



**Best practices in Icelandic crisis
communication during volcanic eruptions:
development of a tentative framework**

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60 ECTS thesis submitted in partial fulfilment of a
Magister Scientiarum degree in Environment and Natural Resources

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Abstract

The objective of this study is to investigate what practices have been successful and what practices need improvement in official communication prior to, during and after volcanic eruptions in Iceland. Furthermore, to analyse to what extent previously identified best practices within the crisis communication literature are applicable to the Icelandic situation. A qualitative interview research was conducted on experiences of public information officers, experts, spokespersons and crisis managers as well as journalists working during the Bárðarbunga seismic activity and the Holuhraun eruption in Iceland that started in August 2014 and ended in February 2015. It revealed nine elements that are considered important and/or successful in communication efforts during recent eruptions, here suggested as a tentative framework for best practices in crisis communication in Iceland. The study underlines that Icelandic crisis communication practices need to consider the special Icelandic conditions which are characterized by scarce resources; a greater need for improvisation in the crisis communication process; a great international media interest; close contact with and good access to the local media; a sense of closeness to the public; and the importance of cooperation between various institutions. Furthermore, the need for proactive communication is prominent in the digital landscape of modern society.

Útdráttur

Markmið þessarar rannsóknar er að kanna hvaða aðferðir hafa reynst vel og hvað mætti fara betur í opinberri upplýsingagjöf fyrir, eftir og meðan á eldgosum stendur á Íslandi. Sömuleiðis að greina að hvaða marki bestu starfsvenjur (e. best practices) sem fyrri rannsóknir hafa dregið fram, eiga við á Íslandi. Gerð var eigindleg viðtalsrannsókn á reynslu opinberra upplýsingafulltrúa, sérfræðinga, talsmanna og viðbragðsstjórnenda auk fréttamanna sem unnu að upplýsingamiðlun vegna jarðskjálftavirkni í Bárðarbungu og eldgoss í Holuhrauni frá ágúst 2014 til febrúar 2015. Hún leiddi í ljós níu atriði sem talin eru mikilvæg og/eða árangursrík í upplýsingamiðlun opinberra aðila vegna nýlegra eldgosa á Íslandi og skilgreina má sem bestu starfsvenjur við slíkar aðstæður. Rannsóknin dregur fram að taka verður tillit til sérstakra aðstæðna í upplýsingamiðlun í hættuástandi á Íslandi. Þær einkennast m.a. af takmörkuðu fjármagni og skorti á starfsfólki; þörf á sveigjanleika og spuna við upplýsingamiðlunina; miklum áhuga erlendra fjölmiðla; persónulegu sambandi og góðu aðgengi að íslenskum fjölmiðlum; mikilli nálægð við almenning; og mikilvægi samvinnu mismunandi stofnana. Þá er árangursríkt að sýna frumkvæði í upplýsingamiðluninni í því stafræna umhverfi sem einkennir nútímasamfélög.

Dedication

This thesis is dedicated to the hard working people of the department of Icelandic Civil Protection, the IMO, the Institute of Earth Sciences and other institutions and Ministries working on communication efforts during natural hazards in Iceland. Their resourcefulness and relentlessness is invaluable to those who depend on reliable information in times of uncertainty.

Preface

The date is May 21, 2011. I had been working for ten days in my new position as the head of information at the Ministry for the Environment, when the Icelandic Met Office (IMO), which observes volcanic activity, reported that an eruption had started in Grímsvötn volcano located in Vatnajökull glacier. As the IMO is under the auspices of my employing ministry, few hours later I found myself at the IMO's headquarters, trying to organize communication efforts and meet what seemed to be an insatiable need for information. It was obvious that the international media remembered way too well the aviation chaos from the year before, when Eyjafjallajökull subglacial volcano erupted, and was expecting a new media sensation all over again.

Fortunately, the expectations exceeded the reality. The airspace remained open and free for air travel, and as the eruption only lasted for few days the situation quickly came to an end. It wasn't until August 2014, at the start of the seismic activity of the Bárðarbunga volcano looming beneath Vatnajökull glacier, that my help was needed again. The media was alerted to a possible eruption and the phones had started ringing all over.

This time the interest lasted. It lasted the whole two weeks it took before a volcanic fissure ripped open in the Holuhraun lava, north of Bárðarbunga in Vatnajökull glacier, and then it took off for real. For the following six months, Iceland experienced its largest volcanic eruption in over 230 years and the mass media, nationally and internationally, was craving for information on this spectacular. Still, the largest communication tasks were related to local inhabitants, many of which were suffering from airborne sulphur dioxide contamination from the eruption, while others needed to be prepared for possible evacuations in case of major floods that could be expected.

These unexpected circumstances of such a broad information need have called for the involvement of a number of people in the communication efforts. As I've stood side by side with crisis managers, scientists, experts and communication officers from different organisations, diving into the task at hand, I've realized that despite the chaos, previous experience has been a valuable asset in the communication efforts. At the same time, the uncertainty of the situation has called for new approaches each time.

This study is intended to provide an overview of how communication efforts can best be conducted, taking Icelandic circumstances into account. Hopefully, it contributes to improving communication procedures and easing the work of communicators working under the heavy information pressure that arises during volcanic eruptions in Iceland.

Reykjavík, May 2016, Bergþóra Njála Guðmundsdóttir.

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Abbreviations

The following abbreviations and terms are used throughout the thesis:

Communication officer/expert – an expert on communication, information and media-relations, holding a formal position as such at an organization.

The Holuhraun event – The Bárðarbunga seismic activity and the Holuhraun eruption that started in August 2014 and ended in February 2015.

IMO – Icelandic Met Office (the state volcano observatory).

NCCCC – The National Crisis Coordination and Command Centre.

SAB – Scientific Advisory Board of the Civil Protection.

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1 Introduction

People need communication. To seek information, to share knowledge and interact with each other is probably the one feature that distinguishes the human being most from other animals.

When crisis strikes, the need for information becomes urgent, as it is essential to our survival. We cannot effectively act on sudden danger or critical circumstances without the basic knowledge of what the crisis is all about. Thus crisis communication is prominent in modern crisis management, regardless of the type of crisis or the size of the audience. However, the larger the audience, the greater effort is needed in order to satisfy all needs in this respect.

This reality has become increasingly apparent in the case of Icelandic crisis communication. For the past decade, the tiny nation has over and over again experienced the global spotlight in crisis situations, whether it has been due to the sudden collapse of its entire bank-system or because of volcanic eruptions affecting people far beyond the island.

The volcanic eruption of Eyjafjallajökull in 2010 was certainly such a situation as it led to the cancellation of flights all over Europe (and beyond) for a six-day period and generated massive information requests from the international media. At the same time, local inhabitants in the most affected areas in Iceland were in great need of information as they suffered extensively from ash fall, glacial-floods and lahars caused by the eruption (Bird & Gísladóttir, 2012; Marelsdóttir, 2010). Later events, such as the explosive Grímsvötn eruption in 2011 (Oddsson, Gudmundsson, Larsen, & Karlsdóttir, 2012) and the Holuhraun eruption 2014 – 2015 (Gíslason et al., 2015; Schmidt et al., 2015), revived this interest.

Thus the landscape for crisis communication during eruptions in Iceland had changed dramatically. This has called for new and improved procedures for the crisis communication efforts, as they are conducted on a much larger scale than previously was necessary. With limited financial and human resources due to the small population of the country (332,750 people, end of year 2015 (Statistics Iceland, 2016b) and predicted increased volcanic activity in Iceland in the future (Compton, Bennett, & Hreinsdóttir, 2015; Pagli & Sigmundsson, 2008), it is a significant challenge to meet this sudden and broad need for crisis communication.

1.1 Problem statement

The concept of “best practice” has been widely used by researchers to describe methods and routines that have proven to be effective in order to improve organizational performance in various areas, crisis communication being one of them (Seeger, 2006). Some of those research results have been used by public authorities responding to crisis (Sellnow & Seeger, 2013) and developed into official handbooks or guidelines on crisis communication. Thus best practice-analysis is widespread and considered an important tool for improving communication performances of organizations in crisis situations, by

building upon past experiences, detecting shortcomings and correcting them (Veil, Buehner, & Palenchar, 2011).

Even though crisis communication best practices already identified can be generalized for different organizations to a certain extent, it is important to keep in mind that “widespread adaptation of best practices should be undertaken cautiously with a firm understanding of contextual factors and situational variables” (Seeger, 2006, p. 233). Therefore, identifying Icelandic best practices for crisis communication, with consideration to Icelandic geological and social conditions, is important. Despite the urgency, this specific field of research has been left unattended so far.

1.2 Objective and research questions

The objective of this study is to investigate what practices have been successful and what practices need improvement in official communication prior to, during and after volcanic eruptions and seismic activity in Iceland. Furthermore, to analyse to what extent previously identified best practices within the crisis communication literature are applicable to the Icelandic situation.

The following research questions guided the study:

- 1) What methods work well and what are the main shortcomings in Icelandic crisis communication practice during volcanic eruptions, according to Icelandic official communication servants and journalists working during the Bárðarbunga seismic activity and the Holuhraun eruption that started in August 2014 and ended in March 2015?
- 2) What is Icelandic best practices for crisis communication during volcanic eruptions in the light of those experiences and suggestions from previous research and literature on best practices?

In this study, the Bárðarbunga seismic activity and the Holuhraun eruption that started in August 2014 and ended in February 2015 will generally be referred to as the Holuhraun event, except when specifically discussing the seismic activity in Bárðarbunga or the Holuhraun eruption separately.

1.3 Background

1.3.1 Geological conditions affecting risk- and crisis communication

Iceland lies on the tectonic plate boundaries of the Mid-Atlantic Ocean Spreading Ridge, which makes it one of the most active volcanic spots in the world (Einarsson, 2008). It is estimated that Iceland has had over 200 eruptions since settlement, 1130 years ago (Larsen & Eiriksson, 2008), from its 32 active volcanic systems, of which over 20 eruptions occurred during the past 50 years (*Catalogue of Icelandic Volcanoes*, 2015). Ten percent of the land is covered with glaciers and around one third of the volcanic eruptions in the last century were subglacial, which increases the range of hazards stemming from the volcanic activity. Thus Iceland’s main volcanic hazards comprise lava flows, tephra fallout such as volcanic ash and cinders, jökulhlaups, which are catastrophic glacier outburst floods that, beside carrying water, often carry heavy loads of sediment and sometimes ice

blocks, generating gas emissions and lightning (Guðmundsson, Larsen, Höskuldsson, & Gylfason, 2008). The frequency of these events is expected to increase, especially in the Vatnajökull glacier, as the ice cap of the glacier is melting and thus losing weight rapidly, lifting pressure from the volcanos which increases the likelihood for eruptions (Compton et al., 2015; Pagli & Sigmundsson, 2008).

1.3.2 The Holuhraun event: sequence of events

The Holuhraun eruption started on August 31, 2014, when a fissure opened in the Holuhraun lava-field north of Vatnajökull glacier. This happened after two weeks of intense seismic activity in one of the largest central volcanos in Iceland, the Bárðarbunga, located in the northern part of the glacier (Ágústsdóttir et al., 2016; Sigmundsson et al., 2015). Due to the location of the activity, major floods could be expected if the eruption would have been a subglacial one. The eruption that lasted for six months, or until February 28, 2015, was the largest eruption in Iceland in over 200 years, producing ca 1.5 km³ of lava and emitting volcanic sulphur dioxide (SO₂) by amounts that were at least three times larger than the daily SO₂ emissions from all human sources in Europe in 2010 (Galeczka, Sigurdsson, Eiriksdottir, Oelkers, & Gíslason, 2016; Gíslason et al., 2015; Larsen & Gudmundsson, 2015; Schmidt et al., 2015). As the concentrated SO₂ pollution was carried by wind to all parts of Iceland during the eruption, it frequently violated air quality standards in different populated areas around the country (Rognvaldsson et al., 2015).

1.3.3 Population

Iceland has a population of just over 330,000 people, of which 214,000 live in the greater Reykjavík area. The rest inhabit the remaining 66 municipalities, each with 50 – 18,300 inhabitants (Statistics Iceland, 2016b). Many of the smaller populated areas are remote and characterized by rural farming communities. In addition to the inhabitants, the number of tourists visiting Iceland has been on the rise the recent years; it has increased from 459,000 people in year 2010 to 1,262,000 in year 2015 (Statistics Iceland, 2016a), 80% of which mention Icelandic nature as the primary reason for their visit (Óladóttir, 2015). Thus, foreign visitors are scattered throughout the nature of the country which counts for 103,000 km² (Landmælingar Íslands, 2016).

