Important skills for elementary school: Implementing preschool life skills program in a kindergarten classroom in Iceland

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Forewords and acknowledgments

Submitted in partial fulfilment of the requirements of the MSc Clinical Psychology degree, Reykjavik University, this thesis is presented in the style of an article for submission to a peer-reviewed journal. The research that this thesis presents is the culmination of work over three semesters. In the first semester, a literature review was written about preschool life skills (PLS) and a survey was sent to kindergarten and elementary school teachers in Iceland that involved questions about behavior problems and important skills that children should have acquired before entering first grade of elementary school. The survey results were used to select which skills from PLS program were chosen, and over the summer the PLS was translated into Icelandic. Appropriate permits were obtained from The Icelandic data protection authority. The implementation of PLS started in October 2017, the third semester, and finished in May 2018. The writing of the final draft took place in the fourth semester. The work of this thesis will be submitted to a peer-reviewed journal. Berglind Sveinbjörnsdóttir and Einar Þór Ingvarsson will be co-authors to the article.

The purpose of this study was twofold. The first was to examine Icelandic kindergarten and elementary teachers’ view on what skills they considered to be important for children to have mastered before entering first grade of elementary school. The second purpose was to implement the PLS skill teaching with three-tiered instructional approach in one kindergarten in the capital area of Iceland. Specifically, researchers wanted to examine the difference in skill acquisition between children who had formal diagnosis, informal diagnosis, or no diagnosis.

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Abstract

Transition from kindergarten to elementary school can be difficult, especially for children that have not acquired school readiness skills. Previous studies have shown positive correlation between social skills and academic success, as well as between problem behavior at a young age and long term social and academies difficulties. It is important to implement an effective intervention to prevent children at risk for developing further difficulties. The preschool life skills (PLS) program was first developed as a class-wide teaching program, teaching typically developing preschool children important social and communication skills (Hanley, Heal, Tiger & Ingvarsson). The aim of this study was to examine the impact of systematic teaching of school readiness skills in kindergarten in Iceland. First, we compared the view of kindergarten and elementary school teachers in Iceland on important school readiness skills. We translated the PLS program into Icelandic and adapted it to those skills that Icelandic teachers thought to be important. We implemented PLS in kindergarten in Iceland for children who were starting first grade in elementary school in the fall of 2018. Results from the survey showed that both kindergarten and elementary school teachers in Iceland viewed instruction following and functional communication as the most important skills for children to acquire before first grade. The implementation of PLS increased the likelihood of the occurrence of instruction following and functional communication and decreased problem behavior for most children.

Keywords: preschool skills, school readiness skills, social skills, life skills, Three tired teaching, kindergarten, behavior skills training.
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Transitioning from kindergarten to elementary school is a big step for every child. Some children adjust quickly to the new environment, however, for other children, this transition can bring many challenges, especially if they have not acquired some specific fundamental skills in kindergarten (Broström, 2002).

Social skills such as receptive language, cooperation and self-control are good predictors for academic success, as well as absence of problem behavior (Agostin & Bain, 1997; McCord, 1992; Mofitt, 1993; Tremblay, Vitaro, Bertrand & David, 1992). In addition, problem behavior such as aggression, disruption and noncompliance are positively correlated with long-term social and academic difficulties (Agostin et al., 1997). Children who lack social and emotional skills and showing problem behavior when they are young are at higher risk for academic failure, school absences, and delinquency (McCord, 1992; Mofitt, 1993; Tremblay et al., 1992). Therefore, children who have not achieved social and emotional skills are potentially entering elementary school not yet ready to learn. One can conclude that it is important to teach children social skills at an early age so that difficulties may be mitigated later on in life. In this context, the role of parents and teachers is very essential. With early interventions, children can be taught appropriate social skills that can prevent greater behavioral problems in the future and increase the likelihood of academic success.

School readiness usually refers to what skills children should have in their repertoire before entering elementary school (High, 2008). School readiness skills can include a variety of skills including pre-academic skill such as identifying letters and numbers. In Iceland, these academic skills seem to be a priority for children to learn in their last year of kindergarten (Gunnarsdóttir, 2014). However, studies on teachers and parents view on important skills to acquire before entering elementary school have shown more emphasis on
children learning appropriate social skills rather than academic skills (Hains, Fowler, Schwartz, Kottwitz, & Rosenkoetter, 1989; Heaviside & Farris, 1993; Johnson, Gallagher, Cook, & Wong, 1995; Lane, Pierson & Givner, 2003; Lin, Lawrence & Correll, 2003; Wesley & Buysse, 2003; West, 1993). Specifically, Heaviside et al. (1993) examined the view of public school kindergarten teachers towards readiness for school. A majority of the teachers reported that communicating needs, wants and thoughts, following directions, not being disruptive in class, being sensitive to others, taking turns and curiosity in approaching new activities, were important skills for children to acquire before school. In addition, Lin et al. (2003) showed similar results, where learning social skills in kindergarten was viewed as a higher priority than learning academic skills and compliance was rated as one of the most important skills.

Based on the studies mentioned before, children might benefit more with the systematic teaching of fundamental social skills rather than academic skills in kindergarten. If children have mastered skills such as following instructions, functional communication, how to interact with others, and achieved some degree of independence; those children should be more receptive to academic teaching when attending elementary school (Wesley et al., 2003). An example of a program that emphasizes on teaching these skills is Preschool life skills (PLS), a systematic teaching program on social skills that was developed by Hanley, Heal, Tiger & Ingvarsson in 2007.

Hanley, Heal, Tiger & Ingvarsson (2007) developed a class-wide teaching program to teach important social and communications skill to typically developing preschool children ages three to five. Hanley and colleagues wanted to develop a prevention program that could minimize the likelihood of developing problem behavior with children that had been in nonmaternal care. The definition of preschool life skills was desirable responses to commonly occur in evocative classroom situations (Hanley et al., 2007). PLS contained 13
social skills that were chosen according to a survey that compared teacher’s views on school readiness (Davies & North, 1990; West, 1993) and the literature on functional communication training (FCT; Carr & Durand, 1985; Hanley, Iwata & Thompson, 2001). FCT is a method used to teach socially appropriate behavior to replace problem behavior. FCT is considered a differential reinforcement procedure where an individual is taught an appropriate behavior that serves the same function as the problem behavior. For example, a kid that yells at the teacher to get her attention is taught to raise his hand to get the teacher’s attention. Raising his hand is an alternative response that results in the same type of reinforcement (Carr et al., 1985).

