föstu formi og ég hef svona eiginlega ekkert breytt því.</p>
<p>And the test – usually I have prepared one test question which I discuss with them a month in advance and encourage them to discuss among themselves. And that is then a question that demands that they have an overview of all the readings and can relate different parts and taka a personal stand ...</p>	<p>Og prófið er – vanalega er ég með eina undirbúna spurningum sem ég ræði við þau með svona mánaðar fyrirvara og hvet þau til að jafnvel ræða í sínum hópi. Og það er þá spurning sem að gerir kröfur til þess að menn hafi yfirsýn yfir allt lesefnið og tengi ólíka hluta og taki svona persónulega afstöðu til l...</p>

<p>the pedagogical goal is that they won't just arrive at the test from rote learning – page this and page that – but that they will analyse and think abstract about the issue as a whole. The rest is more restricted – what did this author contribute or ... (15:32)</p>	<p>Pedagógísku markmiðin fyrir henni að þau komi ekki bara inn í prófið með svona rútnulærdóm – blaðsíðu þetta og þetta – heldur að þau vinni úr og hugsi svona dálítið abstrakt um þetta heild. En hitt er svona afmarkaðra – hvað lagði þessi höfundur að mörkum eða ...</p>
<p>I haven't made use of the Internet to the same extend as my colleagues ... it is a bit of a gimmick. I mean a good theoretical book has its credit and people should not forget that even though the Net is enormously powerful and will give you access to qualified scholarly journals. But this demand about contestant on-line and endless search in data basis ... I think it has gone overboard. At the end of the day the conversation in the classroom and teacher and student dialogue means much more than a fancy Power Point show. This is my bias so I don't spend much time on it (15:25).</p>	<p>Ég hef ekki tileinkað mér Netið í þeim mæli sem margir kollegar minna gera ... og mér finnst það svolítið ofmetið. Ég meina vönduð fræðileg bók stendur fyrir sínu og menn mega ekki missa sjónar á því þó að augljóslega Netið sé rosalega öflugt og greiði götu þína inn í vönduð fræðirit annars staðar – hvar sem er. En þessi krafa um sítingingu og endalaus leit í gagnagrunnun og Neti eða – ég held hún gangi svolítið út í öfgar. Þegar að upp er staðið þá skiptir samræðan í kennslustofunni og dialóg kennara og nemenda meira máli en fancy power-point show. Það er minn bias – þess vegna eyði ég ekki miklum tíma í það.</p>
<p>I adhere to routine teaching methods that are shaped by years of tradition in teaching a group of maybe 10 and where you know everyone and it is easy to keep a dialogue going and follow up on each and everyone's interests. And those tricks are maybe not very conscious just something you have somehow learned to use – they just don't apply in a lecture with 80 students (15:26).</p>	<p>Ég hef svona rútinerað kennsluáferðir sem eru mótaðar af áralangri reynslu af kannski 10 manna hópum og herna þar sem maður þekkir alla og kannski auðvelt að halda uppi samræðum og elta áhugamál hvers og eins. Og þessi trix sem eru kannski ekki mjög meðvituð – bara maður hefur einhvern veginn lært þau – þau gilda ekki svo vel í 80 manna fyrirlestri.</p>
<p>I find it very comfortable to be able to discuss with Urður, both bigger issues but also some things I feel insecure about ... like 'wait is this normal' and being able to admit that this is how you do thinks. Like 'do you think I am too strict here ... and how can we get students to participate more (16:18).</p>	<p>En mér finnst það mjög þægilegt, að geta borið undir Urði bæði sko svona stærri mál og líka bara eitthvað sem ég er örugg, varðandi bara „bíddu er þetta eðlilegt? eða víðurkennt að maður geri þetta svona“. Eins og „finnst þér ég vera of ströng herna“ eða þú veist, bara einhver svona...og hvernig er hægt að gera nemendur meira þátttakendur</p>

The Department of Physics

English	Icelandic
<p>The research projects are usually 30 – 45 credits. The student finds an adviser, a master's committee is established and sometimes some kinds of courses are provided (17:8).</p>	<p>Rannsóknarverkefni eru yfirleitt 30 eða 45 einingar. Þetta byrjar með því að ná sér í leiðbeinanda. Og svo stundum þýðir þetta einhverskonar kennslu þ.e.a.s. eitthvert námskeið sem er kannski kennt.</p>
<p>Different from what I hear from other disciplines all our education is built on steps. We teach <i>Physics</i> 1,2,3,4, we teach or learn <i>Mathematics</i> 1,2,3,4, and we keep on learning more and more. And it always based on what is already there and it is not until you have reached that point and are at the third year in the BS programme that you start to understand the context (18:15).</p>	<p>Andstætt því sem ég heyri úr öðrum deildum, þá er allt okkar nám s.s. byggist á þrepum. Við kennum <i>Eðlisfræði</i> 1, 2,3, 4, við kennum eða lærum <i>Stærðfræði</i> 1, 2, 3, 4 og alltaf lærum við meira og meira. Og byggir á því sem sagt undir er og það er ekki fyrr en, fyrr en þú ert komin með þennan áfanga og komin á þriðja ár í grunnnámi sem, sem þú ferð að skynja samhengi hlutanna.</p>
<p>G: Why do you do that? First of all we think that everyone worth calling himself a physicist should be able to teach this</p>	<p>G: Af hverju gerið þið það? Í fyrsta lagi teljum við allir eigi að geta kennt þetta allir, sem kalla sig eðlisfræðinga og í öðru</p>

and secondly we find that fruitful. We think you might get tired or bored if you did this more than three, four times in a row. And we think this has worked out well. And of course the research leave system calls for this too (17:3-4).	lagi finnst okkur það frjótt. Okkur finnst að maður verði kannski þreyttur eða leiður á þessu ef maður kæmi að þessu sama í meira en þrisvar, fjórum sinnum í einu. Og ... finnst, teljum að þetta hafi reynst vel. Svo náttúrulega sko rannsóknamisskerfið það kallar á þetta líka.