1.3.4 Institutional structure

There are over 200 governmental institutions in Iceland, out of which more than half have fewer than 50 employees (Ríkiskassinn, 2016). The interviewees participating in this study come from agencies, institutes or departments that were involved in the communication efforts during the Holuhraun event, and have between 9 and 130 employees, according to their websites. The institutions' involvement in the crisis response and communication is determined by their roles as defined by laws and regulations. Thus, some have direct roles in the crisis response, some are monitoring bodies, some are research institutes and some are responsible for health promotion and health hazard prevention.

The District Police Commissioners in Iceland are in charge of all civil protection operations within their jurisdictions ("Civil Protection Act no 82/2008," 2008), and in the case of the Holuhraun event, it was the District Police Commissioner in North-East Iceland who was in charge of the operations in the most affected areas. Meanwhile, the Icelandic

Civil Protection, a department of 9 people working under the National Commissioner of Police, is responsible for coordinating emergency plans, both general ones for various types of hazards, regardless of location or likelihood, and specific ones for highly likely events, such as large earthquakes and volcanic eruptions. The Civil Protection department is also responsible for the organization and coordination of the crisis response, including relief and rescue operations at the national level in emergency situations. The heart of this coordination is the National Crisis Coordination and Command Centre (NCCCC), which is activated during crisis. There, representatives of the relevant civil protection response bodies coordinate actions necessary for relief and rescue under the command of the Civil Protection department. These bodies are typically from the Icelandic Coast Guard; the Directorate of Health; the Metropolitan District Fire Brigade; the Icelandic Red Cross; ISAVIA, which is responsible for air navigation; and/or the Icelandic Association for Search and Rescue (ICE-SAR), all depending on the nature and the scope of the event. The Civil Protection department works in close contact with relevant institutions monitoring the event and responsible for acting on diverse risks and bases its decisions on knowledge gathered from their scientists and experts who form the Scientific Advisory Board of the Civil Protection (SAB) (Almannavarnadeild Ríkislögreglustjóra, 2016; "Civil Protection Act no 82/2008," 2008).

The Icelandic Met Office (IMO) monitors natural hazards, such as volcanic activity in Iceland, and issues warnings when needed and possible ("Lög um Veðurstofu Íslands nr 70/2008," 2008; Veðurstofa Íslands, 2016), and the Institute of Earth Sciences is an academic research body centred on Icelandic geology (Jarðvísindastofnun Íslands, 2016; "Reglur um Jarðvísindastofnun Íslands," 2012) – both were therefore involved in the crisis response through the SAB from the start of the seismic activity of Bárðarbunga and throughout the whole eruption. Upon the discovery of the magnitude of the SO₂ gas emissions carried by the prevailing winds to populated places, the Environment Agency, which is responsible for monitoring air quality ("Lög um Umhverfisstofnun nr. 90/2002," 2002; Umhverfisstofnun, 2016), became involved as well as the Directorate of Health, which is responsible for public health issues and health hazard prevention (Embætti Landlæknis, 2016; "Lög um landlækni og lýðheilsu nr. 41/2007," 2007). As the eruption continued, questions arose on environmental safety for people working outdoors as well as the safety of livestock – thus the Administration of Occupational Safety ("Lög um aðbúnað, hollustuhætti og öryggi á vinnustöðum nr. 46/1980," ; Vinnueftirlitið, 2016) and The Icelandic Food and Veterinary Authority ("Lög um Matvælastofnun nr. 80/2005," ; Matvælastofnun, 2016) were brought to the table as well.

The Civil Protection department does not employ an information officer, nor does the IMO or the Institute of Earth Sciences. Instead, the two latter institutions have received professional communication help from related bodies (the Ministry for the Environment and Natural Resources and the University of Iceland) and the Civil Protection department has “borrowed” communication experts from diverse Ministries and governmental institutions as well as from ICE-SAR in case of large events.

2 Literature review

2.1 Definitions

When studying crisis communication, definitions of crisis and crisis communication are important. Scholars have defined crisis in various ways from different standpoints as Coombs (2010) points out, himself suggesting the definition of crisis as “the perception of an unpredictable event that threatens important expectancies of stakeholders and can seriously impact an organization’s performance and generate negative outcomes” (p. 19). Here, the emphasis is on the perception of crisis, which reflects the uncertainty due to possible negative outcomes. This is highly relevant for the focus of this study, as uncertainty is usually a distinctive feature of volcanic and seismic activity – even when eruptions do not pose immediate threat to inhabitants they have the potential to do so, and thus alarm stakeholders to prepare for the worst.

On the other hand, it could be argued that the focus on the organization itself is not as prominent when it comes to official crisis communication during natural disasters, as it’s somewhat obvious that the disasters are not caused by the organization in question. Or as Heath (2010) puts it: “no force could stop the storm” (p. 7). However, an organization’s performance and reputation becomes relevant the moment the organization fails in the crisis response, and thus becomes vulnerable to critique. This was the case e.g. under the Hurricane Katrina disaster in 2005 when the credibility of the responsible agencies was weakened due to the mistakes they made in the crisis response, making the following efforts more problematic (Sellnow & Seeger, 2013).

It has also been pointed out that damaged reputation can effect legislators who determine funding of governmental agencies (Heath, 2010). It is important to bear in mind though, that preserving organizational reputation can never be the main goal of official crisis communication during natural disasters, even though feasible so the organization can be better equipped to fulfil its role in hindering harm and secure public wellbeing. Again, Heath (2010) points out the obvious when stating that by concentrating on restoring a damaged reputation, the official agency involved in the crisis might ignore the magnitude of the crisis.

Reich and Korbas-Magal (2011) definition focuses on the public organizations’ role, rather than that of private companies: “As a crisis we define situations which require an emergency response from public organisations. These could be major accidents, natural disasters or criminal activity (i.e. a school shooting or act of terrorism), and thus both intentional and unintentional crises are included” (p. 17).

When it comes to crisis communication, Coombs (2010) argues for a broad definition: “the collection, processing, and dissemination of information required to address a crisis situation” (p. 20). Such a definition applies to all three stages of the crisis preparations and response: pre-crisis, crisis and post-crisis. This is in line with definitions that focus on crisis communication as an ongoing process which is characterized by the different phases of crisis (Reich & Korbas-Magal, 2011; Sellnow & Seeger, 2013).

The three-phase framework is a highly relevant focal point when it comes to analysing best practices (Heath, 2010) and is used by scholars and managers worldwide to describe and emphasize the different phases of crisis, all of which are important to attend to. The pre-crisis stage is characterized by “an emerging threat of pre-critical uncertainty”; the crisis stage starts with a “trigger event and a general recognition that a crisis has indeed occurred”; and the post-crisis stage is initiated when “some sense of order is re-established” (Sellnow & Seeger, 2013, pp. 31-32).

However, one should note that scholars discuss crisis communication from different focal points. For example, in three parallel articles on best practices of crisis communication (see chapter 2.2), Seeger (2006), Heath (2006) and Sandman (2006) all have their different views of definitions of crisis and/or crisis communication. While Seeger focuses on crisis communication as a type of public relations, first and foremost intended for repairing damaged reputation of organizations, Sandman disputes the reputation repair focus. He points out that the Seeger definition is better described as outrage management of companies while the true paradigm of crisis communication is to help the public to bear crisis and guide them through it. Meanwhile, Heath concentrates on the inherent nature of the concept of crisis, which he considers risk manifested.

2.2 Best practice theories

Seeger (2006) defines best practices as a “general set of standards, guidelines, norms, reference points, or benchmarks that inform practice and are designed to improve performance” (p.233). He describes the following ten general best practices for crisis communication: process approaches and policy development; pre-event planning; partnerships with the public; listen to the public’s concerns and understand the audience; honesty, candour and openness; collaborate and coordinate with credible sources; meet the needs of the media and remain accessible; communicate with compassion, concern and empathy; accept uncertainty and ambiguity; and messages of self-efficacy.

However, Seeger (2006) points out that some of the various goals of crisis communication may conflict. Also, that crises vary significantly, are dynamic and unpredictable. Thus, procedures developed and described before a crisis struck are not likely to match the exact crisis situation at hand.

Heath (2006) and Sandman (2006) refine and add to the best practices defined by (Seeger, 2006). For example, Heath (2006) emphasizes the importance of communication, not only during the crisis but also before and after (pre-crisis and post-crisis). He points out that while it is important to create partnerships with credible sources, it is also important to recognize that not all sources are credible – and some of them might be listened to by the media. It is noteworthy that even though the article is written in the infancy of social media, Heath underlines the internet as a tool accessible for anyone to give information, which makes it even more important for the organization to be the first and best source of information. He adds the following two best practices to those defined by Seeger: to realize that crisis response is a narrative; and the importance of being committed and able to deliver on the promise to be the first and best source of information. In his article, Sandman (2006) offers some refinements to Seeger’s original research. He agrees with the bulk of it, with one exception: he contradicts the practice to collaborate and coordinate as he disputes the effort of coordinating a single, credible message. Finally, Sandman stresses

the importance of realizing that the best practices are very hard to achieve, almost impossible to his mind, and thus serve first and foremost as aspirational goals.

Seeger (2006) follows in the footsteps of Covello (2003), who three years earlier described seven best practices for public health risk and crisis communication: to accept and involve stakeholders as legitimate partners; to listen to people; to be truthful, honest, frank, and open; to coordinate, collaborate and partner with other credible sources; to meet the needs of the media; to communicate clearly, and with compassion; and to plan thoroughly and carefully. As the listing indicates, the two scholars agree on most accounts – Covello’s list is somewhat shorter than Seeger’s, but in turn he provides quite descriptive guidelines on how to achieve the goals set by the best practices. What Seeger provides beyond Covello, though, is a solid scientific research theory where the best practices approach is suggested as a tool for improving crisis communication processes (Seeger, 2006).

In a meta-analysis of existing studies on best practices for risk and crisis communication, Reich and Korbas-Magal (2011) summarized 42 main books and articles on the subject, identifying 38 best practices for risk and crisis communication. Recognizing the need for placing them into the context of the real situation at hand in each case, their advice is not to “take any of the suggested practices at their face value” but rather “consider them carefully as initial options” (p.157). This reflects in the opinion of McConnell and Drennan (2006), who point out that there are no universal rules to be found with regards to crisis management. Rather, the sets of principles developed by analysts and practitioners should be formed into practical working procedures. The same notion is to be found in the Perry and Lindell (2003) review of community and emergency preparedness, as they state that a single master-plan serving all communities effectively does not exist.

In addition to the literature review, Reich and Korbas-Magal (2011) conducted a field study consisting of interviews with communication personnel at seven public agencies in Israel and thus identified 37 best practices in their crisis communication procedures. The authors group the best practices found in the two studies into the categories of pre-crisis, crisis and post-crisis, with some of the best practices applying to more than one category. As the authors claim that their literature review offers the largest list of best practices, it is important to bear in mind that this variety of best practices boils first and foremost down to the level of details of the descriptions, while these best practices could be fitted into a tighter frame using more general descriptions. What is interesting, with the current study in mind, are the differences the authors found between literature-based best practices and practices used by the studied organizations. They conclude that this is, partly at least, due to work overload leading practitioners to take short-cuts towards their goals and thus hindering them from using literature-based best practices in their every-day practice. This might be a contributor to why the authors argue that no best practice should be taken at face value but rather considered as an option – something that is even more relevant taking the specific circumstances of a local organization or institution into account. Also, it is important to bear in mind that best practices need to be subjects of continuous assessment and improvement to prevent them from becoming outdated (Veil & Sellnow, 2008).

2.3 Social media and ICTs

An increasing focus is on the use of social media and information and communication technologies (ICTs) within crisis communication research. By reviewing relevant

literature, Veil et al. (2011) elaborate on how to use social media when following 11 best practices, 10 of which were identified by Seeger (2006), with the aim of improving communication in risk and crisis management.

Eriksson (2015) provides an interesting view on how those newer communication technologies are altering the practice of crisis communication. Thus, the need for improvisation is rising within crisis communication as the use of social media and ICTs is getting increasingly common. At the same time, rigid crisis communication plans and rules on dos and don'ts of crisis communication do not allow for this much needed flexibility. Thus, effective crisis communication is now "more about experienced and involved crisis communicators who improvise in close relation with the material at hand" (p. 517).

This is in line with the results of Olsson (2014), who examined the communication practices during the major Queensland floods in Australia 2010/2011. She found out that organizations focusing on resilience, as in contrast with organizations that focus on their own reputation, need to rely more and more on discussion, decentralization and improvisation, all aspects important for the organizational use of social media during crisis.

Furthermore, studies conducted by St. Denis, Hughes, and Palen (2012) on a virtual operational support team (VOST) during a 2011 wildlife fire in Oregon US that lasted for three weeks, indicates that social media and ICTs can be valuable tools for utilizing outside voluntary communication support, especially in case of long lasting periods of heavy communication workload under uncertain conditions.