In PLS (Hanley et al., 2007), the 13 social skills were categorized into four units: Instruction following, functional communication, delay tolerance and friendship skills; each unit had 2-4 skills. The skills were taught using behavioral skills training (BST); a method that is used to teach skills with instruction, modeling, rehearsal, and feedback (Miltenberger, 2004; Ward-Horner & Strumey, 2012).

Hanley et al. (2017) used a class wide teaching approach. During circle time, the teacher explained the skills for the class, modeled the target skill with another teacher, provided the children with the opportunity to practice the skill with a teacher. Then the teacher arranged a certain number of learning opportunities (evocative situations) for each child throughout the school day. The evocative situations were contrived and gave the teachers a chance to observe the behavior of the children. A descriptive praise that specified each feature of the skill was provided when a participant demonstrated the target skill. For example, “I like the way you stopped what you were doing, looked at me and said yes when I called your name” (Hanley et al., 2007, p. 283). If a participant did not demonstrate the target behavior, the participant was reminded of the skill and given another opportunity to practice the skill.
PLS increased the acquisition of life skills more than four-fold and decreased problem behavior for the whole group by 74% (Hanley et al., 2007). Despite impressive results, some participants did not acquire or maintain all skills. Performance-based mastery criteria (i.e., the mastering of skill defined when a child engaged in the correct response on 80% of trials) (Robison, Mann & Ingvarsson, 2018) might be a more suitable teaching method compared to the time-based criterion that Hanley and colleagues (2007) used in their study (i.e., teacher had two days to teach every skill and the number of teaching opportunities and correct responses varied between participants). Luczynski and Hanley (2013) used a performance-based mastery criterion on PLS to teach children functional communications and self-control skills with good results. In their study the mastering of skill was defined as when a child engaged in the correct response on 85% of trials. Another addition to the PLS curriculum is the use of rewards to enhance acquisition of skills (Beaulieu, Hanley & Roberson, 2012, 2013; Hanley, Fahmie & Heal, 2014; Kraus, Hanley, Cesana, Eisenberg & Jarvie, 2012). Using token may be a good technique to enhance acquisition for those individuals who still do not meet the mastery criteria after the teaching of the skill or as a method that the teacher can use to maintain the acquisition after the implementation of the teaching has been completed.

The PLS program has been replicated in different settings and has been an effective method for reducing problem behavior as well as teaching children social skills (Beaulieu et al., 2012, 2013; Francisco & Hanley 2012; Hanley et al., 2014; Kraus et al, 2012; Luczynski et al., 2013; Luczynski, Hanley and Rodriguez, 2014). Researchers have taught PLS for large groups (16 participants; Hanley et al, 2007), small groups (Beaulieu et al., 2012, 2013; Luczynski et al, 2013; Luczynski et al., 2014) and others have used one to one format (Francisco et al., 2012; Kraus et al., 2012).
Originally, PLS was designed as a teaching program for children with typical development (Hanley et al., 2007) but few studies have implement the teaching with children that have developmental delays. Falligant & Pence (2007) examined the effect of PLS on eight children diagnosed with an autism spectrum disorder (ASD) and developmental disabilities using the three level of the Response-to-intervention model (RTI). RTI uses a tier model to represent the intensity of services where a higher tier means more support (Gresham, 2004). Class wide teaching is considered a tier 1 intervention, small group teaching is considered tier 2, and one to one format is considered tier 3. Falligant et al. (2007) taught five PLS: responding appropriately to name, requesting adult assistance, requesting adult attention, delay tolerance and denial tolerance. Six out of eight participants met the criteria for mastery (85% of trials across two consecutive sessions) for all five skills. Acquisition of skills on tier 1, 2 or 3 varied between participants and skills, but two participants needed tier 3 teaching for all five skills with additional modifications to the PLS curriculum. Examples of modification used were simplified response requirements, changing the topography of the target response, using arbitrary reinforcement and textual prompt. Their results showed the potential for effect of an RTI approach with PLS for children with developmental disabilities. However, there was poor generalization of skills in other situations with all participants. Robison, Mann & Ingvarsson (2018) also used the RTI model to teach children with developmental disabilities with two differences. In tier 3 teaching, they incorporated progressively increasing intertrial intervals (PITIs) and they used visual prompts when teaching each skill. Results showed an increase in skills for all participants and the skill acquisition maintained four weeks after the implementation of the teaching had ended. These studies show the possibility on using PLS curriculum to teach children with developmental delays important school readiness skills.
According to Fahmie & Luczynski (2018) there is a need for a study that combines all these three formats by using RTI model. Two studies (that we know of) have used RTI model to teach PLS, and in both of these studies, all participants were diagnosed with developmental disabilities (Falligant et al., 2017; Robison et al., 2018). To our knowledge, this three-tiered teaching on PLS has only been examined with participants that have developmental disabilities. Therefore, one of the goal of this study was to extend the research on PLS using a three-tiered instruction model. In a typical kindergarten group, there are children with different needs. Some children might have diagnosis, others may have informal diagnosis and some children have no developmental deviance. Implementing the PLS using a three-tiered instruction model might be a good fit for a group of children with different needs and could assist teachers to assess skill acquisition of all participant, with or without a diagnosis.

The purpose of this study was twofold. The first was to examine the view of Icelandic kindergarten and elementary teachers on skills they considered to be important for children to have mastered before entering the first grade of elementary school. The second purpose was to implement the PLS curriculum using a three-tiered instructional approach in one kindergarten in the capital area of Iceland. Specifically, the researchers wanted to examine the differences in skill acquisition between children who had a formal diagnosis, an informal diagnosis or no diagnosis.

Method

Study 1

Participants

Participants were 121 kindergartens teachers (118 women and 3 men) and 128 elementary school teachers (114 women and 14 men) in Iceland that answered an online survey. The age for kindergarten teachers ranged from 19 to 67-years-old, with the mean age
47. The age for the elementary school teachers ranged from 24 to 67-years-old, with the mean age 46. The kindergarten teachers had work experience from 1 to 42 years, with the average experience of 17.8 years. The elementary school teachers had work experience from 1 to 41 years, with the average experience of 12 years.