<i>Physics 1</i> is very similar all over the world, <i>Physics 2</i> is, very similar. The course I am teaching ... sometimes students have to be assessed into the programme. I notice that this is very much the same, even the same textbooks ... There is one textbook in electronics of masses that is taught all over the world and it is also taught here (18:27).	<i>Eðlisfræði 1</i> er mjög svipuð allsstaðar í heiminum, <i>Eðlisfræði 2</i> mjög svipuð. Sá kúrs sem ég kenni ... stundum þarf fólk að fá sig viðurkennt inn. Ég tek bara eftir að það þarna, það er mjög svipað meira að segja sömu bækurnar. Það er ein bók í rafeindatekni fastra efna sem er t.d. kennd, kennd mjög víða og hún er líka kennd hér.
We keep it like I said before...like in the theoretical part we have <i>Physics 3</i> , <i>Quantum Mechanics 1</i> and <i>Quantum Mechanics 2</i> . There has to be a hierarchy. Well, it has happened that a teacher teaches <i>Quantum Mechanics 1</i> like it was <i>Quantum Mechanics 2</i> or <i>Physics 3</i> as it was <i>Quantum Mechanics 1</i> and that had caused a general discontentedness within the department and we try to discuss this and get it back under control (18:26).	Við höfum eins og ég sagði ... t.d. á kennilegu hliðinni höfum við <i>Eðlisfræði 3</i> , <i>Skammtafræði 1</i> og <i>Skammtafræði 2</i> . Þetta verður, þetta á allt að vera sem sagt stígandi. Nú það hefur auðvitað komið fyrir að kennari kenni <i>Skammtafræði 1</i> eins og það væri <i>Skammtafræði 2</i> eða <i>Eðlisfræði 3</i> eins og það væri <i>Skammtafræði 1</i> og það hefur valdið almennri óánægju í skorinni og við reynum að ræða og koma reglu á þetta.
Then we start teaching courses that are model courses maybe from nuclear physics, condensed matter physics, astronomical physics ... so the kids get to know what they want (18:15).	Þá förum við að kenna kúrsa sem eru sem sagt sýnikúrsar, kannski úr kjarneðlisfræði, þéttfnisfræði, stjarnfræði og öðru til að krakkarnir svona viti hvað þeir vilja.
There you are trying to have them work independently and bringing in articles and such so the curriculum does change a bit from year to year. And when I am teaching at the 2 nd or 3 rd year then it becomes more independent and then you hand them more reading materials and so on ... you rather select from the textbook and add something to it. G: What do you add to it and why? It is just because I find it more relevant and then I have something specific in mind that I do know what they will go on to study (17:31).	Þar er maður nú kannski meira líka að reyna að láta þau vinna sjálfstætt og vera með greinar og eitthvað slíkt og námsefnið breytist frá ári til árs. Og sömuleiðis ef ég er að kenna á öðru eða þriðja ári þá, þá verður þetta nú sjálfstæðara, þá líka réttir maður þeim eitthvað meira af öðru námsefni og svona eitthvað .../greinar og eitthvað slíkt ... velur úr henni meira og bætir við einhverju öðru kannski. G: Af hverju bætir þú því eða hvað er það? Það er bara af því að mér fyndist það vera relevant þá mundi ég kannski vera með eitthvað ákveðið í huga sem ég veit hvað þeir eiga að fara í á eftir og eitthvað svona.
We just came from a departmental meeting where we made decisions on which optional courses will be taught. We have a certain group of optional courses that we have more and less moved over to the graduate level but we do allow students to have an elective meeting about which courses they would like to see in the syllabus next year. We allow them to come and almost have a voting on what they want and we kind of try to push them together as they are so few and our department can't adhere to the rule that a course is not taught for less than 10 or six students. If that was the case there would be no optional courses at the third year. But we pack students together to make a group (18:22).	Við vorum bara núna að koma af skorfundi t.d. þar sem við ákveðum hvað verður kennt af valkúrsnum. Við erum með ákveðinn hóp af valkúrsnum sem við erum búin að færa núna mikið yfir á framhaldsstig en við t.d. leyfum nemendum að hafa svona valfund um hvaða, hvaða framhaldsnámskeið eru tekin (næsta ár þá). Við leyfum þeim bara nánast að fara í atkvæðagreiðslu um hvað þeir vilja og við reynum að þjappa þeim saman því þeir eru þó þetta fáir og þar sem okkar skor rís ekkert undir því að námskeið sé ekki kennt séu færri en tíu eða sex. Þá væru engin valnámskeið á þriðja ári. Við þjöpnum nemendum saman í þetta til þess að þetta séu þó einhverjir.
If you have a master's or doctoral student you may have to create a specific course around his or her subject and then you try to round up some	Ef þú ert komin með meistaranema eða doktorsnema þá, þá verður náttúrulega að búa til námskeið í kringum hann og þá reynum við að

other students for that course as well (18:24).	smala í þau námskeið líka.
But we are the disciplinary department, these are our courses, we teach them and have the custody over them. This is our subject but of course we have to do in such a way that is severs (22:26).	En við erum fagskorin, þetta eru okkar námskeið, við kennum þau og höfum forræði yfir þeim. Þetta er okkar fag en við verðum náttúrulega að gera þetta þannig að þetta þjóni.
The BS programme is mainly to establish a good basic disciplinary foundation and neither I or [a colleague] have any great ambitions about our students taking [courses in this speciality] nor that by the time they finish their BS degree they need to have done a whole lot of specific courses because they really learn enough. If they do spend the three years getting the right foundation and always solving interesting problems it is the best training they can get (22:31).	BS námið, við viljum fyrst og fremst að þau komi með góðan grunn og hvorugur okkar [nefnir samstarfsmann] erum með einhverjar rosalegar ambisjónir með það að nemendurnir sem eru að taka [ákveðna grein] og eru komnir með BS próf að þeir séu búnir að taka svo eitthvað rosalega mikið af námskeiðum og þau læra nefnilega alveg nóg. Ef þau eyða þremur árum á fullu í það að taka þennan rétta grunn og eru alltaf að leysa áhugaverða hluti, það er langbesta þjálfunin.