2.4 Official guidelines

In many countries, studies of best practices have been developed into official crisis communication guidelines, intended to improve and develop crisis communication procedures and plans. Examples of this are the Swedish Emergency Management Agency Crisis Communications Handbook (2008); the New Zealand Ministry of Civil Defence and Emergency guidelines (New Zealand Ministry of Civil Defence & Emergency Management, 2013); and the Norwegian guidelines for risk- and crisis communication (Direktoratet for samfunnssikkerhet og beredskap, 2014). Moreover, guidelines have been made on the use of internet and social media in crisis communication (Eriksson, 2014; McSaveney et al., 2014).

2.5 Theories on learning

Learning is a key element in crisis communication, as crisis response is to a large extent based on what has been learned from previous crisis events. This has motivated numerous scientists to study the effects of learning on the process of crisis communication. The bulk of this research is aimed at corporations' reputation and blame avoidance strategies (Olsson, 2014). This is as private corporations often find themselves in the position of having caused the crisis which sometimes induces them to communicate in a defensive and reactive way (Larsson, 2010). That situation is not prominent in the cases of public institutions and authorities responding to natural disasters (Heath, 2006). However, it is possible to apply the literature of organizational learning to public institutions, not in the least as learning from crises can lead to meaningful and positive changes in the organization's communication strategies (Sellnow & Seeger, 2013).

Best practice models can serve as tools for evaluation of crisis planning and response efforts in a post-crisis review as done by Veil and Sellnow (2008). They suggest that the best practice models can be used for detecting errors in order to correct them and thus ensure that the organization learn from them. In their opinion, crisis is a potential trigger point for new learning processes of the organization and thus can help reconstructing or improving communication processes that turn out to be outdated or inoperative. Thus the organization draws a lesson from the experiences of the crisis and changes accordingly.

This is in line with Larsson (2010), who refers to organizational learning as “efforts where individuals and collectives in organizations [...] gain knowledge from the past in order to deal with the present, or use knowledge from an earlier crisis when managing a new crisis, especially to correct previous shortcomings and mistakes” (p. 714). Here, Larsson underlines the element of experience as an important feature in crisis communication. Thus, learning from crisis plays an essential role in crisis response and communication.

As evident from the citation above, Larsson focuses on the personal or individual experience as the core of the organizations’ learning-process, similar to what Popper and Lipshitz (2000) presented. One of the prerequisites they identify for successful organizational learning is a learning culture which incorporates learning mechanisms, such as post-event reviews aimed at improving the organizational performance in the future, and a willingness to receive an honest feedback. They also mention accountability as a term for being willing to learn from mistakes in order to avoid them in the future. Their focus on a high level of environmental uncertainty, as one of the factors that characterizes organizational settings that are likely to yield learning, is also of interest for the current study. Not only is a clear connection between environmental uncertainty and organizational learning established, but moreover is the latter considered vital for the survival of organizations that operate in uncertain environments.

3 Method

Data was collected in qualitative interviews with 14 information officers, experts, scientists, spokespersons and managers at 9 public and one non-governmental organizations responsible for crisis communication and active as such during the Holuhraun event 2014 – 2015, the latest of large-scale volcanic eruptions in Iceland. Nine of them were also active in communication efforts during the Eyjafjallajökull eruption in 2010. Five journalists working for the three largest mass media organizations in Iceland, covering the Holuhraun event, were also interviewed, all of which also worked on covering the Eyjafjallajökull eruption in 2010. These 19 people were interviewed in 20 interviews, 11 with men and 9 with women, one of which was interviewed twice with 10 months in between. The interviews were conducted in April and May 2015 and in February and March 2016, and lasted from 22 minutes to 2 hrs 03 minutes, dependent on whether the interviewee was involved in the crisis communication process as a whole or merely a part of it.

The interviewees represented all key institutions and one non-governmental organization that were involved in the crisis communication effort during the Holuhraun event: three interviewees from the Icelandic Civil Protection department; two from the IMO (the state volcano observatory); two from the Institute of Earth Sciences at the University of Iceland; and one from each of the following organizations: the Environment Agency of Iceland, the Icelandic Directorate of Health, the Administration of Occupational Safety and Health, the Icelandic Food and Veterinary Authority, the Ministry of Foreign Affairs, the District Police Commissioner in North-East Iceland, and the Icelandic Association for Search and Rescue that has a defined role in the Icelandic crisis response (see chapter 1.3). Two media representatives came from the Icelandic National Broadcasting Service (RÚV) radio and television; from the 365 media corporation, a representative from the Channel 2 television news was interviewed, and another one writing for the Fréttablaðið newspaper and Visir.is news site; and finally a representative from the Árvakur media corporation working for the Morgunblaðið newspaper as well as the news site Mbl.is.

The interviews were semi-structured, using open-ended questions drawing primarily on the work of Seeger (2006), Sandman (2006), Heath (2006) and Covello (2003) on best practices as well as recent literature on Social media use in crisis communication, such as Eriksson (2015) as well as Veil, Buehner and Palenchar (2011). Norwegian, Swedish and New Zealand's official guidelines on crisis communication and official guidelines on internet and social media use in crisis communication also served as background for questions.

The interview data was analysed using the constant comparative method (Merriam, 2009), where the three-stage model of pre-crisis, crisis and post-crisis (Sellnow & Seeger, 2013) served as a framework. The thematic categorization was loosely based on themes from the theoretical best practice framework as well as the experiences of the respondents, as reflected in the interviews.

4 Results

There was no doubt in the mind of the respondents that the Eyjafjallajökull eruption in 2010 was a triggering point for the development of the crisis communication procedures that have been evolving ever since. During that eruption, a sudden need for information arose from the international media of a magnitude not known before during volcanic eruptions. In a matter of hours, communication and media relations became one of the largest tasks of the crisis operation, according to respondents – a situation that was totally unforeseen:

“The phone started to ring around 5:30 am and it was the Turkish television, then the Israeli television and then the BBC and CNN and...I was blocked from doing anything else. Just before lunch I realized that it was soon 12 o'clock and the only thing I had been doing was interviews with some foreign media. And then...we were drowned, we totally just drowned this morning” (A crisis response manager).

In the wake of the Eyjafjallajökull eruption, respondents report that later eruptions in Iceland have invigorated the international media interest to the degree that as soon as an eruption is anticipated the “*phones start ringing*” at relevant institutions like the IMO, the Institute of Earth Sciences and at the Civil Protection department. At the same time, the Icelandic media is obviously in intense need of information.

The respondents reported that the small sized institutions are generally understaffed and therefore vulnerable to sudden deviations from their daily operation or absence of employees. Many respondents reported an immense workload caused by the increased need for information during previous eruptions, Eyjafjallajökull in particular – in some cases the conditions were described as “*inhuman*”. Reinforcements were needed, and in spite of external help, some respondents worked long shifts lasting for as long as needed, depriving them of sufficient rest over long periods of time.

The uncertainty of the situation added to their tiredness, especially with regards to the length of the event. The Holuhraun event lasted for six months of crunch time that called for great endurance. An example of this was how the airborne SO₂ contamination turned suddenly up in different places around the country throughout the whole period and thus every time triggering a new and sudden information need from the respective inhabitants. At the same time, some of the institutions needed to carry out other urgent tasks, such as preparation measures undertaken by the Directorate of Health because of the Ebola epidemic and response measures conducted by the Environment Agency and the Civil Protection department when a stranded ship imposed a threat of oil leaking into the ocean. Both these tasks were carried out simultaneously as the Holuhraun event evolved.

This changed reality, of a broader and more intense information need during volcanic eruptions in Iceland, has led to new crisis communication procedures at the respective institutions. In the following sections, experiences of the study participants on communication efforts during volcanic eruption are described, as reflected in the qualitative interviews conducted for the research. Those experiences reveal nine main

features that have proven to work well or, in some cases, are considered missing in Icelandic crisis communication practice during volcanic eruptions, according to the respondents. These nine elements will be further discussed in chapter 5.

4.1 Perceptions of integrating communication efforts into the managing process

Respondents spoke repeatedly about how the communication efforts were prioritized and integrated into high level decision making within the main response and monitoring bodies during crisis. They described the dedication of managers as an important feature during the crisis response of the Holuhraun event. Most experienced that managers prioritized communication efforts, and that communication was discussed at meetings where decisions were made during crisis. The respondents considered this important and effective in the communication efforts.

It was explained as an example of the importance given to the communication efforts that a team of communication experts was physically allocated a central area at the NCCCC and thus became a central entity for the crisis response system during crisis. Also, that during the first weeks of the Holuhraun event, a communication officer was always working side by side with a crisis communication manager, even when staffing counted as few as two persons. The respondents felt this showed that the communication efforts were high on the agenda during the crisis, which they considered vital for the success of it.

However, the respondents experienced shortcomings with regards to day to day communication and preparation. Respondents from central bodies explained that their institutions did not employ a communication specialist, even though the need for one was recognized within their institutions. Some respondents reported that communication was left out in preparations for the crisis response and felt that this needed more attention. Others said that oversight of the communication was missing. One said that an analysis of the communication vulnerabilities was needed. Only few reported that their institutions had a specific policy for the communication, and surveys conducted by the institutions on the communication efforts were almost non-existent. Still, academic research regarding the communication efforts was on-going, supported by, or in cooperation with, some of the institutions.

4.2 Experiences of institutions cooperating on communication efforts

Respondents experienced that cooperation between key institutions and organizations was a fundamental feature in Icelandic crisis preparations and response. The SAB was said to be an example of this and described as a highly effective measure. The board consists of scientists and experts from institutions with a designated role during volcanic eruptions. The board was reported to be summoned together and meet regularly during eruptions – daily if necessary, as was the case for the bulk of the Holuhraun event, and regularly between events, both prior to an event and in the aftermath of it. The respondents felt that this was essential for the communication efforts, not in the least as the members of the board would thus become personally acquainted already before an event.

Besides giving response bodies the scientific basis on the development of the natural hazard at hand, respondents found it highly useful that messages were coordinated at the SAB, and that the board discussed what needed to be added to the information already given. This was presented in the form of a detailed factsheet on various aspects of the eruption presented to the media, the international scientific community and the public, after each board meeting, and considered by the respondents to play a vital role in meeting the need for information (see section 4.5). The board was described as a forum where small institutions supported each other, exchanged opinions and settled dispute, made personal connections, improved information flow and prevented misunderstanding, all considered essential features for the communication.

A cooperation network between institutions and organizations outside the SAB was also considered important for the communication, although the structure of it was reported to be less established. One respondent reported that during the Holuhraun event, he would have preferred to have been involved sooner in the process when discussing issues and coordinating messages related to the responsibilities of his institution. For future references, he felt that the participation of his institution should be formalized in one way or another. Another respondent felt that the network should be more active between events.

All in all, the respondents felt that the institutional cooperation was highly positive as they found it contributed to a better understanding, more flow of information, prevented misunderstanding and increased trust between parties. The respondents underlined, though, the importance of clear division of responsibilities, as they found it essential to prevent friction between the institutions, not in the least as such friction seemed to find its way easily into mainstream media. This was confirmed when a media respondent addressed this matter describing the friction as peculiar:

“The information on the gas [...]. It was very strange. You know, the institutions did not agree [on that matter].”

Another form of institutional cooperation, described as successful, was the communication team summoned together during large events of natural disasters. According to the respondents, the members of the team are professional communication officers from various ministries and institutions that are responsible for subjects related to the event. The team worked at the NCCCC under the command of the Icelandic Civil Protection department. The officers took shifts working on communication and media service during the peak of the event, 24 hours a day if needed. This was considered to relieve pressure of information communication from institutions under heavy strain, which had few or no resources for the task. The respondents from institutions that utilized this service described it as vital in coping with the information pressure: *“I’m convinced that we would have winded up in a lot of trouble without it,”* a respondent from a central institution reported. Also, the communication experts were said to serve as important contacts to the institutions they came from, as the large scale event of a volcanic eruption crosses the subjects of most ministries and many institutions.

According to respondents, the communication team is based on a culture of helping out. *“It seems like everybody is willing to lend a hand when something like this happens,”* a manager at the NCCCC reported. However, as the team consists of officers working for institutions and organizations “lending” those resources to the NCCCC out of “goodwill”,

the need for formal procedures to ensure these resources in case of crisis was underlined by some respondents.

4.3 Impressions of coordinated messages

Coordinated messages were a returning issue of respondents, as they experienced them as essential for building trust and reduce uncertainty. Or as a senior crisis coordination manager phrased it:

“It is totally, totally essential for public trust, that key-players that communicate information are together, and work together on it.”

Furthermore, respondents felt that when messages were not coordinated, communication efforts became more difficult as this opened up a window for confusion and misleading or wrongful information that would result in uncertainty and distrust and require extensive resources to rectify. This was e.g. the case when remarks of so called “*armchair specialists*” got wings in the media.

It was considered effective that the SAB coordinated messages, as well as ensuring other kinds of institutional cooperation in coordinating them. Respondents also found it useful that disagreement on the content of the message was resolved in meetings between institutions, and the same applied to the common practice of not presenting minority opinions if they were not applicable to different scenarios that were a part of the official message (see chapter 4.4).