**Measurement and Procedure**

**Indirect measures.** An electronic survey was sent by email in March of 2017 to principals of all kindergartens and elementary schools in Iceland. In the email, the principals were asked to forward the survey link to teachers in their school. The survey included questions about behavioral problems and about what important skills teachers (elementary and kindergarten) thought children would need to have acquired before they started elementary school. The survey was done in collaboration with a BSc student.

The questions from the survey that was used in this study were:

1. “What skills do you think are important for children to acquire before they go to the elementary school?” Teachers were asked to rate the following factors by importance from 1 to 9: functional communication, instruction following, share with others, dress themselves, able to sit still, acknowledge and complement others, know the letters, wait for teachers’ attention and able to stand still in line. Participants marked 1 (most important) to 9 (less important). In addition, there was an “other” column where the teacher could write down a skill they thought was missing from the list.

2. “How much systematic preparation is in your kindergarten curriculum to prepare children for elementary school?” The participants answered on a five Likert scale: 1= not at all to 2= very high degree. In addition, teachers were asked to give an example of what kind of preparation for elementary school they used in their kindergarten.
Data Analysis

All the analysis from the questioner was processed with excel. In order to get more accurate overall assessment for question 1, the weighted importance was calculated by giving first choice weight 3, the second weight 2 and the third weight 1. For example, the weighted importance for Instruction following for elementary school teacher was calculated: 

\[(30.21\% \times 3) + (16.67\% \times 2) + (15.63\% \times 1)/6 = 23\%\].

For question 2 the number of participants was calculated after their response to the question.

Results

Figure 1 and 2 show weighted importance of skills that kindergarten and elementary school teachers thought to be important. Kindergarten and elementary school teachers reported that functional communication and instruction following were the most important skills for children to learn before elementary school.

Figure 3 depicts answers from kindergarten teachers to the question “How much systematic preparation is in your kindergarten to prepare children for elementary school?”.

The result from this question show that it was most common for kindergarten teachers to evaluate the preparation for elementary school at a high degree. Teachers were also asked to give an example of preparation for elementary school they were currently doing in their kindergarten, and the most common example the teachers gave were visits to elementary schools, teaching letters and numbers, mathematics, self-help such as table-manners, dress themselves and use toilets and teaching basic social skills.

Based on the answers of Icelandic teachers, following instructions and functional communication are important skills to teach children in kindergarten. The purpose of the second study was to examine the effects of using the PLS curriculum using a three-tiered model to teach instruction following, functional communication, and tolerance for delay to a group of kindergarten children in Iceland.
Study 2

Participants

Participants were eight children ages 4 to 5-years-old (5 boys and 3 girls). The children were in their last year in kindergarten and were supposed to start elementary school in the fall of 2018. The last year of kindergarten in Iceland is used as a preparation for elementary school and therefore the groups are often called school groups. The current study took place in one kindergarten in the capital area of Iceland.

The kindergarten had two school groups, however, participants in the current study were all part of school group 1. The intervention was implemented starting in the middle of October in 2017 and ended in April 2018. The children in school group 2 were also taught preschool life skills with a three-tiered instructional approach, however the intervention was implemented in January 2018 and their data were not included in this study. In school group 1, there was one child with diagnosis of Autism spectrum disorder (ASD) and one child that had informal diagnosis of attention deficit hyperactivity disorder (ADHD).

The two school groups attended activities in the same classroom throughout the day. Each group had one lead teacher and one or two special education teachers, each of whom was usually around 2 hrs a day in the classroom. The lead teacher of School group 1 had a bachelor and master’s degree in mathematics and was licensed to teach at all levels of school in Iceland. She had 6 years of experience as a kindergarten teacher. The role of the special education teacher was to assist individuals in the two groups who had a developmental diagnosis. There was a regular substitution for the special education teachers, usually every 2 to 3 hrs.
Settings

Sessions took place in the school group’s classroom. Their classroom was an open area that was divided into circle time corner, playing area, and two large tables that were used for handcrafting and eating.

The schedule for the school-groups were similar everyday with few exceptions such as swimming lesson and visits outside the kindergarten. The kindergarten opened at 7:30 a.m. and closed at 5 p.m. Usually the children arrived at the kindergarten around 9 a.m. every day. At 9:15 a.m., group time started and lasted until 11:15 a.m., where one group started inside the classroom and the other outside and then they switched after an hour. Each lead teacher followed his/her group and had planned activities during the group time. After lunch, the groups were together with both lead teachers and with assistance from the special education teacher. After lunch, two free choice activities were available where the students selected between different activities, including going outside.

Tier 1, 2 and 3 teaching took place during group time. Tier 1 teaching took place in the circle time corner because it was the best place to have group teaching. Tier 2 and 3 teaching took place in a teacher’s meeting room or playing area, depending on which one was free at each time. These places were most suited for privacy away from the rest of the group. Evocative situations were contrived throughout the school day and conducted in the classroom and in the school entrance where the students had their lockers.

Response Definition and Measurement

Direct measures. Data were collected by the researcher and lead teachers using pen and paper across three conditions: baseline, teaching condition, and post unit teaching probes. For baseline and post unit teaching probes, data were recorded when the participant emitted the correct skill, an error of omission, or an error of commission. Correct emission was recorded if the participant completed the target response accurately. Each skill included a
definition of a correct emission (e.g., Appendix A: PLS definition of skills). Error of omission was recorded if the participant did not complete the target response or did not initiate a response at all. Error of commission was recorded if the participant engaged in problem behavior or behavior that was not the target response.

In the teaching condition, when a participant emitted an error of omission or an error of commission, data were recorded as an incorrect response. This was done in order to make the recording more manageable for the teacher and quicker to write down on paper. The lead teacher did majority of the recording in the teaching condition with a help from the researcher in the beginning of each teaching condition.

**Indirect measures.** A questionnaire about the likelihood of preschool life skills was administered to both parents and lead teacher before teaching the first skill (in October 2017) and after teaching the last skill (in April 2018) (e.g., Appendix B: Questioner PLS). The questionnaire included questions related to preschool life skills, where the parents and the teacher were asked to answer according to the typical response their child exhibited in certain situations. The answers were on a 5-point Likert scale (1=always to 5=never). The parents had to answer a few additional questions about whether their children had a diagnosis and whether they were worried about how their child would adjust to elementary school environment (1=none to 5=very much).