Something to do with energy and mass and power and those concepts that are being used. And material refers to things dead or alive. But it has also to do with the methods and ways of measuring and numbers and models and theories and laws and finally using mathematics (17:22).	Þetta er eitthvað með orku og massa og krafta og svoleiðis hugtök sem er verið að nota. Og ... það er efnið óháð því hvort það er lifandi eða dautt. Náttúrulega mæliaðferðir og þú veist og þessar aðferðir sem ég nefndi og tölur og líkön og kenningar og lögmál og svo að nota stærðfræði.
[There is] ... a geographical division within the department on campus ... we are here and then there is a department on the other side. I can feel it just by moving into this house has joined together this group and all communication is so much simpler. People take a walk to other floors, drink coffee ... this is so much comfortable and has its influence (22:43).	[Það er] landfræðilegur aðskilnaður á háskólalóðinni ... við erum hér og deildin er svo hinum megin við. Ég finn það bara við að koma inn í þetta hús þá er sameinaður þessi hópur og það er miklu svona einfaldari samskipti. Menn labba á milli hæða, drekkum kaffi ... Þetta er miklu þægilegra og hefur áhrif.
Compared to the engineering department we are more scattered and more individualistic ... but nevertheless within the department it seems to be working (18:25).	Verkfræðin er dálítið öðruvísi, við erum dreifðari og meiri einstaklingshyggjumenn en samt sko ... í svona skor þá virðist þetta nú samt virka.
They [the buyers of service courses] can't do it within this system. That is the defence, the idea that the disciplinary teaching is best placed within the professionals in that discipline and also to protect that ... the foundation is not taken from the [discipline] (22:35).	Þær [kaupendur að þjónustunámskeiðum] geta það ekki í núverandi kerfi. Það er í raun og veru vörnin fyrir, hugmyndin er sú að fagleg kennsla í greinum sé best, það best að hún sé hjá fagfólki og líka að vernda ... að það sé ekki kippt undan sviðunum.
There is a difference between faculties and disciplines, if you look at it the difference in need for finance is often because of the expensive technology and equipment needed within the sciences. We are not renewing our laboratories and the tools we need for teaching (22:34-35).	Ef þú ert að skoða muninn þá liggur hann oft í því að það er þá tækjabúnaðurinn sem er verið að nota í tilraunum og hann kallar þá á stuðningslið í kringum það. Við erum ekkert að endurnýja tilraunastofurnar og þessi tæki sem þarf að nota til kennslu.
The discussion about teaching and the organisation of teaching is shaped by saving money and cutting down and then the professional aspects are left out (22:42).	Umræðan um kennsluna og fyrirkomulag hennar að hún mótist af því að spara og þá, faglegu sjónarmiðin verða útundan.
The department can not compete with large nations and lack the resources and equipment – so people have just found their own niches where expensive equipment is not required and used their connections with other nations to go and get data that they then process at home (17:12).	Við keppum náttúrulega ekki við stórþjóðir í einhverju sem þarf mikinn búnað og dýran eða eitthvað en menn hafa þá bara fundið sér svona sínar nichur þar sem að tækin eru ekkert rosalega dýr og þá meira ... hægt með samstarfi við erlendis þá geturðu farið og mælt einhversstaðar annarsstaðar komið með gögnin hingað og unnið úr þeim.
No we don't want that. There is nothing Icelandic within astronomy, there is nothing Icelandic in high condensed matter, there is	Nei, við viljum það ekki. Það er ekkert íslenskt í stjörnufræðinni, það er ekkert íslenskt í eðlisfræði þéttfnis, það er ekkert íslenskt í stærðfræðilegu

nothing Icelandic in mathematical physics. Yet those are the groups that get the largest fund, have the international connections ... we think primarily from the research (18:12).	eðlisfræðinni. Samt eru þetta hópar sem fá stærstu styrkina, eru með erlend sambönd ... við hugsum fyrst og fremst út frá rannsóknum.
Built up on totally false premises. The teaching done at the BS or BA level has not required the kind of research we claim is the basic foundation for university education and much of what we have been doing ... we could have done without being highly involved in research (18:15-16).	Byggt upp þennan háskóla á algjörlega fölskum forsendum. Þessi kennsla sem við höfum verið með til BS eða BA prófs hún hefur ekki krafist þessara rannsókna sem við höfum alltaf talað um að sé undirstaða háskólanáms eða háskólakennslu ... margt af því sem við höfum verið að kenna hefðum við alveg getað gert sem góðir kennarar án þess að vera á kafi í rannsóknum.
I am not worried about competition – I am a strong advocate for competition ... I think the University of Iceland should just close its doors and become a 8000 student research university of a high calibre and those that can not make it into the University in their first attempt they have to go somewhere else and try again ... we should not stick to this meritocracy and let everyone come in ... but close and become bloody good (18:39).	Ég óttast aldrei samkeppni - ég er alveg eitilharður talsmaður samkeppni. Hins vegar er það mín skoðun sú að Háskóli Íslands eigi bara að loka sér og verða svona 8000 manna rannsóknarháskóli af háum kaliber og þeir sem ekki komast inn í fyrstu atrennu þeir verði að fara annað og reyna aftur ... við eigum ekki að veðja á einhverja meðalmennsku og þetta að hleypa öllum inn ... heldur bara að loka okkur og þarna verða bara djöfull góð.
I sometimes feel that there is a bit too much admiration for us the physicists ... This can be widely felt... not only in Iceland but this is quite common. It is a discipline that is respected in the science community. G: And you can feel that? Yes you do. G: By the way they talk about you? Yes and to us (17:14).	Stundum finnst mér að það sé kannski einum of mikið litið upp til eðlisfræðinga. ... Þetta er nú víða, þetta er ekki bara á Íslandi heldur víða. Þetta er grein sem nýtur virðingar í vísindasamfélagi. G: Og þið finnið alveg fyrir því? Já maður gerir það. G: Bara þá hvernig er rætt um ykkur eða ...? Já, já og við okkur.