The respondents found it helpful to forward the coordinated messages not only to traditional information channels, but also to key players within governmental and administrative entities such as ministries and government, institutions, municipalities, Icelandic embassies abroad and foreign embassies in Iceland, as these entities were likely to comment on the situation in the media or in personal communication with the public. Last but not least, it was considered important to inform the Icelandic president as, during the first days of the Eyjafjallajökull eruption, he compromised the sleepless communication effort with a public statement in an interview with BBC television that contradicted greatly the main message so far. In the interview he claimed that an even worse scenario could be expected if the volcano Katla would erupt, as he truthfully claimed was expected in near future.

Respondents all emphasized the importance of coordinated messages. However, one of them simultaneously recognized the importance of different scientists working within the academia having the freedom of expressing their educated meanings on the event, even though they might be contrary to the conclusions of the SAB. Still, as the coordinated message was presented in the form of joint press releases or directly from the spokespersons officially “in charge” of the event, all respondents, within institutions and the media, agreed that contradictory meanings that got the attention of the media did not compromise the “one voice” nature and effect of the coordinated message.

4.4 Reflections on truthful, honest and transparent information

Respondents from the governmental bodies felt generally that their organizations had the public's trust, a notion that was reflected by the media respondents. The most important feature for acquiring or maintaining trust was believed to be providing the public with information that was truthful, honest, candid, transparent, trustworthy, clear and complete. Thus respondents from the institutions explained that a great emphasis was placed on this in their communicating practice. This was also considered vital on the grounds that the information concerned public security as well as economic interests of diverse stakeholders.

Most of the respondents underlined that it was never an option in their practice to give wrongful information or lie, as this could increase the contingency of the situation and generate tension or unwanted reactions. The difficulties of lying were also pointed out, as the liar would need to memorize what he had said. At the end of the day, the truth would likely be revealed.

Furthermore, according to the experiences of diverse respondents, it was important that communicators would stick to facts and avoid speculations. At the same time, they should be cautious in their statements in order to avoid unnecessary panic. Thus the communication was described as “*an art of balance*” – one should not exaggerate the imminent danger but at the same time not trivialize it. Additionally, it was pointed out that messages in the media on e.g. evacuations could be delicate, as people with dishonest intentions could misuse them.

In cases when information was not available, respondents reported that the practice was that spokespersons simply said so and explained the uncertainty of the situation. At the same time, it was considered helpful to inform about measures taken in order to reduce this uncertainty, whether it was additional measuring instruments that were expected or information that was being collected. This was highly relevant upon the discovery of the SO₂ gas pollution from the Holuhraun eruption, travelling with wind from one part of the country to another. Respondents explained that the public was informed that the Environment Agency didn't have the equipment needed to monitor the air quality with regards to SO₂ contamination around the country, as this was the first time the agency experienced this situation. Subsequently, providing the equipment also became a question of providing resources for purchasing the appropriate measuring instruments and, finally, to have the manpower around the country to operate the instruments. All of these factors were said to have added to the ambiguity which needed to be explained to the public at the same time as the authorities were trying to sort out the situation and making decisions on necessary measures:

“We never tried to hide that this of course wasn't the most perfect system. And we...just told people exactly how things were and what was the nature of the problem” (Agency communicator).

According to the respondents, one way of tackling the contingency of the Holuhraun event was the daily factsheet by the SAB presented to the public, on different scenarios on possible outcomes of it, ranging from expecting it to be relatively harmless to having large

scale consequences (see example given in Text box 1). Overall, there was good experience with this practice – respondents believed that by introducing different possibilities of the outcome of the eruption, the uncertainty would become easier for the public to understand and their alertness would be increased. They also felt that it underlined the effort of the authorities to tell the whole truth. The disadvantages were said to be that the most serious scene tended to get the most attention, even though it was not the most likely one. Thus this had the potential to cause unnecessary concern. One participant expressed concern over foreign media lacking prerequisites and context to understand the hypothetical scenarios presented. Therefore, scenario presentation should not be a priority in the information provided to the foreign media, according to the respondents' opinion.

Text box 1: Scenarios presented in the factsheet of The Scientific Advisory Board of the Icelandic Civil Protection (SAB) on September 30 2014.

Three scenarios are considered most likely:

- The eruption on Holuhraun declines gradually and subsidence of the Bardarbunga caldera stops.
- Large-scale subsidence of the caldera occurs, prolonging or strengthening the eruption on Holuhraun. In this situation, it is likely that the eruptive fissure would lengthen southwards under Dyngjajokull [glacier], resulting in a jokulhlaup [glacial flood] and an ash-producing eruption. It is also possible that eruptive fissures could develop in another location under the glacier.
- Large-scale subsidence of the caldera occurs, causing an eruption at the edge of the caldera. Such an eruption would melt large quantities of ice, leading to a major jokulhlaup, accompanied by ash fall.

Other scenarios cannot be excluded.

Putting eruptions into the greater context of geological history was described as common practice that some respondents considered vitally important while others found it beneficial without stressing it as important. It was said likely to increase the awareness and vigilance of the public and the institutions, and by keeping the same geological scale in mind when discussing different eruptions, one would prevent the use of superlative adjectives when not applicable.

4.5 Experiences on proactive communication

Respondents described their practice, of taking the initiative to deliver available information out to the media and public in a fast and secure manner, as highly effective. This was said to reduce the need of the media and public to seek individually information within the institutions. At the same time, respondents found it directed the media discussion and questions towards the issues the organizations considered important and correct. Information was delivered in a rapid way, but at the same time it was ensured that the information was correct, as this was believed to increase public trust in the actions taken by the institutions. Similarly, a media respondent experienced that delayed initial

communication response in the starting phase of the Bárðarbunga seismic activity resulted in the journalists' suspicion about information being retained on purpose.

One respondent found it non-effective to focus on comprehensive information at the beginning of the crisis, as collecting information on all aspects of a situation was time consuming and likely to slow down the communication. It was also pointed out that the phones keep on ringing while such material is being prepared, which again increases the workload on the communication personnel who are trying to concentrate on the extensive information package.

According to the respondents, communicators found it effective to present the information in various ways, e.g. in the form of news releases, website news, evaluations, pictures, graphics, models etc., in order to serve different needs of the audience. Factsheets, presented daily by the SAB and distributed to the media and the public through various channels right after the daily board meeting, were considered highly successful, both by communicators and the media. The media reported an extensive use of this material, which presented existing knowledge on the situation in a systematic and concise way with consideration to all main aspects of the event. Thus interested could count on rapid and regular updates on the progress of the event.

However, it was suggested that messages should be customized for different media groups: local media on the one side and the international media on the other. It was pointed out that the international media generally did not need as detailed information as the local media – too many details could even confuse them as they were not familiar with neither the surroundings nor the nature. While local media would be interested in the local effects in details, international media would first and foremost be interested in whether the airspace would close or not.

Respondents found it effective to use different channels for the communication, as the public acquired information in various ways. Apart from the mainstream media, lists of e-mails were used as well as designated telephone numbers for information on the event; local information meetings were held for the public and crisis respondents also met with stakeholders and officials that were likely to spread information; respondents also utilized advertisements, brochures, pamphlets and person to person communication for distributing the information. The web and the webpages of the institutions proved to be effective, and for some institutions their webpages have become core instruments in proactive communication. During the Holuhraun event, extensive amount of information on the seismic activity and the eruption was published via this channel, according to the respondents. In some cases, special subsections of the institutions' websites were devoted to the event. Some of the sites were highly praised by the media respondents for publishing informative and graphical material that was frequently used by reporters, who reported that often this was sufficient information for their news. Thus it was considered important to have a solid and up to date webpage, compatible with latest technology and suitable for fast communication, before the crisis struck. Similarly, the respondents believed that the use of the webpage should be integrated into existing response plans and procedures.

Respondents also experienced social media as a valuable channel in the crisis communication during the Holuhraun event. One communication expert went as far as saying: *"It would have been very difficult to take on this task without the social media. [...] It helped tremendously!"*

Social media was reported to have saved time and diminished communication pressure, as it was easy to use while it also was ideal for graphical information that could be more illuminating than written updates. One of the main advantages was reported to be how easy it was to operate social media and how little text was required to post any kind of information – thus it was possible to publish information with minimum effort and without hesitation, according to the respondents.

Additionally, social media proved to be fast, and it provided a platform where the institutions and the public could interact directly in an informal manner and with human tone, all of which were considered features likely to increase trust. This was reflected by the positive public response during the Holuhraun event:

“The tone was a little bit [...] calming, because there often is a lot of agitation around these things. I remember [when] two [of our employees] had flown to Húsavík village [in North Iceland] to participate in a meeting with the residents. And it was, of course, the most dangerous area to start with, because of flood-risks. So they had several residents’ meetings. So, two of our employees flew up there and it was this beautiful weather in this area and [...] we wanted to have a photo from the meeting, of people where they were discussing this matter. But they hadn’t taken a photo at the meeting. However, they had taken a photo of some goats! And we posted them and pointed out that these goats were totally calm. That was considered quite neat” (A communication officer).

Respondents pointed out that social media accounts should be established and have a solid group of followers before crisis to ensure a group of audience; otherwise it would be like “having a non-working megaphone.” However, in the case of the Institute of Earth Sciences, Facebook and Twitter accounts were created during the Holuhraun event, with a considerable success, especially with the Facebook account where the numbers of followers went to 8000 people during the first week. In March 2016 the page had around 12.000 followers. Other respondents from institutions using social media also experienced rapid increase in their group of followers during the event.

The respondents reported that they were trusted with posting statuses and tweets and using the social media in general without supervision of their executives. This was considered important for the flow and fast use of this tool. At the same time, the media respondents reported using the institutions’ social media sites as resources for information, and communicators experienced relieved pressure from foreign media because of the social media use:

“We noticed a lot less pressure in the National Crisis Coordination and Command Centre from the foreign media this time, compared to previous events, because we were much more aware of wallpapering the web with [...] information” (A crisis management officer).

The information presented in social media was also said to give the media a focus for their inquiries. Finally, it was reported that in a recent storm event, social media proved to be important when the storm lead to power failure in certain areas. According to respondents, during that event smartphone users acquired information via social media, as mobile transmitters were not vulnerable to the power failure and kept on sending out the necessary 3G and 4G signals.

Respondents reported that during the Holuhraun event, response bodies used mobile technology to send text messages to every mobile in the areas that were affected, and this was seen as successful:

“People got [text message] warnings in their mobiles when the [SO₂] concentration measured high in their area [...] I felt this relieved a little bit, and people were happy with this” (A communication officer).

It was also found to be successful during eruptions to issue warnings in the form of online forecasts on the IMO web site where expected ash and/or gas distribution was reported on daily bases.

4.6 Impressions on being accessible and having a good relationship with the media

Respondents experienced that the small population of Iceland engenders an informal and a personal communication between key players within the institutions and the media. Thus the relationship between them was characterized by mutual respect, trust, understanding, honesty and candid interaction. *“No journalist who is reporting from a natural disaster wants an interviewee that looks bad. That is not the goal of the media,”* one spokesperson pointed out, underlining that there was no reason to distrust the media, and then he explained further:

“The media wants their viewers to believe that both the reporter that conducts the interview and the person he is speaking to know better than anyone everything about the things they are discussing.”

However, respondents pointed out the fragile nature of this relationship and that trust could be easily lost. In one case breaches of confidentiality between an institution and a specific media was reported.

According to the respondents, it was the common practice that scientists and specialists at the main institutions (such as the IMO, the Institute of Earth Science, the Environment Agency and the Directorate of Health) and the highest ranking executives at the Civil Protection Department gave interviews to the media, as these were in possession of the in depth knowledge the media required. It was common that the journalists were given access to private mobile numbers of specialists and executives in order to be able to reach them when needed, even during nights. This was considered important. However, it was also reported that for periods of times this access could become a burden when the phone rang around the clock, especially when the respective specialist was off duty. In one case it was reported that a scientist handed his private mobile over to a co-worker during nights in order to get much needed sleep. The co-worker would then only call his home-number in case of a call that constituted an emergency.

The double role of scientists being spokespersons as well was reported to create conflicts, as their fundamental duties were to monitor and investigate the eruption. According to respondents, one way of solving this was to have experts taking shifts as spokespersons, e.g. by carrying a designated media-mobile whose number was given to the media. This gave the rest of the employees an opportunity to concentrate on their much needed work.

One institution reported having good experience with allocating time-slots with experts for the media in order to reduce the constant queries for interviews. Another institution reported having positive experience with a special e-mail address for inquiries from the media and the public on the eruption and its consequences.

All in all, respondents emphasized the effectiveness of being accessible to the media, both in terms of providing relevant information and interviewees. Lacking accessibility was reported to make the media turn to other resources, risking wrongful or misleading information that could be difficult to rectify.