**Data analysis**

All the analysis was processed with excel and IBM SPSS statistics. Person correlation was used to explore the relationship between the answers from the parents on the questionnaire with the answers from the teacher. The relationship between the answers from the teacher and parents was also assessed with the probability of correct skill on the first baseline measures that was made in October 2017. Significant difference was estimated as p-value below 0.05.
Interobserver Agreement

Interobserver agreement (IOA) was collected for 45% of the baseline and 74% of the post unit teaching probes. IOA was not collected during teaching conditions. IOA was collected by two undergraduate students and one graduate student from the University of Reykjavik. Agreement between the researcher and the second observer was defined as scoring the same response category during each observation. IOA was calculated by dividing the number of agreements between researcher and second observers, by the number of agreements plus disagreements and multiplying by 100%. Mean agreement between researcher and second observers for the direct measures was 96% (range, 95% to 98%).

Social Validity Assessment

In addition, the teacher filled out a brief social acceptability questionnaire (e.g., Appendix C: Social acceptability questionnaire), after the implementation of the teaching program was finished, to assess the acceptability and feasibility of the teaching program. The questionnaire contained 15 questions, the first 6 questions were statements (Robison et al., 2018) such as “all the participants benefitted from the teaching”. The teacher was asked to answer on a 7 Likert scale (1=do not agree to 7=very much agree). The next 9 questions were open ended and asked about what the teacher thought about the teaching, what skills she thought was important and on what skills she saw the most improvements.

Experimental design

A multiple probe design (Horner and Baer, 1978) across skills was used to determine the effectiveness of using the PLS three-tiered instructional approach on skill acquisition and problem behavior (errors of omission and commission). This method was chosen as it provides thorough analysis of the relationship between the independent variable (PLS with three-tiered instruction) and the dependent variable, the behavior of the participant during evocative situations (correct response, error of omission and error of commission).
Procedure

Appropriate consent was received from parents, kindergarten and the Icelandic data protection authority. PLS (Hanley et al., 2007) was translated in Icelandic, the curriculum included a definition of each skill, the circumstances in which the skills could be taught and examples of appropriate descriptive praise.

A week before the implementation of the PLS with three-tiered instruction, parents received a questionnaire (e.g., Appendix B: Questioner PLS) that they were asked to return within a week in a closed envelope. The lead teacher answered a similar questionnaire for every participant. The same questionnaire was answered after the intervention.

In the current study, six preschool life skills across three domains were evaluated (e.g., Appendix A: PLS definition of skills). Domains included instruction following, functional communication, and tolerance of delay. The domains of instruction following contained three skills (skill 1= responding appropriately to name, skill 2= complying with simple instructions and skill 3= complying with multistep instructions), the domains of functional communication had two skills (skill4= requests attention from teacher and skill 5= requesting assistance) and the domains of tolerance of delay had one skill (skill 6= tolerating delays imposed from teacher). All skills were taught similarly, with one exception; during instruction following on skill 6 (tolerating delays imposed from teacher) the children were also taught to say, “If I wait patiently, the teacher will come to me.”

Baseline and post unit teaching probes. Baseline sessions and post unit teaching probes were run identically. The teacher set up an evocative situation and recorded whether the participants showed correct skills, an error of omission or an error of commission. Each child received 2 or 3 trials in baseline and post unit teaching probes, dependent on responding. If a participant responded the same way in the first two trials, the third trial was discontinued. If the participant emitted a correct response, the teacher provided descriptive
praise. However, if the participant did not emit the response correctly, the teacher continued his typical communication with the participant.

**Teaching preschool life skills with Three-tiered instructional approach.** All participants started at tier 1 and those participants that were not able to demonstrate the skill above 80% mastery criteria received training in level 2 and so on.

**Tier 1.** Teaching in tier 1 took place in a large group where all the participants sat in a circle. The researcher used visual prompts when he explained the skill (e.g., Appendix D: Visual prompt) and then demonstrated the skill by modeling the behavior with assistance from the teacher. Each participant was given one opportunity to practice the skill with the researcher/teacher (role play). The tier 1 teaching usually took about 10-20 min. After the tier 1 teaching, the teacher set up evocative situations (teaching trials) throughout the school day. Evocative situations were opportunities for participants to practice the skills. The teacher provided descriptive praise contingent on correct responding. However, if a participant emitted an incorrect response or did not complete the skill, the teacher reminded the participant of the skill they were practicing and continued to set up conditions for the participant to demonstrate the correct skill until the participant performed the correct response or if the teacher had to give his attention to something else. Each participant got eight opportunities to practice the skill on teaching trials. Teaching trials could take from two to three school days and was implemented after each teaching tier. Those participants who were under 80% mastering criteria after the eight opportunities proceeded to tier 2 teaching.

**Tier 2.** Teaching in tier 2 was implemented in the same way as tier 1 teaching, except the participant were in smaller groups with no more than four participants.

**Tier 3.** Teaching in tier 3 was an individual instruction, one teacher and one student. The teaching was the same as in tier 1 and 2, where the teacher explained the skill, modeled
the behavior and then the participants got the chance to practice the skill one time with the researcher. The teaching in tier 3 took place in the classroom in the playing area and usually took about 5 min.

Thus, with higher number of tier, participants got another teaching session and more opportunities to practice the behavior

**Token-system.** Two days after the post unit measures for Unit 1 a token-system was implemented for the participants who did not reach 80% mastery criteria after going through a three-tiered instruction. The token system was in place for two days. A dependent group contingency was used. The teacher constructed one evocative situation for every child, however the children that did not master the 80% criteria for unit 1 had 9 evocative situations, three for every skill. Participant received stars for correct responses. The stars were put in a closed box and in the end of the day the teacher and children counted the stars together. If the children earned enough stars, the class got the chance to do scientific experiments with the teacher in group-time the next day. Scientific experiments were something that most of the children thought was fun and something different from what they usually did in group-time.