G: Why is it more difficult? It just seems to be that many find it hard to cope with the mathematics, this abstract thinking that is in mathematics and physics. So little by little it is constructed in the schools that those who can handle this can handle quite a lot. It is more difficult to study and it is not for everyone (23:5).	G: En af hverju er hún erfiðari heldur en aðrar greinar? Ja það bara virðist vera þannig að það gengur mörgum hálfilla að ráða við þessa stærðfræði, þessa abstrakt hugsun sem er í stærðfræðinni og eðlisfræðinni. Þannig að byggist smátt og smátt upp í skóla að þeir sem að ráða við þetta þeir ráða við svona ýmislegt sko. Og að það sé ekki öllum gefið.
(Laughs)... there are people who are much aware of themselves and do not all handle that equally well (22:46).	(Hlær) ... það er til fólk sem veit mjög vel af sér og kann misvel með það að fara.
We are mainly looking at the discipline, not the department ... It doesn't matter what happens to this department, it is just a structure but it is the discipline. This is where the discipline is located and it the discipline that is important. It is this kind of thinking we are trying to keep the [policy formation] within (22:33).	Við erum kannski bara aðallega að horfa á fagið, ekki skorina ... Það skiptir engu máli hvað verður um þessa skor, hún er bara strúktúr en það er fagið, þetta er hins vegar sá staður sem þetta fag á heim í og það er fagið sem skiptir máli. Það er þessi hugsun sem menn eru að reyna að halda þessu [stefnumótuninni] í.
They could be teaching the theoretical parts of the [basic] courses, that is quite possible but it is more often the case that the theoretical physicists	Þeir eru kannski að kenna bóklega hlutann. Það getur alveg verið með í myndinni þó hefur það kannski heldur verið að kennilegu

are teaching the theoretical third year courses (22:51-52).	eðlisfræðingarnir sem eru meira að kenna fræðileg þriðjaársnámskeið.
Yes it is the opinion here that it [the theoretical physics] is a bit more ... (above?) - yes the most posh. Well Einstein was a theoretical physicist ... and when it comes to thinking the greatest thoughts it will not be done with a screwdriver (22:52).	Jú, það er nú svona viðhorf manna að það [kennileg eðlisfræði] sé nú heldur svona ... (æðri?) - Já það er nú viðhorfið að það sé langflottast. Jú Einstein var nú kennilegur eðlisfræðingur ... og þegar kemur að því að hugsa hinar stærstu hugsanir gerum við það ekki meðskrúfjárn.
The laboratory part of teaching tends to tolerate worse the cut downs ...but we do try to stick together to defend that part of the programme. Maybe it is more about what emphasis there should be within the programme (22:51).	Tilraunakennslan þolir niðurskurð verr en en við náttúrulega reynum að sameinast um það að verja þann þátt í náminu. Svo er það kannski aðeins mismunandi hvað menn líta á hvaða áherslur eigi að vera.
Much too simple thinking irritates me. Such as to think that each problem only has one solution. You have to get them away from that kind of thinking (17:35).	Öll svona of einföld hugsun fer í taugarnar á mér. Eins og að halda að hvert dæmi hafi bara eina lausn og svona. Og þarf að koma þeim burt frá því.
A good physicist has to be able to talk about the discipline in plain language. Physicists may have to work with all kinds of people that do not necessarily have the same special knowledge and even physicists do not need to have the same area of speciality (17:36).	Hann [góður eðlisfræðingur] þarf að geta talað um þetta svona á mannamáli. Menn þurfa að vinna með öðrum sem að hafa ekkert endilega þessa sérfræðipækkingu. Og ... það getur líka verið á milli tveggja eðlisfræðinga, þeir eru ekkert endilega sérfræðingar í því sama.
You are on one hand teaching the principles and the stringency and these logical things and that you can just do by books and lectures and God knows what else. But then you have to teach, I think, intuition ... you have to keep them on your knee with an apprenticeship method (23:20).	Þú ert annars vegar að kenna þeim lög málið og allt svona rökfestuna og svona þessi rökrænu atriði og það gerirðu bara með bókum og fyrirlestrum og guð má vita hverju öðru. En svo þarftu líka að kenna því, held ég, innsæi ... þú þarft einhvern veginn að hafa það sko, hafa það svona á hnénu og vera með svona sveinsskipulag.
Fist of all, some part of the student group would continue into graduate studies and secondly there would be students entering [secondary school] teaching or that's what we thought we were educating people for... Thirdly, we were educating people for industry or something like that but that was a bit ... unclear. But this was the picture, those three main compartments (17: 15-16).	Í fyrsta lagi væri það einhver hluti af nemendahópnum sem fer í framhaldsnám, í öðru lagi fólk að fara í kennslu. Við héldum að við værum að mennta eða töldum að við værum að mennta fólk fyrir það ... Og í þriðja lagi værum við að mennta kannski fólk fyrir iðnað eða eitthvað slíkt en það var samt ... frekar óljóst. En svona var myndin, þetta voru aðallega svona þrjú hólf.
And then time passes, ten or twenty years and then it appears that much fewer students take on teaching than we had anticipated and probably more enter the graduates studies than we had foreseen. But then the market just expands and students start to enter the computer field and into all kinds of mathematics ... this has also happened internationally... into the financial system, the banks ... and the large scale industry and industry has taken more than we had predicted (17: 15-16).	Svo líður tíminn, tíu ár eða tuttugu ár og þá kemur í ljós að það fara miklu færri í kennslustörf en við héldum (já) og það fara líklega fleiri í framhaldsnám heldur en við héldum. En síðan bara stækkar markaðurinn og fólk fer í, það fór náttúrulega talsvert yfir í tölvurnar og það fer í svona reikninga alls konar útreikninga ... og það er nú það sem er líka þekkt alþjóðlega, líka talsvert í svona í þessum fjármálaþrasa, bönkunum og ... já og stóriðjan og iðnaðurinn hefur kannski tekið meira en við héldum.
We are so lucky here in physics that people work in all possible and impossible occupations from doing research into being in the banks calculating some changes in currencies and there seems to be an endless need more people with some kind of hard education (18:16) .	Við erum svo heppin í eðlisfræðinni að fólk starfar við alla mögulega og ómögulega hluti frá því að vera í rannsóknum hér og kennslu yfir í að vera í bönkunum að reikna út einhverjar hreyfingar á gjaldmiðlum og gengi og virðist endalaus þörf á fólki með einhverja svona harða menntun.