The respondents reported their institutions to have good access to the media when in need for coverage during crisis as well as before and after an event. One communicator reported that when the SO₂ gas pollution was first discovered, he was able to use his personal relationship with a media person to get warning messages on prime time national broadcast service TV, RÚV, which was airing a live national fund raising program the same evening:

“It was immediately possible to get out the basic information: that there was a polluted cloud coming over the village Reyðarfjörður vicinity [in East Iceland] and [...] all broadcasted live.”

Respondents found it highly helpful that communication and media officers working on the communication team at the NCCCC helped out with connecting media and specialists when needed and gave general information when sufficient. This mostly applied to international media, which, according to respondents' experience, constituted a large part of the information need during the Holuhraun event. Meanwhile, Icelandic media was reported to contact spokespersons directly, usually being in need for detailed information, although sometimes also making use of the communication team. A designated phone number was activated for the communication team in the NCCCC during recent eruptions, a practice generally described as successful.

All in all, the media respondents reported having good access to trustworthy information as well as high ranking and experienced spokespersons and specialists that gave a clear and trustworthy message in plain spoken language.

The national broadcast service, RÚV, has a small studio at its disposal at the NCCCC, which RÚV respondents found helpful. The studio was reported to have been set up years ago due to the legal status and responsibility of RÚV as a part of the national crisis response measures. Also it was reported that because of this official role, RÚV is alerted as soon as scientists believe an eruption or other kind of natural hazard has started or is about to start, a measure considered effective by the RÚV respondents. Other media respondents reported to also have good access to the NCCCC, but called for a similar alert in case of an eruption.

The warnings and forecasting room at the IMO where seismic activity is monitored was also described as a magnet for Icelandic and international media that were said to have turned up unannounced over the years and thus disturb and surprise the employees. An access system installed in the IMO buildings was reported to have solved this problem to a large extent.

A significant tension was reported during the Holuhraun eruption as the media respondents working on site of the volcano complained over access restrictions that made it more difficult than usual to report from the heart of the event. The media respondents reported that this was the first time they experienced such extensive closures of a designated area around an eruption site, and even though they were able to gain access to the area under certain conditions, they complained over the criteria they needed to fulfil being too rigorous. Respondents from the relevant authorities were aware of this critique, but argued that the restrictions were necessary due to security reasons, as the eruption site was highly hazardous.

4.7 Perceptions of interacting with and understanding the audience

Informing the public about expected or ongoing eruption was considered effective as well as providing instructions on how they could reduce harm and discomfort caused by the event. It was reported that during the Holuhraun event, people were informed on how to react in case of possible evacuations due to glacier floods; they were urged not to go to the eruption site; and when levels of SO₂ airborne pollution rose above certain levels, they got instructions on how to avoid discomfort (stay inside, close windows etc.).

Respondents reported positive experience from doing this in a direct conversation with the public, e.g. at residents' meetings conducted locally for inhabitants in designated areas before and during an eruption. It was also pointed out that sometimes the media would report from those meetings and thus spread the information beyond those who attended. It was underlined as effective that at the meetings experts and specialists not only informed locals on what to expect and how to react but also listened to their concerns and ideas as well as their advice. They were said to benefit from the public's knowhow and material, such as photos taken by them, which was described as valuable information for scientists' research and evaluation of the event. It was reported that locals often turned out to be right in their perception of the situation, and thus their opinion was highly valued and considered helpful.

It was also considered useful to understand how the residents experienced the event, how they felt about it and what they expected, as their reactions would be an important factor for the crisis response. It was underlined that the information needed to be relevant to the audience and thus sometimes communication was changed and/or improved, following suggestions and critique from residents.

According to respondents, communicators and spokespersons tried to reflect their understanding of the public's situation in how they spoke to the media. It was considered important to communicate with respect, to use plain language and speak to people as equals in order to gain or retain trust. One should be comforting, calming and deliberate, even speak in a light tone in order to reduce the feeling of panic or drama, still without jesting about the situation.

Apart from residents' meetings, other means were considered effective when communicating with the public. Respondents spoke of using mainstream media, educational videos, brochures and pamphlets that were distributed before and during the

Eyjafjallajökull eruption, and contacting individuals on a personal basis. This was done via e-mail or telephone and sometimes by directly visiting the individual in question:

“When the ash-fall was at its peak during the Eyjafjallajökull and Grímsvötn eruptions, then people we needed to inform weren’t monitoring any media. They were just out there in the midst of the ash cloud saving their sheep. So the only sufficient thing was to send somebody to visit them at home” (A crisis response manager).

Reportedly, the public contacted the institutions directly via telephone, e-mail, social media or special features on the institutional websites where people could send in their suggestions and remarks. This happened both prior to and during an event. The respondents also reported success with asking the public directly to help with mapping the distribution of the airborne SO₂ contamination during the Holuhraun eruption via a feature on the IMO website where they could report if they smelled gas in their area.

Respondents spoke of a drill, conducted by the Civil Protection department ten years ago, which they saw as a successful example of cooperating with the public. Residents in designated areas in South Iceland, expected to be affected by eruptions of the Katla and Eyjafjallajökull volcanos, participated and rehearsed on how to react in case of an eruption. According to respondents, the knowledge and information the residents gained during the drill turned out to be highly useful for their reactions during the Eyjafjallajökull eruption in 2010. Respondents also spoke of service centres that were opened for those living in the Eyjafjallajökull area where residents would get information during the eruption. Respondents explained that they found out that it was important to set such centres up in close proximity to the people’s homes and take the situation and needs of the residents into account when planning them. Thus it was decided to offer meals in combination with informative lectures during lunchtime to increase the likelihood of farmers, busy with rescuing their livestock and livelihood, taking the time to come and listen, as they would need to eat anyway.

Over the years, rescue squads have monitored on-going eruption sites with the aim of ensuring the safety of the public that wishes to witness the eruption and guiding them on precautionary measures needed. This is especially current in case of lava eruptions that do not lead to as much ash-fall as sub-glacial eruptions and are therefore easier to watch from a safe distance. Because of this, these kinds of eruptions are sometimes locally referred to as “tourist-eruptions”, as they have become somewhat a tourist-attraction.

Respondents spoke of the importance of having a dialogue with various stakeholders. This was reportedly done in meetings with e.g. the tourist industry, non-governmental organizations and businesses that were effected, both prior to and during the Holuhraun event. Even though authorities decided on security measures that were in conflict of interest of these parties, it was considered important to try to understand their reasoning, especially as those decisions caused tension and dissatisfaction that easily could get public attention.

According to respondents, discussions and opinions expressed in social or mainstream media were monitored to some extent but generally not systematically. Some reported that they heard soon enough, from colleagues or acquaintances, of negative remarks or other relevant issues discussed online. Thus the resources that would go to such monitoring were

considered to be better utilized otherwise. Others considered the monitoring important, as this could prevent misleading or wrongful information to fly off.

4.8 Experiences of improvising in communication efforts

„These are in fact working procedures that just happened, and that was just totally necessary – they were in fact the key to hindering the situation from becoming a total chaos“ (An institutional manager).

Respondents explained how improvisation had been a vital ingredient in their communication efforts over the years. They reported that practices that have become standards in today's procedures were largely improvised out of a sudden need during previous volcanic eruptions, with the Eyjafjallajökull eruption in 2010 as a major trigger point. They described how they were forced to respond quickly and make fast decisions as well as having flexible communication routines because of the uncertainty of the situation. This was said to have been possible because of experienced communicators who found it easy to adapt to new situations and practices, and were trusted to work out the things that needed to be done.

Respondents reported that this has contributed to an overall successful communication. However, it was pointed out by respondents that shortage of written procedures and plans for the communication increased the need for this sort of improvisation. It was furthermore suggested that this should be changed in order to reduce the improvisation need to a minimum.

4.9 Viewpoints on crisis communication planning, preparations and post-crisis documentation

Written procedures, guidelines and plans on the crisis communication was a returning issue of the respondents, or rather – the lack of them. According to them, such plans should include procedures for the communication in whole as well as specific components of it. The procedures mentioned by different respondents were e.g. the use of social media, checklists, clear division of duties, definitions of responsibilities, identified objectives, defined target groups, prioritization of actions, guideline documents etc. Some pointed out that the plans and procedures would need to be dynamic and continuously reviewed in order to reflect best practice at every time. This was considered especially important, as communication technology and the environment these institutions operate within is ever changing.

Another thing that respondents experienced as missing in the preparation phase was communication training and exercise. The fewest of the spokespersons and communicators reported having had practical media training, and even though their institutions had organized or participated in emergency management exercises, communication issues were incorporated to a minimal degree.

Some respondents believed that having a plan or procedures on communication would have been helpful during the Holuhraun event, as it would have increased the communicators' confidence and prevented unnecessary repetition of work. Some reported that to a certain extent they could use procedures written for other kinds of crisis and/or summaries or reports that had been written following previous eruptions.

Such post-crisis documentation was reported to be somewhat coincidental, as summaries were made after eruptions in some cases and not in others. Most respondents reported lack of time, personnel, endurance and/or financing hindering the making or finishing of communication reports following an event, or that other tasks needed to be prioritized. However, it was acknowledged that summary reports would be helpful as...:

“[...] all of these points I did not even have the time to jot down on what could be better handled are bound to come up again next time” (A manager).

Some respondents reported that a summary made by the institution leading the joint communication effort was considered sufficient, even though they were unsure of whether such a summary had been made. A year after the end of the eruption, the summary was still under construction.

5 Discussion

The qualitative interviews with the 19 respondents working on the crisis communication and within Icelandic media during the Holuhraun event 2014 – 2015 reveal nine elements that are considered important and/or successful in communication efforts during recent eruptions in Iceland. Thus the study suggests that they generate a tentative framework for best practices in crisis communication in Iceland. Table 1 lists those best practices and which phase of the crisis communication each practice applies to. The nine elements are discussed further in chapters 5.1 – 5.9.

Table 1 Summary of practices identified as relevant in the different phases of the crisis communication during volcanic hazards in Iceland.

Best practice	Pre-crisis	During crisis	Post-crisis
1. Integrating communication into the managing process	x	x	x
2. Cooperating on an institutional level	x	x	x
3. Coordinating messages	x	x	x
4. Providing truthful, honest and transparent information	x	x	x
5. Communicating in a proactive way		x	
6. Being accessible and having a good relationship with the media	x	x	x
7. Understanding, informing and cooperating with the audience	x	x	x
8. Improvising if necessary		x	
9. Planning, preparing and documenting the crisis communication	x		x

5.1 Integrating communication into the managing process

The respondents emphasis on the importance of integrating the crisis communication into the managing process are consistent with Seeger (2006). However, Seeger underlines that an effective crisis communication should be integrated into all stages: before, during and after crisis. Thus it should include pre-crisis and post-crisis communication activities regarding policy-making, planning, and pre-crisis education as well as informing about what was learned and mending relationships that might have been damaged by the crisis.

All of this should be integrated into the general response planning and decision making processes. The practice of Icelandic managers prioritizing crisis communication during

crisis response is not unique. Previous research has identified that information demand increases significantly from various publics during crisis. Thus the communication efforts become a crucial element for the crisis response, and often a need for having a communication manager placed in the crisis managing group emerges (Larsson, 2010). This is consistent with the Icelandic crisis response experience.

The study indicates that the element of communication needs to play a larger role in the pre-crisis and post-crisis phases in Iceland in order to be as effective as possible. Planning, training and exercising is considered to be a prerequisite for successful emergency preparedness in general (Perry & Lindell, 2003), and in the same way, those elements need to be in place for successful crisis communication, as a part of crisis preparations.

Thus the study reveals that the practice of integrating the communication efforts into high level decision making and managing is an important element that constitutes a best practice, although there is room for improvements of it with regards to the pre-crisis and post-crisis phases (Table 1).

5.2 Cooperating on an institutional level

Respondents' emphasis on cooperation between different institutes is reflected in previous research and suggestions (e.g. Covello, 2003; Larsson, 2010; Lundgren & McMakin, 2013; Perry & Lindell, 2003; Seeger, 2006). The literature points out the importance of joining forces in the communication work instead of having the information coming from different institutions (Larsson, 2010). The respondents' emphasis on this indicates that cooperation could be of even more value in a system where institutions are small and short on staff, including communication experts, as is in the case of Iceland. This is reflected by the effort on building up the relationship between those institutions prior to an event, as emphasised by Seeger (2006), as well as keeping the cooperation going on in the aftermath of a crisis (Table 1). The experiences of the communication during the SO₂ airborne contamination from the Holuhraun eruption confirms that coordinating breakdowns during a crisis response reveal confusion and generate additional uncertainty (Seeger, 2006). This is a notion journalist as well as institution respondents believed was revealed in the media and public discourse as a result of delayed cooperation between the agents involved.