**Results**

Overall, 416 evocative situations were set up across baseline and post-teaching sessions (i.e., 183 in baseline and 231 post teaching). In baseline the probability of correct responding for all participants was 47% and the probability of correct responding for all participants post teaching was 78%.

Figure 4 shows the percentage of correct responding, error of omission and error of commission for all children during baseline and post-teaching unit probes. Probability of correct responding for each child is depicted by each bar. The children’s order across clusters are always the same, thereby the first bar in every cluster represent the response from
the same child. Grey bars above horizontal axis represent correct responding and the bars below horizontal axis represent error of omission (black bars) and error of commission (dark gray bars). Participant number eight could not attend school during first baseline and last post teaching measures, and participant number 5 did not attend school during the last post teaching baseline for skill 4, 5 and 6. Therefore, no bars for participant number 8 in the first and last cluster and no bar for participant number 5 for unit 2 and 3 in the last cluster are shown.

In baseline for Unit 1 (instruction following) the children the emitted correct response in 33% of the evocative situations. During baseline measures, none of the children responded correctly to their name (skill 1: $M= 0\%$), about half of them completed a simple instruction (skill 2: $M= 57\%$, $SD=37\%$) and about third followed complex instruction (skill 3: $M= 29\%$, $SD=36\%$). After teaching Unit 1, participants emitted the correct response in 81% of evocative situations. The average of correct response for skill 1 was 63% ($SD=44\%$), skill 2 was 83% ($SD=30\%$) and skill 3 was 69% ($SD=39\%$).

Three stars above bar number 4, 7 and 8 in Post unit 1 teaching cutler represent correct responding after additional implementation of the token system. The token system was implemented two days after measurements on post unit 1 teaching. With the additional token system, the probability of unit 1 skill increased over 80% criteria for those children that had not acquire Unit 1 skills after the implementation of the three-tiered teaching (child 4= 100%, child 7= 86% and child 8 =100%).

Two baseline measurements were taken for Unit 2 (functional communication) with two months apart (skill 4: $M=43\%$, $SD=37\%$ and $M= 38\%$, $SD= 38\%$, skill 5: $M= 62\%$, $SD=40\%$ and $M= 38\%$, $SD=21\%$). During both baselines for unit 2, participants emitted the correct response in 44% of evocative situations. After implementation of the teaching program for unit 2, the probability of demonstrating those skills increased to 66% (skill 4:
$M = 61\%, \ SD= 41\% \text{ and skill 5: } M = 76\%, \ SD= 38\%$. Unit 2 teaching (functional communication) showed improvement in the post teaching measure which was implemented as soon as the teaching of tier 3 was completed, but two children did not meet mastery criteria. However, in the post unit 3 teaching measures, that was implemented 2 months after the teaching on Unit 2, some children showed decreased in acquisition on Unit 2. The reason for this reduction was related to skill 4: Requests attention appropriately by teacher. The reason for this low acquisition on skill 4 might be because the skill was multicomponent and could have been divided into fewer skills, the children were taught to get attention from the teacher by raising their hand or call the teacher name only once and then wait for the teacher to say “yes” before asking the teacher a question.

Three baseline measurements were taken for Unit 3 (tolerance for delay), two months apart. Baseline measures showed relatively high probability of correct responding for skills in Unit 3 before implementation PLS. Participants emitted the correct response in $63\%$ of evocative situations (skill 6: $M = 71, \ SD= 30, / M=58, \ SD= 46, / M=71, \ SD=28$). After implementation PLS for unit 3, the probability of demonstrating the skill increased to $91\%$ ($M=91\%, \ SD=20\%$).

Error of omission and commission is also depicted in figure 4. During baseline, the total probability of error of omission was $27\%$ and the total probability for error of commission was $26\%$. During post teaching conditions, the total probability of both error of omission ($19\%$) and error of commission ($3\%$) decreased. During baseline on skills in Unit 1, the probability of error of omission and error of commission were $67\%$ and the probability for both error of omission and error of commission decreased to $18\%$ after the teaching. The probability of error of omission and error of commission for skills in Unit 2 in baseline were $56\%$ and after teaching the probability for both error of omission and error of commission
decreased to 32%. For skills taught in Unit 3, the probability for error of omission and error of commission was 36% in baseline and decreased to 8% after teaching.

Figure 5 shows percentage of correct responding for all six skills before and after teaching. Black bars represent correct responses before teaching and grey bars correct responses after teaching. All six skills improved after implementing of the teaching program. The largest improvement was for skill 1 (responding to name) and skill 3 (complex instruction).

The percentage of correct responses during tier-1, 2 and 3 teaching are depicted in figure 6. Black bars represent correct responses during tier 1 teaching, closed circle represent correct responses during tier 2 teaching and open circles represent correct responses during tier 3 teaching. Participant number 8 was not able to attend tier 1 teaching for skill 1, participant number 7 was away when teaching tier 1 for skill 4, and participant 3, 5, 8 were all ill when tier 1 teaching occurred for skill 5. For skill 1, most of the children met the criterion after tier 2 teaching (63%) and one child did not meet the criteria after tier 3 teaching. For skill 2 and 3, 38% of the children met the criteria after tier 1 teaching, only one child did not meet the criteria after tier 3 teaching for skill 2 but two children for skill 3. None of the children met the criterion after tier 1 teaching for skill 4 and about half of the children did not reach over 80% skill acquisition after tier 3 teaching. For skill 5 most of the children met the criterion after tier 2 teaching (38%) and two children did not meet the criterion after tier 3 teaching. Six children met the criterion after tier 1 teaching on skill 6 and the other two after tier 2 teaching. There were 10 incidents where children did not meet the mastery criteria after tier 3 teaching, seven of these ten incidents (70%) were the children who had a diagnosis of autism and an informal diagnosis of ADHD. The difference in skill acquisition between children that formal or informal diagnosis and no diagnosis was observed with how often children reached mastery criteria on tier 1, 2 and 3 teaching. Overall, the children met
mastery criteria in tier 1 in 37% of trials, tier 2 in 50% of trials, and tier 3 in 38% of trial. Two children that had an informal and formal diagnosis never met the criterion to mastery after tier 1 teaching and were more likely to still have not acquire the skill after tier 3 teaching then then children that did not have any diagnosis.