No we would never do that deliberately ... we would just say ok you go this way or that way – this just goes to show that this is a good	Nei, við myndum ekkert gera það viljandi þannig ... við myndum bara segja allt í lagi þú ferð þetta eða einhver fer þessa leið - það er bara

foundation and there is no motive to change it (17:24).	sýnir að þetta er góður grunnur og það gefur ekki tilefni til að breyta honum.
What I have for the longest time seen as been the problem for the physics department and more so earlier and before I arrived ... was that this was some kind of 'elite'. It only received the duxes and nobody was anything unless he could stand by the blackboard and had this theoretical approach. This was the pack that was supposed to educate students for the various occupations and tasks made available for physicists (18:18).	En ég tel nefnilega, það sem lengi háði eðlisfræðiskor og kannski í ríkari mæli hérna áður fyrr og áður en ég kom og fyrstu árin ... var að þetta var eitthvað svona 'elítu'. Þetta tók bara við dúxunum og enginn var maður með mönnum nema hann gæti staðið upp á töflu með krít og hefði helst bara sem sagt kenningavinkil Þetta var liðið sem sko átti að, að mennta til hinna ýmsu starfa sem eðlisfræðin býður upp á.
We opened up a study line in applied physics which is physics that makes it possible for the kids to get into developmental work in modern companies and invent and so on (18:18).	Við opnuðum línu í hátæknieðlisfræðina sem er eðlisfræði sem gerir krökkunum kleift að fara í þróunarvinnu í nútímafyrirtækjum og finna upp og svona.
Yes and we find out that the book duxes are not necessarily the best ones in physics and not necessarily in the areas that we want to stress. We are not turning things around and saying lets just take in the dunces but the others can stay on in the theoretical physics but this is how things happen ... Those [students] we really want into the programme are part of those entering engineering. Not to steal them away but because we think that in many ways the modern high technology society needs a stronger science foundation before you enter the application (18:18-19).	Já og það kemur í ljós að bókdúxarnir eru ekkert endilega bestir í allri eðlisfræði og alls ekkert endilega í þeim hlutum sem við viljum leggja áherslu á. Þá er náttúrulega, má ekki snúa því við og segja við tókum bara tossana en hinir verða áfram í kennilegri eðlisfræði en svona vill þetta oft verða. Þeir sem við viljum, viljum gjarnan fá inn hingað það er hluti af þessu fólki sem fer í verkfræðina. Ekki til að stela frá þeim heldur af því að við bara teljum að, að mörgu leyti þurfi nútíma hátækni þjóðfélag meiri og sterkari raungreinar í botninn áður en þú ferð út í hagnýtinguna.
You see we don't select the material for the courses, we come to an agreement what is in the courses. It is more and less a departmental tradition. If you teach <i>Electrodynamics</i> this is the material you cover, if it is <i>Physics I</i> you are teaching this is the material you cover and if you teach a laboratory group these are the experiments you teach (18:26).	Við veljum ekki efnið í námskeiðið, við komum okkur saman um það sem er í námskeiðunum. Það er meira og minna ákveðin skorarhefð. Ef þú kennir <i>Rafsegulfræði</i> þá er það þetta efni sem þú ferð yfir og ef þú kennir <i>Eðlisfræði I</i> þá er það þetta efni sem þú ferð yfir ef þú kennir og ef þú kennir verklegum hópi þá eru það þessar tilraunir sem þú kennir.
G: And this gets discussed? This is discussed and we have emphasised that it is the department that selects the teaching and the discussion we have within the department are often because a teacher is too demanding towards his students so he is using more of their time than is normal or wants to make a course more difficult that has been the tradition (18:26).	G: Og þetta er bara rætt? Þetta er bara rætt og við höfum lagt ríka áherslu á það er skorin sem ræður kennsluframboðinu og þær umræður sem verða í skor eru oft ef einhver kennari er sem sagt of kröfuharður við nemendur þannig að hann fari að leggja meira á tíma þeirra heldur en eðlilegt er eða vill t.d. gera eitthvað námskeið erfiðara heldur en hefur tíðkast.
But now this technology that is used in computers and all high technology is based of the physics from 1900 which means that now when we are teaching them this physic we can make references to the computers ... and daily life (17:21).	En núna er þessi tækni eins og í tölvunum og ýmsu svona allri þessari hátækni mikið af því er byggt á þessari eðlisfræði sem að er frá því um 1900 og það þýðir þá líka að sko ... þegar við erum síðan að kenna þeim þetta, þessa eðlisfræði þá getum við vísað í tölvurnar og vísað í hitt og þetta.
We try to follow the times ... but yet ... I think the main development takes place within the courses. That the courses taught in the 2 nd and 3 rd year are taught quite differently that they were under the same name or almost the same name twenty years ago (17:20).	Við reynum nú að fylgjast með tímanum en það er samt ... jú ég hugsa að þetta sé nú mest innan námskeiðanna sko að þróunin eða breytingin hún verður þar. Að það eru námskeið á öðru og þriðja ári sem eru kennd allt öðruvísi núna heldur en þau voru kannski undir sama heiti eða nokkurn veginn sama heiti fyrir tuttugu árum.
[Research methods] are becoming a larger part of the discipline as it becomes... more analytical. The discipline develops and people are using	Þetta [rannsóknaraðferðir] eru að verða stærri og stærri hluti í sko faginu eftir sem það verður ... analýteskara. Fagið þróast og menn eru að nota

much more sophisticated field today than twenty years ago. Partly because of the use of the computers (22:30).	miklu flóknari líkön í dag en þeir voru að nota fyrir 20 árum og það er að hluta til vegna þess að það er hægt að leysa miklu meira í tölvum.
Not in regards to content – of course not. Not unless you go into deeper thinking like that thought in one language are never the same as in another language ... but we are teaching the same things and we are of course using English textbooks throughout (22:29).	Nejaa, altso, hvað innihald varðar er hún það náttúrulega ekki. Ekki nema að maður sé með djúpar þælingar um það að þegar maður fari að hugsa á íslensku þá sé sami hluturinn aldrei ... en að öðru leyti erum við að kenna sömu hlutina og við erum að nota náttúrulega, enskar bækur gegnumsnæitt.