This emphasis on the importance of institutional cooperation during crisis was furthermore confirmed by the respondent who wished that his institution would be included earlier in the process of coordination and that the cooperation should be formalized in one way or another. This notion was only prominent among the respondents coming from institutions not participating in the SAB on a regular basis but are called in when a crisis crosses the responsibilities of the respective institute.

The team effort of communication experts from different organization is another aspect of the importance of cooperation in an institutional system of scarce resources. Previous research (Comfort & Kapucu, 2006) indicates that joint information centres can be vital for crisis communication efforts, not only in order to increase the level of manpower but also for the coordination of the communication. The fact that Iceland is predicted to experience increased volcanic activity in the future (Compton et al., 2015; Pagli & Sigmundsson, 2008) underlines the importance of establishing this cooperation in a formal way, as it could be expected that frequent or long lasting events could deplete the goodwill of institutions towards lending repeatedly their employees for such a mission.

The importance of institutions cooperating emerged from the study as a feature of a great importance to the respondents, and thus the study reveals that it constitutes a best practice in Icelandic crisis communication.

5.3 Coordinating messages

Taking into account the joint experience of the respondents, the study reveals that coordinating messages is a best practice in Icelandic crisis communication, highlighted as essential by the respondents. This practice is generally recommended (Covello, 2003; Lundgren & McMakin, 2013; Seeger, 2006; Sellnow & Seeger, 2013) and underlined as especially relevant when more than one institution is involved in the communication effort. It is believed that conflicting information from public authorities can confuse the audiences (Lundgren & McMakin, 2013), and this applies to the communication both prior to an event and during it (Table 1).

Post-crisis messages were not emphasized by respondents as a vital part of the crisis communication. However, previous research show that residents in areas affected by eruptions call for information on mitigation and how to cope with ongoing problems related to the eruption, such as mental health and ash-fall (Bird & Gísladóttir, 2012). Thus, post-crisis communication should be on the agenda of the institutions, and in the cases where the post-crisis messages involve more than one institution, these messages should also be coordinated.

The effort of coordinating messages as a best practice has been disputed on the grounds that usually there is a considerable disagreement between parties (Sandman, 2006). The current study suggests that this can be addressed by presenting different scenarios to the public, a practice that also serves as an indicator of the uncertainty of the situation. Even though it was pointed out that scientists needed to have the academic freedom of expressing their meanings on an event, the importance of public spokespersons and communicators sticking to the same story was a matter underlined by the majority of the respondents. The experience of a media respondent supports this, who pointed out that as soon as the message became conflicting, she started to google the phenomenon under discussion to find some information on her own. Thus the organizations missed out on the opportunity to control which information finally got the reporters attention. This is an issue of a growing concern as the magnitude of online information is constantly expanding, allowing laypersons to search out different views and aspects on a matter which can lead to either less uncertainty or increased confusion in case of conflicting advices (Stephens & Malone, 2010).

Experience shows that the practice of involving the Icelandic president and other instances of public administration in the communication efforts by ensuring their knowledge of the coordinated message is well advised, taking the perceptions of the public into account. A previous study shows that residents in the affected areas of the Eyjafjallajökull eruption in 2010 became frustrated by the media focus on the possible eruption of Katla volcano, and felt that the situation was presented as if it would be more “fun” to have an even greater eruption than the one that was ongoing (Bird & Gísladóttir, 2012).

5.4 Providing truthful, honest and transparent information

The study found that presenting truthful, honest and transparent information to the public is an element that constitutes a best practice in Icelandic crisis communication.

Trust is considered to be one of the most valuable assets in crisis communication (Haynes, Barclay, & Pidgeon, 2007). The notion of the respondents from the institutions of having the public's trust is confirmed by previous research that shows that residents in affected areas of the Eyjafjallajökull eruption in 2010 generally trusted the information given by officials coming from those same institutions (Bird & Gísladóttir, 2012).

However, it is easier to lose trust than to gain it (Lundgren & McMakin, 2013). One of the fundamentals in crisis communication literature is that the information given should be honest, truthful and transparent (Covello, 2003; Heath, 2006; Seeger, 2006) as a necessity for building credibility and public trust. This of course applies to all three stages of crisis communication. Even though this is most relevant during crisis as well as when preparing and warning the public about anticipated crisis, this also applies to post-crisis messages regarding e.g. mitigation and coping after an eruption (Bird & Gísladóttir, 2012) (Table 1).

The importance of truthful, honest and transparent information is reiterated over and over again by the respondents. However, there is a contradiction in their discourse as many note the importance of being cautious in statements in order to avoid unnecessary panic. Sandman (2006) describes this "fear of fear" as a huge handicap in crisis communication as the emotion of fear, when at suitable levels, should serve as a motivation for the appropriate actions and/or precautions taken by the public. In fact, research shows that not only are people unlikely to panic when warned in a clear and explicit way but they are less likely to take the recommended precautions when messages are given in a vague or incomplete way (Bird & Gísladóttir, 2012; Bird, Gísladóttir, & Dominey-Howes, 2011; Jóhannesdóttir & Gísladóttir, 2010; Perry & Lindell, 2003).

The effort of balancing the message is however a known phenomenon from the literature. Sandman (2006) touches upon the risk of not getting the message through if not balanced adequately. He states that fear could cause panic or result in denial. Still, it is not good when fear is non-existing.

Worries about giving information on evacuations as the evacuated areas could become vulnerable to looting might be unnecessary, as research indicates that this is extremely rare. In fact, crime decreases immediately after a disaster event occurs (Perry & Lindell, 2003). However, research shows that residents living in the Eyjafjallajökull area during the eruption of 2010 criticised that after they were instructed to evacuate their homes in a hurry, reporters were broadcasting from their properties in front of their homes. Some even refused to leave as they did not believe it was safe to evacuate (Bird & Gísladóttir, 2012; Bird et al., 2011). Whether or not residents are right in their perceptions of the risk, this is a matter that crisis response managers must keep in mind in order to avoid risking losing the trust of respective residents.

Respondents are consequent in their focus on honesty, as they warn strongly against giving wrongful information or lying, and point out the likelihood of the truth to be revealed at

some point. Heath (2006) goes even further when stating that “facts will emerge” (p. 246) and warns greatly against trying to hide facts, as this may become even more damaging than if the facts would have been out in the open in the first place.

The respondents emphasis on admitting to the uncertainty of the situation and lack of knowledge is in line with known best practises (Heath, 2006; Seeger, 2006) that warn against a tendency of trying to be overly reassuring when informing the public. Judging from the respondents’ answers, this seem to be a no-brainer in Icelandic crisis communication during natural hazards – all respondents underlined the importance of admitting to not knowing, if that was the case. At the same time, the practice was to inform on actions taken to reduce the uncertainty, a measure previous study indicates is highly appreciated by the public (Bird & Gísladóttir, 2012).

5.5 Communicating in a proactive way

Being proactive when communicating during the crisis proved to be an essential element in the communication efforts, and thus the study finds it constitutes a best practice in Icelandic crisis communication.

The concept of proactive communication is twofold in this discussion. On the one hand it stands for fast delivery of information, and on the other that institutions should take the initiative to send out or publish relevant information, without or before being asked for it. Thus it is more important to publish the information as soon as possible than to strive for comprehensive information. This is in line with Heath’s (2006) additional best practice of being committed and able to deliver on the promise to be the first and best source of information. He points out that reporters will seek information elsewhere if not given by the organisations and suggests that organizations should never give reporters reason to doubt their information. This is confirmed by a reporter in the study who at the beginning of the seismic activity of the Bárðarbunga volcano had the notion that information was being withheld from the media. That led to the reporter’s speculations and immediate efforts on finding out what was going on.

Although the practice of proactive communication could be relevant for both pre-crisis and post-crisis communication, it is obviously most relevant during crisis, when the intensity of the information need is peaking and the risk of misinformation is at its highest (Table 1).

The practice of sending the daily factsheets of the SAB to the media was well received, and this material was used extensively by the Icelandic media. The question remains on whether this was relevant information for the foreign media, especially when keeping in mind that people seek various information on a particular risk, depending on e.g. “their familiarity with the risk” (Lundgren & McMakin, 2013, p. 107). Taking this wisdom into account the different information needs of Icelandic and international media should be considered when sending out messages on the development of the crisis, as suggested by one of the respondents.

The institutions’ webpages were reported to be an important tool for proactive crisis communication during eruptions. For this, a modern and technically sound website is a necessity. There was some criticism by respondents on an out-of-date webpage of a key institution – a site that was cumbersome and difficult for the communicators to update, incompatible with latest technology, such as smartphones and tablets as well as social

media, and unattractive for the audience. This was considered a drag for the crisis communication to the degree that an extra webpage, set up in only few days using freeware, was launched by this institution during the Holuhraun event in order to be better equipped for fast and proactive communication. A link to this website was then installed on the main website of the institution. The respondents spoke frequently of the necessity of a well-functioning webpage being established before an event, in order to get the maximum utility out of it during the crisis communication. Some other institutions' websites were reported to be in need for updates as well, although not to the same extent. This issue should be highly prioritized, given the focus on the internet as one of the main information channels used by the institutions during crisis.

Social media use is common in Iceland where 70% of internet users were active on social media in January 2014, with the country topping the social media use in Europe for that year (Statista, 2016). Thus it does not come as a surprise that respondents found social media to be an especially useful tool for fast communication.

Social media was considered suitable for trust-building, i.a. because of the activity and responsiveness of the social media accounts that indicated that *"there were people on watch."* The human tone used served the same purpose. This is reflected in a study of the successful SAS social media use during the extensive airspace shut down due to the Eyjafjallajökull eruption in 2010. There, the employees working with the social media found it important to use an informal and personal tone and give the notion that they cared (Eriksson, 2015). The same applied to many communicators working during the Holuhraun event, one of which said: *'I always made sure to express warmth and [...] the human side. You know ... [to say]: "Take care".'* And it turned out, just as in the SAS case, that the audience was appreciative of that. Other success stories of social media use during natural disasters confirm the value of this direct and first-hand communication with the public. Furthermore, they point out that via social media the public participate in collecting and distributing the information (Olsson, 2014).

The Icelandic communicators working during the Holuhraun event and communicators working during the major Queensland floods in Australia in 2010/2011 share the same experience on how active use of social media reduced the media requests directly, as the traditional media used the social media channels for acquiring necessary information for their news (Olsson, 2014). In order for all of this to work, the communicators working with the social-media during the Holuhraun event were trusted and had the self-confidence to compose posts and answer questions, without being censured by their superiors. This was also the case in the SAS study, where the freedom of co-workers to use their sensibility to answer without supervision was emphasized (Eriksson, 2015), as well as in the case of the Queensland floods, even though it often contradicted the common procedures of seeking approval from a higher ranking officer (Olsson, 2014).

It is noteworthy that, in the cases of SAS and the Queensland floods, the social media use was not pre-planned and procedures "happened" as the crisis developed (Eriksson, 2015; Olsson, 2014). This was also the general notion during the Holuhraun event – the communicators had not used the social media as effectively before during crisis, and they learned how to do it as the crisis unfolded. Some called for a policy and guidelines on social media use during crisis, to maximize the effectiveness of it. It was e.g. pointed out that by synchronizing the use of diverse Facebook and Twitter accounts of the different institutions, one could maximize the reach of important messages.

It is an indication of the new position social media has acquired in crisis communication in Iceland that in a new Policy on Civil Protection and State Security 2015-2017 (Almannavarna- og öryggismálaráð, 2015) it is especially stipulated, in a somewhat short chapter on communication, that the Civil Protection department should make use of Social media in crisis response. The demand for communication through social media was further confirmed by the rapid increase of followers during the event in the case of all the institutions that used social media during the Holuhraun event.

No press-conferences were held by the authorities during the Holuhraun event, although they were frequently held during the Eyjafjallajökull eruption in 2010. When asked, the media respondents were negative towards the concept, or as one put it: *“Press-conferences are time-consuming, they are ponderous and [...] I feel they are a damn waste of time.”* He also pointed out that there weren't that many real or big media corporations in Iceland to necessitate press-conferences, unless dealing with tens or hundreds of foreign media on location, as was the case during the Eyjafjallajökull eruption. It can also be argued that the role of press-conferences is diminishing in the digital landscape of the modern society. The media cannot wait for the press-conference to take place, as news travels fast via social media and phone messages, e.g. from people directly experiencing the crisis. Thus Palttala and Vos (2011) point out that a specific time for putting out the information cannot be considered as a best practice, but rather should one underline the importance of getting the information out to journalists as fast as possible. It is therefore likely that the increased emphasis on the internet and social media use by Icelandic institutions during the Holuhraun event played an important role in the fact that press-conferences were not considered necessary.

The fast flow of information from the response bodies and monitoring and research institutes was praised unanimously by the media respondents, as a comment from a reporter reveals:

“I have been working for ten years and I've covered all major events during that time and I can say that [...] one couldn't have asked for a better service.”