Two children had a diagnosis for developmental delay (ASD and informal ADHD). Figure 7 shows the percentage of correct responses for those children before and after teaching on unit 1 (instruction following). Both the participants were under the criterion after tier 3 teaching on unit 1, therefore token system was added. Both met the criterion when the token system was put in place. However, after the token system was taken out the performance for both participants dropped under the mastery criteria.

Figure 8 shows the total score from the questioner that parents and teacher answered in October 2017, before the teaching started. The correlation of how much the parents and teacher agreed on how the children performed on each skill was weak and insignificant, \( r(7) = 0.24, p = 0.6 \). Participant number 7 had high inconsistency between total score from parents and teachers. When the data from participant 7 was removed, the correlation between how much the parents and teacher agreed on how the children performed on each skill increased but still was not significant, \( r(6) = 0.8, p = 0.053 \).

The correlation between the first baseline measurements, taken in October 2017, and the total score from the parents was weak and insignificant, \( r(7) = 0.187, p = 0.69 \). However, when the participant number 7 was taken from the data, the correlation increased but still was insignificant, \( r(6) = 0.476, p = 0.34 \).

The correlation between the first baseline measurements, taken in October 2017, and the total score from the teacher was strong, but insignificant, \( r(8) = 0.711, p = 0.07 \).

The results from the social acceptability questionnaire were promising. The teacher scored a total of 42 points out of 42 possible points. The teacher evaluated that all the
children benefitted from the teaching, however some more than others, and the classroom social environment improved a lot. The teacher said she wanted to implement the three-tiered teaching again in her classroom next fall and that she was very likely to recommend the PLS teaching to other teachers.

The teacher saw most improvements in skills 1 and 4 in the classroom. She stated that although the children sometimes forgot skill 4 and started to call her name repeatedly it was enough for her to say to them “remember what we are practicing” or point to the picture for skill 4 and the children would correct their behavior themselves. The teacher felt that all the skills that were taught were connected in some way and were taught in right order. She came with the example that teaching skill 5 would not have been as efficient if the children had not been taught skill 4, 3, 2 and 1.

When asked what skill benefited her most as a teacher, she answered skill 4 and skill 6. Her experience in teaching these skills was that the children learned self-control. They learned to ask for attention appropriately and wait patiently. According to the teacher, she felt that these skills were most important for children to be able to learn before elementary school. The teacher stated that the teaching program fitted well with her daily teaching schedule and it was useful for her as a teacher to record the behavior herself, so she could monitor which children needed more practicing. According to the teacher, the parents’ reaction to the teaching was very positive.

**Discussion**

The purpose of the present study was twofold. First, we examined the view of Icelandic kindergarten and elementary teachers on what skills they thought were important for children to acquire before entering elementary school. Second, we evaluated the effectiveness of PLS skill teaching with three-tiered instructional approach in a typical
kindergarten class in Iceland. Also, we examined the difference in skill acquisition between children that had formal or informal diagnosis and no diagnosis.

Both kindergarten and elementary school teachers evaluated functional communication and instructions following as the most important skill for children to learn in kindergarten. These results are consistent with other studies on teachers’ view on school readiness, where it is common for teachers to assess social skills such as compliance and communication as more important than academic skills (Heaviside et al., 1993; Lin et al., 2003). The preparation for elementary school in Iceland was evaluated as high by kindergarten teachers and the most common preparation method that teachers reported was visiting elementary school, teaching letters and mathematics, self-help skills, and basic social skills. According to Einarsdóttir, Perry & Dockett (2008), the most common transitional practice in Iceland were school visits, taking part in school events, and written records about the students from the kindergarten to future teachers. It is necessary to examine further the inconsistency between the teacher thinks is important for children to learn before school and what is actually being taught systematically in kindergarten. It is unclear if social skills are taught systematically.

Teaching PLS using a three-tiered instructional approach was implemented in a school group that had 8 students (4 and 5 years old). One of the students had a diagnosis of an ASD and one had an informal diagnosis of ADHD.

Overall, there was an increased in the probability of correct responding when baseline measures were compared to post teaching measures. For all Units, participants demonstrated an increase of the skills being taught, however some more than others. This is similar to previous studies, where the effectiveness of PLS teaching has shown to reduce problem behavior as well as teaching children social-skills (Beaulieu et al., 2012, 2013; Francisco et
Unit 1 (following instructions) showed the most difference on probability of correct responses before and after teaching. The reason for this big difference on unit 1 is mostly related to the improvement on skill 1. Namely, none of the participants responding correctly when the teacher called their name before teaching and the probability of skill 1 increased to 78% after teaching. In addition, Unit 1 skills showed good maintenance 2 and 4 months after teaching the skills.

Unit 2 (functional communication) showed improvement on probability of correct responses after teaching. However, there was a decrease in acquisition of the Unit 2 skills in post unit 3 teaching measures. Interestingly, although the children did not seem to improve that much on skill 4 (requests attention from teacher) the teacher wrote in the social acceptability questioner that she saw the most improvement from the children in skill 4. The teacher said that the children often forgot skill 4 but they were quick to correct themselves when the teacher reminded them by saying “*remember what we are practicing to day*” or pointed at the picture (visual prompt). According to the teacher there was a big difference in the environment of the classroom after teaching skill 4, fewer incidents were children were calling repeatedly the teachers name and more patience when the teacher was occupied.

The probability of unit 3 skill (tolerance for delay) was relatively high in baseline, however there was a moderate increase in demonstrating the skill after teaching. It would have been useful to get an additional maintenance measures (2 months later) for unit 3 to evaluate if the skill maintained over time for all children.

Total error of omission and commission decreased after the implementation of the teaching. Participant number 7 showed increase in error of omission after the teaching on unit 2. In his case, it seemed he needed more practicing to acquire the skill. If he was given an
indication of the skill after incorrect response, he usually showed the correct skill right away, however his original response was the behavior that was recorded in the measures.

The two children that had formal or informal diagnosis were more likely to need tier 3 teaching than the children that had no diagnosis. They were also more likely to still have not acquire the skill after tier 3 teaching. These results emphasize that children with diagnosis need more opportunities to master these skills or other additional teaching method to enhance their acquisition, such as token system or other modifications. One modification could be to incorporate progressively increasing intertrial intervals in tier 3 instruction, similarly as Robinson and colleagues (2018) did in their study with promising results.