In Germany there would more discussions there; they would discuss things more philosophically than in UK and US ... These are the same things but there is difference in how much basic education you have got (22:29).	Í Þýskalandi eru svona diskusjónir, menn ræða svona meira á heimspekilegum nótum um hlutina en í Bretlandi eða í Bandaríkjunum ... þetta eru sömu hlutirnir og menn eru kannski aðeins misjafnir hvað menn eru skólaðir mikið í grunngreinum.
When I teach <i>Physics I</i> which is a big course for engineering students, I like to follow the textbook ... I also think this is what the students prefer. These books are very standard, and we joke about them all being the same. But they do have a standard content; it is a strong tradition what you teach in first year physics. G: You can go all over the world and see this book and teachers are teaching like you? Twenty books and they are more and less the same. The same subjects and mostly in the same order (17:31).	Þegar ég kenni t.d. <i>Eðlisfræði I</i> sem er svona stórt námskeið fyrir verkfræðinema þá finnst mér best að reyna að fylgja bókinni ... ég held að nemendur líka vilji það. Og þetta er mjög staðlað, þessar bækur eru ... við grinumst stundum um það að þær séu allar eins. Eða þær, það er ákveðið staðlað innihald, þetta er alveg föst hefð hvað er kennt í eðlisfræði á fyrsta ári í háskólanámi. G: Og þú getur farið út um allan heim og séð þessa bók og kennarar eru að kenna eins og þú ert að kenna? Tuttugu bækur og þær eru nokkurn veginn eins (já). Sama tekið fyrir og nokkurn, að mestu leyti í sömu röð.
Nobody enters these disciplines ... and succeeds unless they are well prepared from secondary school and of course it pays off to have already acquired the modus operandi. And to know that you do not learn a subject like that by merely reading for the final test (17:19).	Það fer enginn í þessar greinar ... og nær árangri nema að vera með þokkalega góðan undirbúning úr framhaldsskólunum og það náttúrulega borgar sig líka að vera búinn að læra vinnubrögð. Og vita það t.d. að maður lærir ekki svona greinar með því að lesa bara upp fyrir prófið.
G: What students will make it? There are all kinds of students. This is not an easy education and the students claim that they have to work hard for their credits. That is most likely true and they claim they work much longer hours than students in other faculties. This is possibly right. I don't think it is any more than in engineering but this is what they claim and they may well be right (22:11).	G: Hverjir spjara sig hjá ykkur? Hvers konar nemendur? Þeir er svo sem alla vega. Þetta er ekki auðvelt nám og krakkarnir segja að það þurfi að hafa mikið fyrir einingunum. Það er sjálfsagt rétt og segja að þau séu að vinna miklu lengri vinnutíma en heldur en nemendur í öðrum deildum. Það má vel vera að sé rétt. Ég held að það sé ekkert meira heldur en í verkfræðinni en þeir segja þetta og það má vel vera.
I think they need to put in more effort just to survive here. But in order to be brilliant then you have to be a fast learner because it takes a lot of effort to get the basics ... and how well they do ... we don't have any statistics but we always loose some students that decide to leave after the first year, possibly to enter engineering. But that may be a practical attitude that is behind that because the beginning there is not easy either (22:11).	Ég held að þeir þurfi að leggja á sig meiri vinnu til að komast hreinlega áfram hérna. En svo aftur hvað þú þarft mikið til þess að svona brillera þá þarftu náttúrulega líka að vera fljótur að tileinka þér hlutina ef því það fer mikil vinna í að ná grunninum ... og hversu vel þau spjara sig ... við höfum ekki nákvæma statistikk um það en við töpum alltaf einhverjum nemendum sem ákveða að fara eftir fyrsta árið kannski í verkfræði. En þá er það nú kannski svona alveg eins hagnýtt sjónarmið sem að stjórnar því, því að byrjunin er ekkert auðveldari.
G: How are students that don't do so well in the first year handled? How do we handle them? With a total lack of	G: En hvernig er þá tekið á krökkum að ekki gengur vel á fyrsta ári? Hvernig tökum við á þeim? Af fullkomnu

mercy! This is a snob community that hates idiots (23:27-28).	miskunnarleysi algjörlega. Þetta er svona snobbsamfélag sem leiðist heimskingjar.
We do have a difficult programme and we do make big demands and that means that some [students] are left off and can not finish. But on the other hand those that have graduated from here have done well (22:15).	Við erum með svolítið erfitt nám og við erum með ... gerum dálítið miklar kröfur og það þýðir það að sumir heltast úr lestinni, komast ekki með. En á móti kemur að fólk sem héðan kemur hefur vegnað vel.
This is because I think that ... as this is not a larger society they [the students] will in three or certainly in five years ... the teacher will not be able to surprise them anymore. They will know in a sense...all the ideas that this world carries within it, they know them and have come accustomed to them. And going somewhere abroad for your education ... into another world, another environment is very important in order to increase their broadmindedness (22:5).	Það er vegna þess að ég er þeirrar skoðunar að þau [nemendur] hafi á þremur árum og örugglega á fimm árum ... þá komi kennarinn þeim aldrei neitt meira á óvart. Þau viti þannig séð ... allar þær hugmyndir sem þessi heimur hérna hefur að geyma, þau séu komin inni þær og orðin samdauna þeim. Og það að fara eitthvað erlendis í náms sé ... í einhvern annan heim, annað umhverfi, það sé mjög mikilvægt til að þau fái meiri víðsýni.
At least I feel that the Icelandic science society or community needs to be aware of not getting isolated in their own ideas or problems ... There is a danger of degeneration (22:6- 7).	Mér finnst að minnsta kosti að þessi íslenski vísindaheimur þurfi að passa sig á að einangra sig ekki í sínum eigin hugmyndum og vandamálum ... Hættan er á að þetta úrkynjist.
I mean we would like to have equally as many females and males and that would mean doubling our student number (18:20).	Ég meina við hefðum helst viljað hafa jafn margar og strákarirnir og þá bara værum við helmingi stærri skor.
Maybe we are just so awesome ... it is just that this is the last fortress that seems so inaccessible (18:20).	Við erum kannski svona hrikalegir ... það er bara einhvern veginn síðasta vígið sem einhvern veginn virðist fráhrindandi .