He described how he utilized the online information to a great extent. Another reporter pointed out that this was highly appreciated due to the heavy workload of Icelandic journalists and reporters:

“[...] if you receive some information and you don't have to go through a great deal of effort to get it, then you try to use it so that you can use the time for something else.”

Thus he confirms Heath (2006), who suggests that organizations responsible for crisis communication must focus on being the first and best source of information in order to prevent disinformation from filling any reporting gap that might exist. The case of the Holuhraun event seems to prove this to a great extent.

The practice of sending out warning messages in the form of SMS to the mobiles of people who find themselves within a specific geographic location has proven to be helpful in order to ensure that audiences get well-timed information necessary to effectively respond to pending threats (Bean et al., 2016). This is even more useful when the number of receivers

is not known, as a large part of them is likely to be foreign tourists that might or might not be registered in the area – a situation descriptive of Icelandic reality.

5.6 Being accessible and having a good relationship with the media

Taking the respondents experiences into account, being accessible to the media and having a good relationship with it constitutes a best practice in Icelandic crisis communication. This emphasis is confirmed by the literature as being one of the most important features of crisis communication (Covello, 2003; Lundgren & McMakin, 2013; Seeger, 2006). According to respondents, this has been a successful feature in Icelandic crisis communication, as there is a somewhat personal relationship between the media on the one hand and spokespersons or communicators on the other. This is likely to be a result of a small society where everybody seems to know everybody. The fact that officials do not hesitate to give the media access to their private mobile numbers underlines this. However, good relations are not made over night. They are a vital asset to the institutions during crisis and thus it is important to establish and grow good contact with the media and be accessible to them all year around and in all phases of the crisis communication (Table 1).

The direct media-access to experts is noteworthy, as is recognizing the importance of the role as spokespersons being woven into their role as experts. This is in contrast to the description of Seeger (2006), who says scientists often consider it counter-productive to communicate with the public and even see the media as problematic. On the contrary, the experts in the study generally described the media as an ally, and the media reported the scientists being supremely good and patient when informing them. This is important, as research show that the public views scientists as being one of the most trusted source for volcanic information (Bird et al., 2011; Haynes et al., 2007). The open access to scientists reflects the authorities' understanding of the role of the media and the public perception during extreme events. Larsson (2010) even points out that the comprehensive coverage of the media is the most important channel to the public for the authorities. Thus the close contact between the parties is vital.

Furthermore, experts seem to be aware of their own weight when communicating to the media during natural disasters. One frequently interviewed scientist explained that during small scale geological events, he avoids being interviewed, implying that doing so, people could assume that the event was larger than it actually was.

The conflicting roles of the scientists also being spokespersons was recognized as being a challenge. When Eyjafjallajökull erupted in 2010, a media centre was opened in the town of Hvolsvöllur in southern Iceland, near the eruption site, in order to serve international and local media coming to the area during the event. At the centre, scientists were available for interviews, explaining and elaborating on the development of the eruption. Although generally experienced as a good arrangement, one institution that provided scientists for this task aired some doubts on the legitimacy of allocating valuable resources in this manner on the grounds that during times of eruptions, scientists working for the institutions were highly needed at their workplace for research and monitoring. Therefore, the respective respondent suggested that the media should seek interviews at the institutions' office in Reykjavík where the scientists are located and not vice versa. Others argued the importance of understanding and meeting the needs of the media in this respect.

A communication expert from another institution thus pointed out that the media will locate themselves at the heart of action and if they can't talk to knowledgeable representatives from the institutions at the site, they will seek any information from others. This is in line with the literature which points out geographic proximity as one of the features that controls the interest of the media (Lundgren & McMakin, 2013) and the need of being available, as the media have plenty of other resources to turn to if the official ones are not accessible (Heath, 2006).

The one factor, in the relationship between the media and officials, which seemed to cause the greatest tension was the access restrictions to the eruption site of Holuhraun. This was especially prominent with the media respondents who complained about access controls being too stringent, unclear and not fully necessary. To some degree, this friction is a new phenomenon, as previously there were no or limited media access restrictions to eruption sites, according to respondents. One can speculate whether the increased tourism in Iceland contributed to the need for stringent restrictions, as response officials reported that not only was the area crowded with tourists before evacuation, but also suddenly “everybody” claimed, on vague grounds, to be a media representative after the restrictions were imposed. Thus the tackling of the media-representatives wanting to seek the eruption sites became almost a question of crowd control under extremely difficult conditions, with the largest eruption since the eighteenth century (Schmidt et al., 2015), the massive SO₂ gas emissions, and the extensive flood-risk along with the remote location, as described by the crisis response management respondents. At the same time, media respondents, all working for the largest media-corporations in Iceland, complained that no difference was made between the major national media and e.g. the small regional media, tourist magazines or vague news websites with limited audience. This claim was disputed by the respondent from the response bodies, although one communication officer pointed out the difficulties in allowing some but not others access to a hazardous area.

This study is not the right venue to determine whether the restrictions were fully necessary or fair or not. However, it is important for the response bodies to create a platform of mutual understanding in order to avoid friction between the institutions and the media. Such friction could jeopardize a relationship that, apart from the complaints of the media regarding the restrictions, was described as good by all respondents. Rules on restrictions must be clear, fair and transparent, and in place before an event strikes. This becomes even more important in the light of predictions of increased volcanic activity in Iceland in the future (Compton et al., 2015; Pagli & Sigmundsson, 2008).

5.7 Understanding, informing and cooperating with the audience

The study found the efforts of understanding, informing and cooperating with the audience to be an essential element to the respondents, and thus it constitutes a best practise in Icelandic crisis communication.

One of the largest factors in the relationship between the institutions and the public is undoubtedly the small population of the Icelandic community, which only counts just over 330,000 people (Statistics Iceland, 2016b). This relationship has been well documented by previous research (Bird & Gísladóttir, 2012; Lebon, 2009). There is a notion that every person is considered an asset to the society, firstly for simply existing and secondly as a

resource of information and valuable opinion. This reflects e.g. in the emphasis on first-hand information and communication at local residents' meetings, the interactivity with the help of social media during the Holuhraun event and definite measures like paying some farmers a direct visit if necessary in order to bring them the message.

The small society also raises doubts on the need of putting great resources into monitoring public discourse online and in the media, as the news would get about – via personal acquaintance – before doing too much damage. It is notable that the one respondent stressing the need for such monitoring was first and foremost worried about the country's reputation abroad, where these principles of the small community do not apply.

The emphasis on a direct dialogue with the public, where its opinions and concerns were considered as a valuable contribution, is highly reflected in the literature, and to go even further, Seeger (2006) states that understanding the audience is a prerequisite for successful communication. He also points out that establishing relationship and goodwill before crisis strikes is vitally important for the management of a crisis, and underlines that this should be an ongoing effort. This has obviously been the case in the residential areas near the Katla volcano in South Iceland, which has been expected to erupt for over a decade. There, regular information meetings have proven to be a useful tool for building trust and good relations between scientists and authorities, as well as the public, a notion confirmed by a previous study (Bird et al., 2011). One of the scientists interviewed for the current study describes the meetings in a place called Álftaver as “spectacular”:

“Then we go to the little community centre and half of the residents of the area show up, which is about 30 people, and...we sit around a table and drink coffee. There, more or less everyone is an expert” (A scientist and a spokesperson).

Here, he refers to the public as an important source for information for Icelandic crisis communicators, a practice Sandman (2006) agrees upon when stating “that sources need to learn what the public knows” (p. 260).

As eruptions from Katla and Eyjafjallajökull impact the same area to a large extent, those meetings and the relationship building contributed to good cooperation during the Eyjafjallajökull eruption in 2010. The same applies to the large scale exercise on the response of the public, four years prior to the eruption (Bird & Gísladóttir, 2012; Bird et al., 2011; Jóhannesdóttir & Gísladóttir, 2010). It does not come as a surprise that Sandman (2006) underlines pre-crisis communication as best practice. Thus, understanding and cooperating with the public is relevant not only during crisis but also prior to it. Post-crisis communication is also important, especially for the affected residents struggling with the consequences of volcanic eruptions long after they ceased, as previously documented (Bird & Gísladóttir, 2012; Bird et al., 2011; Jóhannesdóttir & Gísladóttir, 2010) (Table 1).

It is noteworthy that the respondents from the crisis response bodies reported that they did not experience much criticism on their actions during the eruptions in Holuhraun and Eyjafjallajökull, and this was attributed to the fact that the eruptions were obviously not their fault. It is a known phenomenon that natural disasters are amongst the types of crisis that inflict minimal likelihood of crisis responsibility being attributed to the organization in question. (Adkins, 2010; Coombs & Holladay, 2002).

However, as soon as an organization fails in the crisis response, it becomes vulnerable to critique, as was the case of the Hurricane Katrina disaster in 2005 (Sellnow & Seeger, 2013). This is not likely though to happen until the disaster starts to have a direct impact on people, as in the case of the SO₂ airborne contamination during the Holuhraun eruption and in the case of the ash-fall during the Eyjafjallajökull eruption in 2010 (Bird & Gísladóttir, 2012). A communication expert working during the Holuhraun eruption explained how people's frustration towards his institutions' actions grew along with their increasing discomfort caused by the SO₂ gas, even when medical specialists claimed that the levels of it did not pose a threat to the general public. According to the respondent, it was almost as important to try to listen and be understanding of their situation as it was to guide them on how to react and protect themselves from being exposed to the gas. Thus he confirms what the literature underlines about the importance of taking the perception of the public seriously, even though the situation does not in fact pose serious harm to them (Bird & Gísladóttir, 2012; Bird et al., 2011; Jóhannesdóttir & Gísladóttir, 2010; Lundgren & McMakin, 2013), and that they should be addressed with compassion, concern and empathy (Seeger, 2006).

Different approaches on this matter were reported to have caused institutions not to be in step with one other for a period during the Holuhraun eruption. Furthermore, studies of residents' attitudes toward the impact of the Eyjafjallajökull eruption in 2010 suggest that their psychological health should have been taken more into consideration in the communication during the event (Bird & Gísladóttir, 2012). This could indicate that Sandman (2006) is right when he states that "failure to respect the public is a consistent problem in crisis communication" (p. 259), even though the communicators have good intentions in this respect.

Advice to the public on how to react in order to ease stress and reduce harm, often referred to as messages of self-efficacy (Covello, 2003; Heath, 2006; Olsson, 2014; Sandman, 2006; Seeger, 2006), was frequently given during the Holuhraun eruption in connection to the SO₂ gas pollution. Almost as prominent were repeated newsflashes and warnings where people were urged not to visit the eruption site as it was a highly hazardous venue (RÚV, 2014a, 2014b), located remotely in the Icelandic highlands north of Vatnajökull glacier, a 100 kilometres from the nearest farm. The area was a floodplain and at risk of large glacial flooding in case the eruption would reach the Vatnajökull ice-cap. In addition, concentrations of SO₂ gas stemming from the eruption were dangerously high (Bergsson et al., 2015).

In the literature these kinds of warning messages, where people are advised from behaving in a certain way, constitute as discounting actions, which generally is not recommended, unless the specific action might increase the harm (Seeger, 2006). A respondent pointed out that this has become increasingly necessary with a changed society where powerful 4x4 vehicles equipped for travelling through rough terrains have become public property. It is undeniably food for thought that instead of e.g. informing and guiding people on how to evacuate a hazardous area, an effort is needed to explain that they should not seek it directly. Even though respondents from institutions agree upon the golden rule of warning and informing people without frightening them, in this case people needed to be frightened off – instead of calming people, communicators needed to arouse fear. This resonates with Sandman (2006) that suggests that official "fear of fear is a huge handicap in crisis communication" (p. 258). In this case it was vital not to indulge into such fear.

The Icelandic custom of visiting eruption sites is reflected by previous efforts of allowing access and even assisting the public when visiting lava-eruption sites. A crisis management respondent pointed out that there are recent instances of accidents and even deaths related to visits to one such site, the eruption site of Fimmvörðuháls that preceded the Eyjafjallajökull eruption in 2010. Furthermore, that there were extensive efforts of rescuing people that strained themselves too much out of a wish to see such a spectacular. Thus he felt that allowing public access to hazardous eruption sites could be critical, an opinion supported by residents living in the vicinity of the eruption (Bird & Gísladóttir, 2012). On the other hand, several respondents recognized that closing down the Holuhraun eruption area raised criticism from the public as well as parties with direct interest in the possibility of bringing people to an eruption site, such as the travel industry and the media.