In the current study, a token system was implemented after tier 3 teaching on Unit 1 to enhance acquisition for those children that were still under the mastery criteria. All three of the children met the mastery criteria after implementation of the token system, which show the possibility of adding token system to enhance acquisition of skills. Unfortunately, due to time restraints, we did not get to install a token system for those individuals who did not meet the criteria after teaching on units 2 and 3. It would have been interesting to see if token system would have been enough to enhance skill acquisition for unit 2 and 3 as well. Token system is rather easy to implement and is something that teachers should be able to use to reinforce desirable behavior.

The key difference between this study and other that have examined the effectiveness on PLS is the use of the three-tiered instructional approach with a group of children with and without diagnosis. The effectiveness of three-tiered instructional approach with PLS has been examined with children that have developmental disabilities and has shown promising results (Falligant et al., 2017; Robison et al., 2018). However, this had not been examined with typically developing children. The results of the current study showed that both children
with and without diagnosis can benefit from three-tiered teaching of PLS, but some children might need more instruction than others.

There were many benefits from this teaching program. Among those benefits that the researcher noticed during these 7 months, was that with the three-tiered teaching on PLS, the children that were used to receiving attention from the teacher when they were showing undesirable behavior, were suddenly getting more attention from the teacher when they were showing desirable behavior.

Another benefit is regarding the visual prompts. In the current study, the researcher used visual prompts in the teaching that were similar to what Robinson et al. (2018) used in their study. Simple and clear visual prompts can help children to better understand what behavior is expected from them and it can also benefit the teacher when children show incorrect response for example the teacher can point at the picture instead of explaining the skill again.

Finally, the teaching method seemed to show good result with a school group in the kindergarten. Skill increased for most of the children and the children also seemed to enjoy the lessons and there were many fun moments that support that conclusion, such as: Children were practicing the skills with each other in free-time where one child was the teacher and the other child the student, both parents and teacher reported that their children talked about the skills and for example proudly told their parents “now I am following complex instructions” and there were incidents where the children called the teacher and teacher came to them and said “yes” and then they answered “nothing. I was just practicing saying your name just once and then wait for your attention”.

There were few limitations on this study that are worth mentioning. There were incidents were children did not attend school and missed out of teaching or measurement opportunities. Thus measurements for some children could not be completed. The teaching
took seven months, and the researcher was only two or three times a week at the kindergarten. Previous studies on PLS have been taken a shorter time to implement for example Hanley et al. (2007) taught 13 skills in 15 weeks. It is possible that if the researcher was more available at the kindergarten the teaching would have been more systematic and the increase on skills would have been higher. However, it also supports the effectiveness of the teaching where the effects were relatively promising, even though teaching only took place twice a week and longer time was between measures than previous studies on PLS. It is worth noting that although the teaching on tier 1,2 and 3 only took place when the researcher was at the kindergarten, the teaching trials were implemented by the teacher in between those days. Although the goal was that the teaching trials would only take two days, there were cases where the teacher, understandable, was not able to set up 8 evocative situations for all the children and time extension was made for those cases.

Another limitation is regarding the aid that stayed with the children who had a formal diagnosis of autism and an informal diagnosis of ADHD. It varied throughout the day who served as their aid thus there was little consistency and the aid was not always aware if he should prompt the student or not. It is possible that if the student had a consistent aid throughout the study then perhaps he would have acquired the skill faster as well as maintained it.

Future research on PLS should focus on implementing PLS with the three-tiered instruction on difference settings and examine how to improve the correct responding for the children that have harder time achieving those skills. Finally, there is also need for long term studies on the effectiveness of PLS.

PLS teaching can be helpful in identifying which children are having difficulties with important social skills. There are a group of children who do not get a diagnosis until they are in elementary school or because they are just right below the criteria. This group is at risk
of not getting the help they need in kindergarten as they do not fall under criteria for
diagnosis and therefore do not get any additional support. By identifying these problems
earlier it is possible to intervene earlier and thus increase the probability that these children
have successful transition from preschool to elementary school.
References


Gunnarsdóttir, B. (2014). From play to school: are core values of ECEC in Iceland being undermined by “schoolification”? *Journal of Early Years Education, 22*(3), 242-250. doi: 10.1080/09669760.2014.960319


doi: 10.1016/S0885-2006(03)00044-9

Figures

Figure 1. Weighted importance of skills according to kindergarten teachers.
Figure 2. Weighted importance of skills according to elementary school teachers.
Figure 3. Frequency of kindergarten teachers who evaluated the preparation for elementary school in their kindergarten curriculum.
Figure 4. The percentage of correct responding, error of omission and error of commission during baseline, post teaching and maintenance unit probe. Vertical bars represent each child.
Figure 5. The percentage of correct responding for all evocative situations made in baseline and after teaching program was implemented, divided by skills. Black bars represent correct responding pre-teaching and the grey bar post teaching.
Figure 6. Percentage of correct responses for all participants during tier 1, 2 and 3 teaching.

The numbers on horizontal line represent the participants. Black bars represent skills that were acquired during tier 1 teaching, closed circle for tier 2 teaching and open circle for tier 3 teaching.
Figure 7. Percentage of correct responses before and after teaching Unit 1 skills for two participants that had developmental diagnosis.
Figure 8. Teachers and parents total score on skill-questioner before implementation of the teaching program. Higher score indicates that the child was more likely to demonstrate the skills.
Appendix A: PLS definition of skills

Unit 1 – Instruction following

Skill 1 Responding appropriately to name: Within 2 s, the child, stops competing behavior, orients towards speaker, and says “yes”.

Skill 2 Complying with simple instructions: Within 3 s of the initial prompt, child initiates completion of the instruction and completes the instruction in a timely manner.

Skill 3 Complying with multistep instructions: Within 3 s of the initial prompt, child initiates completion of the instructions and completes the instructions in a timely manner.

Unit 2 – Functional communication

Skill 4 Requests attention by teacher, by saying “teacher” or the teachers name and only say is one time and wait for the teacher to say “yes” before asking a question. If the teacher did not answer, the children can tap the shoulder on the teacher and wait for the teacher to say “yes”.

Skill 5 Requesting assistance: Child requests assistance by saying “can you help me” within 45 s of instruction delivery (using appropriate tone and voice volume).