Now it can be very difficult and I sometimes think they just don't understand what you mean. ... You can see it in the student course evaluation that a large part of the 1 st year students want the teaching ... emphasise that it is easy to take notes (17:33).	Það er núna getur verið mjög erfitt og þau skilja stundum ekki hvað maður á við bara held ég nánast, í þessum greinum. Og í sambandi við kennslukannanirnar sérðu að einhver talsverður hluti af fyrsta árs nemum sem að vill bara að kennslan sé þannig að ... leggur megináhersluna á það að það sé auðvelt að taka nótur.
They just show up in class, the teacher is supposed to write on the blackboard ... and his writing is supposed to be readable. He is not supposed to use overheads because if he has overheads then it is always the danger of him proceeding too quickly. He is supposed to talk rather slowly so they can write at the same time. Then there is a part of the group, 5% or so, that arrives with a good foundation and wants the teacher to carry on a dialogue (17:33).	Bara sem sagt koma í tímann, kennarinn á að skrifa á töfluna helst ... hann á að skrifa vel. Hann á ekki að vera með glærur af því að þá ... ef hann er með glærur þá er hætta á því að hann fari of fljótt. Hann á að tala frekar hægt þá held ég (já) og þau eiga að geta skrifað. Síðan er einhver, það er eitthvert brot af hópnum, 5% eða ég veit ekki hvað, sem að er með góðan undirbúning og vill að kennarinn haldi uppi umræðu.
Some only want to teach the physics students and are possibly fireballs; burning fireballs that get lost in the subject ... which can be a wonderful characteristic of a teacher if he manages to captivate his students ... but that may not be the best teacher for service courses (22:26).	Sumir vilja bara kenna eðlisfræðinemum og eru þá kannski svona eldhugar, brennandi eldhugar sem að tyna sér í námsefninu ... sem getur verið alveg stórkostlegur eiginleiki kennara, ef hann hrífur nemendur með sér en það er ekki víst að það er endilega að það sé besti kennarinn í þjónustunámskeið.
I would say that most of the engineering students do like what they are studying, that's not the problem. But their main interest is not in physics and then they might see it as something that they have to learn ... see it as a necessary part (22:27).	Ég myndi segja að flestir verkfræðinemendurnir hefðu nú svolítið gaman af því sem þeir eru að læra. Það er ekki vandamálið. En þeirra aðaláhugi liggur kannski ekki beint í eðlisfræði og þá þau líta þá kannski á þetta sem eitthvað sem þau þurfa að læra.
G: How do you know when you are doing well in teaching?	G: Hvernig veistu hvenær þér tekst vel upp í kennslunni?

<p>I don't know, you kind of feel it. We experience that students are turning to us for references to get into other universities and then you know you have done well. And our students, they fly into the best universities, it is quite incredible! (18:36).</p>	<p>Það veit ég ekki, maður finnur þetta nú svona nokk. Við lendum í því að fólk er að koma til okkar að fá meðmæli og annað inn á háskóla og annað og þá veit maður að manni hefur tekist nokkuð vel. Og nemendur okkar, þeir fljúga inn á bestu skóla, það er alveg ótrúlegt.</p>
<p>When I started here I was a young and angry man and rebellious and fought for all kinds of new things and I was interested in teaching and (17:45).</p>	<p>Þegar ég kom þá var ég hérna ungur reiður maður og uppreisnargjarn og bardist fyrir alls konar nýjungum og nýmælum og þessi kennslumálaáhugi sem ég var með.</p>
<p>I mainly use lectures and then we have project classes ... in almost all of the courses that I teach ... usually there are exemplary classes and I give them problems or projects and they hand them in. This is in a very fixed form in this discipline. Weekly assignments and then exemplary classes and problem classed where the issues are covered and discussed (22:19).</p>	<p>Ég kenni nú mest með fyrirlestrum ... í eiginlega öllum námskeiðunum sem ég kenni þá eru dæmatímar og ég set fyrir dæmi eða verkefni og þau skila. Þetta er bara svona mjög í föstum skorðum í þessu fagi. Heimadæmi einu sinni í viku og svo tímadæmi og dæmatími þar sem farið yfir þetta og hlutirnir ræddir.</p>
<p>When I do lectures I try to hold a red thread, some progression in the course. I may teach a course that starts with the basics and finishes in some complicated application. I usually try to teach the basics in those complicated things so that students can try to puzzle them together... I try to have them see the basic a, b, c but then I also strive to get into the x, y, z (18:28).</p>	<p>Þegar ég kenni fyrirlestra þá reyni ég að halda einhverjum svona rauðum þræði, einhverjum stígandi í námskeiðinu. Ég kannski kenni námskeið sem að byrjar á svona grunnatriðum og endar á einhverri hagnýtingu. Ég reyni yfirleitt að kenna grunnatriðin í þessum flóknu hlutum þannig að menn sjálfir geti þússlað þeim saman ... Ég reyni að láta þau koma auga á sem sagt undirstöðu a, b, c og þá á ég við líka að komast yfir í ... þ, æ, ö.</p>
<p>You do have a certain freedom; people that are much around [the world] may condense their lectures or extend them over a period of time. The rule seems to be that you get together with a colleague that is in a similar situation and they exchange i.e. if a lecture needs to be cancelled.</p> <p>G: But it is not like that you just say: Well I don't believe in lectures so I am going to increase the number of exemplary classes?</p> <p>No! (18:33).</p>	<p>Menn hafa auðvitað ákveðið frelsi, menn sem eru mikið á ferðinni kannski þjappa fyrirlestrum saman og svona teygja á þeim. Reglan virðst mér vera sú að menn svona taka sig saman við kollega sem er á líku róli og þeir og þeir skiptast þá á ef það þarf að falla niður fyrirlestur.</p> <p>G: En það er ekki þannig að þú getir bara sagt: Ja, ég hef ekki trú á fyrirlestrum þannig að ég ætla bara að fjölga dæmatímumunum?</p> <p>Nei!</p>
<p>If we have a reading course ... I sacrifice the lecture but keep the same amount of problems and projects ... because I really believe that it is the student him or herself that does the studying. The teacher helps if he makes an effort but mainly it is the student that studies (22:19).</p>	<p>Ef að við erum með lesnámskeið ... þá fórna ég fyrirlestrum af því að en held óskertum dæmunum og verkefnahlutanum ... Því að ég hef þá bjargföstu trú að það sé nemandinn sjálfur sem að lærir þetta. Kennarinn hjálpar ef hann leggur sig fram en það er nemandinn fyrst og fremst sem lærir námið.</p>
<p>I put much more effort in creating notes and then summarise the material in about half an hour and then we may take one and half hour in the projects and problems (22:20).</p>	<p>Ég legg eiginlega miklu meiri vinnu í það að taka saman glósur og súmmera svo upp efnið á hálf tíma og svo tókum við kannski einn og hálfan tíma í dæmin.</p>

<p>I am one of those who likes final exams as the only mean of assessment but supposedly I am not allowed [to hold that view] any longer. So now we credit about 20% for experiments and sometimes the problems count for something so the final exams are not 100%.</p> <p>G: Why would you like that?</p> <p>Well it is just something I was brought up with but I am getting milder. Possibly it is just because it is much more labour for yourself to be giving feedback all the time. It may be nothing nobler than that (18:37).</p>	<p>Ég er einn af þeim sem er hallur undir bara lokapróf en ég má það víst ekki lengur. Þannig að við gefum núna fyrir, fyrir kannski 20% fyrir tilraunir og stundum er gefið fyrir dæmaskil. Þannig að prófið er þá ekki alveg 100%.</p> <p>G: Af hverju ertu hallur undir það?</p> <p>Ég ... bara það sem ég ólst upp við en ég er nú farinn að mildast í því. Kannski er það af því að það er miklu meiri vinna fyrir mann sjálfan að vera sífellt í þessu námsmati. Kannski er það ekkert göfugra en svo.</p>
<p>I just tell them that the grades reflect the traditions and habits here and actually there is not point in paying attention to the grades overall per se as a number. It is more relevant to look at the student's place in the student group (22:15).</p>	<p>Ég segi bara að einkunnirnar taki bara mið af þeim hefðum og venjum sem hér hafa ríkt og eiginlega þýðir ekkert að taka neitt mark á einkunnum per se sem einhverri tölu. Hins vegar er miklu meira að marka hvar stendur nemandinn í hópnum.</p>
<p>People here do emphasise that there is coordination between years and from group to group. This is what we see as most important about the assessment (17:46).</p>	<p>Menn leggja talsverða áherslu á það hérna að hafa samræmi frá ári til árs og hafa samræmi á milli hópanna. Það er fyrir okkur kannski mikilvægasta atriðið í sambandi við námsmatið.</p>
<p>I have tried to take into consideration, or used as a paradigm, what has been taught [to students] before. The kids pay good attention to the final exams and they become totally mad if there is something unexpected in the exam. The exam from previous years are published within the university and students can access them anytime ... they think it is despicable if you come behind them (18:34).</p>	<p>Ég hef reynt að taka til hliðsjónar eða hafa viðmið af því sem hefur verið kennt áður. Krakkarnir eru nú einu sinni þannig að þau fylgjast mjög vel með prófunum og þau verða alveg vitlaus ef þarna kemur mjög óvænt efni á prófum. Þau eru náttúrulega til í prófasafninu og þau geta nálgast þau ... þeim finnst það bara fyrirlitlegt ef maður kemur aftan að þeim.</p>
<p>Traditionally you get stuck in using something that in the light of today's world view makes life just difficult. And I don't think we in physics are free enough to tear ourselves from that and say: How am I going to transmit this knowledge in the world view of today? Why do I always have to go back and look at things in a historical context? (23:12).</p>	<p>En tradisjónelt þá lendirðu í að nota eitthvað sem að í ljósi þeirrar heimsmyndar sem að er í dag gerir bara lífið erfitt. Mér finnst við kannski ekki vera alveg nógu frjáls í eðlisfræðinni að losa okkur frá því og segja: Hvernig ætla ég að koma þessari þekkingu til skila í þeirri heimsmynd sem nú er. Af hverju þar ég alltaf að líta á þetta í histórísku samhengi.</p>
<p>The question is where those expectations come from ... You know they have been taught this subject through their secondary school education and all the way up to us in a very traditional way. So really ... those are very normal reaction on their behalf when something comes up that is different than this tradition they have seen all the time – then it is strange (23:7).</p>	<p>Það er spurning um hvaðan koma þær væntingar ... Þú veist að það er búið að kenna þeim þetta fag í gegnum framhaldsskólann og upp í okkur á mjög hefðbundinn hátt þegar að það kemur þarna. Þannig að þau í rauninni sko það eru eðlileg viðbrögð hjá þeim ef það kemur eitthvað annað en þetta hefðbundna sem þau eru búin að sjá alla tíð – þá er eitthvað skrítið.</p>
<p>I have always enjoyed teaching in this way [small exemplary classes] because it allows you to come closer to the students. But we just don't have the manpower to teach in this way. It is because the student group is becoming larger and then we find out that there is this technology that has entered the market along with the textbooks... where we use computers instead. And the students can sit by their computers and work on their problems...and they even get some feedback if they do something wrong (17:28).</p>	<p>Og mér hefur alltaf fundist þetta geta verið gaman að kenna svona [litlum dæmahópum], maður kemst miklu nær krökkunum. Nema hvað að svo bara höfum við ekki mannskap í þetta. Þetta eru af því að hóparnir stækka og svo við finnum út úr því það er hérna kom á markaðinn tækni sem fylgir kennslubókunum ... þar sem að við eigum að nota tölvur í staðin. Og nemendurnir geta setið við tölvur og leyst dæmi ... og þeir fá sko meira að segja leiðbeiningar ef þeir slá inn einhverja vitleysu.</p>
<p>And we ... incorporated this technology at the same time ... and this teacher is ready to teach this with this new mode (17:29).</p>	<p>Og þetta gerðum við þarna í leiðinni og að hann var tilbúinn að ganga inn í, að sko kenna þetta með þessu nýja lagi.</p>