Unit 3 – Tolerance for delay

Skill 6 Tolerating delays imposed by adults: Child ask for attention from the teacher, teacher is busy and says, “wait a minute” and the child waits patiently for 30 s.
1. Hefur þú áhyggjur af því hvernig barnið þitt mun aðlagast að skólaumhverfinu (Þar sem fleiri kröfur eru settar á nemendur, stærri bekkir og færri kennarar eru á nemendur)?

Dragðu hring utan um þann svarmöguleika sem á best við.

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Nú muntu lesa um mismunandi aðstæður. Reyndu að sjá fyrir þér algeng viðbrögð barns þíns í þessum aðstæðum. Dragðu sóðan hring utan um þann svarmöguleika sem á best við viðbrögð barns þíns í þessum aðstæðum.

2a. **Aðstæður:** Þú kallar á barnið með nafni.
   Barnið hættir því sem það er að gera, lítur við, og segir „Já“.
   
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2b. **Aðstæður:** Þú kallar á barnið með nafni.
   Barnið sýnir engin viðbrögð.
   
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3a. **Aðstæður:** Þú gefur barninu einföld fyrirmæli.
   Í einföldum fyrirmælum felst eitt verkefni, til dæmis: „Komdu“, eða: “Náðu í x”.
   Barnið fer eftir fyrirmælum innan 3 sekúnda, án þess að þurfi að minna barnið aftur á fyrirmælum.
   
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3b. **Aðstæður:** Þú gefur barninu einföld fyrirmæli.
   Í einföldum fyrirmælum felst eitt verkefni til dæmis: „Komdu“, eða: “Náðu í x”.
   Barnið fer ekki eftir fyrirmælunum/ sýnir engin viðbrögð eða verður reitt, pirrað, öskrar.
   
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4a. **Aðstæður:** Þú gefur barninu flókin fyrirmæli.
   Barnið fer eftir fyrirmælum eða biður um hjálp.
   
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4b. **Aðstæður:** Þú gefur barninu flókin fyrirmæli.
   Í flóknum fyrirmælum felast mörg verkefni, til dæmis: “Farðu og náðu í blað og sestu

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Appendix C: Social acceptability questionaire

Vinsamlegast merktu við hversu sammála eða ósammála þú ert staðhæfingunum hér að neðan.

1. Börnin sem tóku þátt í verkefninu nutu góðs af kennslunni?
   Mjög ósammála – frekar ósammála- ösammála – hlutlaus – sammála – frekar sammála – Mjög sammála

2. Börnin sem tóku þátt í verkefninu náðu öll að bæta sig í þeirri færni sem var tekin fyrir?
   Mjög ósammála – frekar ósammála- ösammála – hlutlaus – sammála – frekar sammála – Mjög sammála

3. Andrúmsloftið inn í skólastofunni varð betra eftir innleiðinguna á verkefninu?
   Mjög ósammála – frekar ósammála- ösammála – hlutlaus – sammála – frekar sammála – Mjög sammála

4. Færnin sem var kennd var gagnleg öllum nemendunum í bekknum?
   Mjög ósammála – frekar ósammála- ösammála – hlutlaus – sammála – frekar sammála – Mjög sammála

5. Ég hef áhuga á að innleiða þessa kennslaðferð hjá næsta leikskólahópi sem ég kenni?
   Mjög ósammála – frekar ósammála- ösammála – hlutlaus – sammála – frekar sammála – Mjög sammála

6. Ég myndi mæla með þessari kennslaðferð við aðra kennara?
   Mjög ósammála – frekar ósammála- ösammála – hlutlaus – sammála – frekar sammála – Mjög sammála

7. Hvaða færni fannst þér gagnast börnunum best að læra?
   Merktu á skalanum frá 1 (mikilvægasta) til 6 (minnst mikilvægasta)
   _____ Færni 1 Barn sýnir viðeigandi svörun þegar kallað er á það með nafni.
   _____ Færni 2 Fylgir eftir einföldum fyrirmælum
   _____ Færni 3 Fylgir eftir flóknum fyrirmælum
   _____ Færni 4 Ná athygli kennara á viðeigandi hátt
   _____ Færni 5 Barn biður um aðstoð frá kennara á viðeigandi hátt
   _____ Færni 6 Barn biður þolinmótt þegar kennari segir „bíddu aðeins“

8. Við hvaða færni sástu mestan mun, fyrir og eftir kennslu?

____________________________________________________________________
____________________________________________________________________

____________________________________________________________________
____________________________________________________________________
9. Hvaða færni fannst þér gagnast best fyrir þig sem kennara?
_____________________________________________________________________
_____________________________________________________________________

10. Er einhver færni sem þér finnst mikilvægt að börn kunni fyrir grunnskóla sem var
eikki tekin fyrir en þú hefðir viljað hafa í kennslunni?
_____________________________________________________________________
_____________________________________________________________________

11. Var einhver færni sem þér fannst að hefði mátt sleppa/var óparfi að kenna?
_____________________________________________________________________
_____________________________________________________________________

12. Fannst þér erfitt að framkvæma kennsluna? Hvernig gekk að koma kennslunni fyrir í
venjulega dagskrá?
_____________________________________________________________________
_____________________________________________________________________

13. Myndirðu treysta þér að framkvæma kennsluna sjálft eftir að hafa fengið
þjálfun/leiðbeiningar um hvernig á að setja upp kennsluna?
_____________________________________________________________________
_____________________________________________________________________

14. Hvernig fannst þér upplifun barnanna og foreldra vera á verkefninu?
_____________________________________________________________________
_____________________________________________________________________

15. Er eitt hvað annað sen þú vilt taka fram?
_____________________________________________________________________
_____________________________________________________________________
Appendix D: Visual prompt

Fylgja eftir fyrirmaðlum kennara

Fylgja eftir flóknnum fyrirmaðlum frá kennara

Kennaði?

Já

"Má og tóna á húsnendið" "Villa tókna áhættu" "Villa og lísa árnika"

Færni 5. Biðja um aðstoð frá kennara

"Kennaði, biðdu aðeins" "Kristján, biðdu aðeins"

Færni 6. Að biða rólega eftir að kennari segir "biðdu aðeins".