Even though respondents concluded that it was important to communicate with respect, calmness and understanding when speaking to the media, words like compassion, concern and empathy were used sparingly, if at all. This is noteworthy in the light of the great emphasis laid on this in the literature (Covello, 2003; Heath, 2006; Seeger, 2006). In fact Heath (2006) goes as far as saying this is the most important best practice of all. This is often put in context with the greater tragedies of life-loss or tremendous harm, caused by larger crisis. The fact that volcanic eruptions and seismic activity in Iceland have not, in recent decades, caused large scale life loss or widespread harm might contribute to this modest approach of Icelandic spokespersons. Whatever the reason, despite the obvious need of people to feel sympathy, communicators did not underline it as a major issue to show sympathy in order for the communication efforts to be successful.

5.8 Improvising if necessary

Due to the vital role improvisation has played in Icelandic crisis communication in connection with recent volcanic eruption, the study finds this element, used to a necessary degree, to constitute a best practice in Icelandic crisis communication.

In an institutional environment of scarce communication resources, operating within the realm of an ever-surprising nature, the art of improvisation has turned out to be a vital element. An example of this was how social media became one of the most important tools for some of the main institutions during the Holuhraun event, even though this had not been the case before.

The uncertainty that characterizes nature hazards, often with unforeseen development and unexpected situations, has also made it necessary to improvise – communicators have had to rely on their own resourcefulness and adaptability as well as being open for innovative solutions in order to manage the situation. This is not likely to change in near future due to the predictions of increased volcanic activity in Iceland (Compton et al., 2015; Pagli & Sigmundsson, 2008), and as an experienced media respondent pointed out “*the eruptions over the last 15 years or so have been very different from each other.*” Thus, something unexpected always comes along with every new eruption. This notion is confirmed in the literature which describes a crisis as a unique event that is characterized by different specifications and circumstances (Larsson, 2010).

Furthermore, the ever growing lability of the human-made environment, such as the digital revolution and constant changes in the institutional structure, makes it increasingly difficult to control all aspects of crisis communication during crisis with pre-written rules and

procedures (Eriksson, 2015). Thus it is important not to get stuck with inadequate routines that have not followed recent developments (Sellnow & Seeger, 2013) but to embrace the uncertainty of the situation and accept that the need for improvisation is likely to prevail. The word is to “never become overly confident in a single set of principles” (Sellnow & Seeger, 2013, p. 87).

The technical revolution, brought by the public access and use of the internet and the interactivity possible by the online development, demands that communicators need to be able and willing to improvise to a larger extent than before (Eriksson, 2015). This study indicates that the communicators, working during the Holuhraun event and some previous eruptions, generally had good sense and intuition for the environment and the public’s reaction, based on personal knowledge of the situation, society and key-players within it. They were thus in a good position for improvising during crisis, when routines were missing. These are in fact the kind of communicators one should strive for employing, as these are the qualities needed in the crisis management process as a whole (Perry & Lindell, 2003).

Thus, regardless of recommendations on improving planning and written procedures on communication, one should always be prepared for mixing those with improvisation to the extent necessary during the urgent situation of an unfolding crisis (Table 1).

5.9 Planning, preparing and documenting the crisis communication

The lack of preparations and planning of Icelandic crisis communication was prominent in the respondents’ discourse, and therefore planning and preparing is not a best practice derived from experience. However, as the respondents find it urgent to change this, the study considers the element of planning and preparing to be a practice that should be incorporated into a framework of Icelandic best practices in crisis communication.

Even though most respondents described the communication efforts during the Holuhraun event as generally successful, it was acknowledged that this was first and foremost based on personal experience. The small society and personal acquaintance also play a large role, as reflected by a respondent who said that “*when something happens, I’m just used to call [Sigríður]*”, a colleague from another institution (the name is altered).

The element of experience is highly valued in the crisis communication literature (Larsson, 2010). However, the fragile nature of a success primarily built on experience was recognized by the respondents. As the procedures were documented to a limited degree, the communication depended on people that learned them through action. Even so, something could always be forgotten as there were no written procedures to follow, and some extra effort was needed every time to retract the personal knowledge in order to set up functional crisis communication. This makes the institutions vulnerable to brain drain through employee turnover – even though the organizations gain new knowledge with new employees (Popper & Lipshitz, 2000), there is always the danger of losing irreplaceable knowhow if the routines are not registered. Research shows that it is common that organizations rely on intuition and experience of their communication employees. However, even though such characteristics have proven to be highly useful and a necessary

element in the crisis communication, it is still considered preferable to have known practices in place in risk and crisis situations (Reich & Korbas-Magal, 2011).

This is why an emphasis should be placed on pre-event planning, as suggested by Seeger (2006), where one would find written procedures for the main elements of the crisis communication (Table 1). Several countries have published guidelines on crisis communication that can serve as a template on what a crisis communication plan should include. In the risk- and crisis communication guidelines published by Norwegian Directorate for Civil Protection (2014), it is suggested that such a plan should include goals and principles for the crisis communication; designated responsibilities; roles, functions and division of labour for those working on the communication; role and placement of the communication team in the organizational chart; designated spokespersons; defined target groups and what media to use for reaching them; what institutions to cooperate with; technical equipment; locals and reserve meeting places; plans for shift work; and who can assist if needed. Elements along those lines are described in the literature as vital in pre-event planning, and it is pointed out that such plans should include pre-crisis communication, communication during the event, and post-crisis communication (Heath, 2006).

Many of the Icelandic institutions in this study do have contingency and response plans on different kinds of crises and disasters and for different areas of the country (see e.g. Lögreglustjórnin á Norðurlandi eystra, Almannavarnanefnd Þingeyinga, & Ríkislögreglustjórnin, 2015; Sóttvarnalæknir & Ríkislögreglustjórnin, 2015). Some of those plans specifically address reactions during volcanic eruptions (see e.g. Lögreglustjórnin á Norðurlandi eystra et al., 2015). Even though the need to communicate to the media is recognized, the instructions on how to do so are in most cases minimal and the elements mentioned above are almost non-existent. Thus, the fewest of those give a comprehensive approach for the crisis communication. However, at least two of the institutions' procedures and contingency plans, including the communication efforts, are being constructed or revised in the wake of the Holuhraun event.

Many foreign templates seem suitable as models for Icelandic crisis communication planning, as they are made for societies that have similar structure and culture and even similar natural environment (Direktoratet for samfunnssikkerhet og beredskab, 2014; New Zealand Ministry of Civil Defence & Emergency Management, 2013; Swedish emergency Management Agency, 2008). However, it is important to bear in mind that these guidelines need to be adapted to Icelandic conditions, as one can assume that they are built for organizations with greater communication resources than are likely to exist in Iceland in the near future.

The small size of Icelandic society and institutions also influences how the channels of communication and the media relations work, which often calls for a different approach. There is no ultimate master-plan that can be utilized effectively by all communities (Perry & Lindell, 2003). Thus it is necessary to take the different circumstances into account and set up a plan formalizing the local practice of cooperation and personal connections, where e.g. the divided reality of local and international media is considered. Icelandic guidelines for crisis communication would thus be most helpful for Icelandic institutions and authorities that are likely to be engaged in crisis response, one way or another.

It is noteworthy that the need for making a summary post-crisis report following an eruption seems to be more or less acknowledged (Table 1), although often none is made, more due to lack of resources than due to lack of transparency or accountability as defined by Popper and Lipshitz (2000). This reflects what is recognized in the literature: that crisis gives an organization an opportunity to scrutinize its performance at every level (Sellnow & Seeger, 2013), and that one of the greatest opportunities of learning lies in the review of responses in the wake of a crisis (Larsson, 2010; Popper & Lipshitz, 2000). An experienced respondent from a crisis response institution suggested that the institutions should now, in the wake of the Holuhraun event, focus on *“writing down the procedures instead of writing a report with the conclusion that the procedures need to be written.”* Another pointed out that making contingency plans and documenting communication procedures comprises a learning procedure. This seems to be the development with the two institutions mentioned above that are revising their plans in the wake of the Holuhraun event, even though no summary reports were written in their institutions after the event. In general, there is a clear trend toward more registration of plans, procedures and lessons learned – the Policy on Civil Protection and State Security 2015-2017 (Almannavarna- og öryggismálaráð, 2015) being the latest example of that. This indicates that people are realizing the importance of the role of communication during crisis and volcanic eruptions. When in place, the structures need to be constantly updated and reviewed and be flexible, in order to reflect best practice and the ever-changing environment they operate within at every time (Perry & Lindell, 2003; Seeger, 2006).

It is important though to realize that procedures are a tool aimed at simplifying and easing the process of communication. Thus it has been suggested that plans should not be too detailed or rigorous, as exact details tend to become outdated quickly and make the planning documents larger and more complex than necessary (Perry & Lindell, 2003). Knowing different possibilities and what have proved to be useful in crisis communication must be considered an asset though and seen as a buffet of choices for the task at hand. One must not follow them too rigorously or without critical thinking – if it turns out, in the heat of the moment, that the written procedure does not work or the job can be done in an easier or more effective way, one should not hesitate to veer from the procedures or abandon them to a large degree if necessary. After all, every drill and training are set up as they are likely to make improvements on the communication plans and procedures, and thus the same applies to the crisis itself (Perry & Lindell, 2003).

Training and exercises are key-elements when it comes to preparations of crisis response and management as, together with real experience, they are considered the most important forms of learning (Larsson, 2010). The purpose of exercises and training is manifold: to prevent skills from disappearing, to detect flaws in crisis plans before it comes to the real crisis, and to resolve conflicts and raise awareness, to name few vital dividends (Perry & Lindell, 2003). This is just as important for crisis communication if the communication efforts are to be as effective as possible. This is even more important in the case of understaffed institutions where employees or specialists need to multitask by carrying out communication tasks parallel to other tasks that are important for the crisis management. Thus, when training and exercising on emergency aid, harm relieving, managing and monitoring, one must also take into account that the experts in question might and will most probably need to divide their time between those assignments and the crisis communication, especially when the usual and highly valued practice is that experts and managers serve as spokespersons, as in the case of Icelandic crisis communication.

Perry and Lindell (2003) also point out that the frequency of crisis is likely to impact the formalization of the planning process. Thus, in a community where crisis is frequent, the crisis response might become a practised skill rather than a well-trained reaction to a hypothetical threat. This is highly relevant with the Icelandic situation, where volcanic eruptions and other natural disasters are frequent and increasingly so. One respondents' comment underlines this even further:

“When we get a half a year of practice that is a real practice or a real event like in the Holuhraun eruption then [...] those who work on that maybe become more efficient in dealing with the media etc.” (A crisis manager).

Larsson (2010) agrees with this, stating that the most effective training is previous crisis experience. However, the value of formalisation “even for the smallest jurisdiction” must be recognized, as it will make the response more stable and the system stronger and less vulnerable to factors such as brain drain and forgetting (Perry & Lindell, 2003, p. 340).

5.10 Further elaboration

Previous research suggests that organizations should utilize crisis for getting out additional information that media would not show interest in otherwise (Heath, 2006). In the case of Iceland, respondents generally do not consider this important on the grounds that they already have good access to the media, reporting them to be generally open for their messages, pre-, during and post-crisis. Thus, the immediate need of achieving media exposure, which is said to be a major issue for organizations (Reich & Korbas-Magal, 2011), does not seem to be particularly urgent for Icelandic institutions.

Another best practice known from the literature but not prominent in Icelandic crisis communication, according to respondents, is the emphasis of Heath (2006) of realizing that crisis response is narrative. Respondents vaguely mentioned practices that could apply to this; some focus on the geological history when putting an eruption into context, and some of the media respondents replied when asked that it would be nice to get information on what lessons were learned from the Holuhraun event. However, this was not prominent enough to qualify as an overall best practice for Icelandic crisis communication during eruptions, more like an additional benefit.

Public perception and information need is one of the fundamental factors of a scorecard developed for assessing the quality of crisis communication of public authorities (Palttala & Vos, 2011). It is suggested that this should be continuously monitored, both pre-crisis, during and after, e.g. by conducting surveys on the public's media use, information seeking and processing, perceptions and understanding of the risk etc. This practice is widely recommended in the literature (e.g. Lundgren & McMakin, 2013; Perry & Lindell, 2003).

With the exception of a simple website user survey that had been conducted by one of the Icelandic institutions, there were no reports of the institutions conducting public surveys on this matter. An existing research on attitudes and behaviour of residents in the area affected by the Eyjafjallajökull eruption (Bird & Gísladóttir, 2012) was done by the academia. This is in line with the results of a research by Reich and Korbas-Magal (2011) on the crisis communication practices at seven Israeli organizations, where the only institution that did such surveys regularly employed a population behaviour officer with a background in social sciences. Even so, the surveys were not considered sufficient in order to measure the

perceptions of the public with regard to the crisis communication, nor was the analysis and exploration of available data sufficient. In addition, the institutions complained about lack of financial resources.

Needless to say, the Icelandic institutions do not have financial resources nor the expert manpower to conduct surveys like the ones suggested, and due to the small size of the population, they are not likely to receive such resources in near future. Thus they need to adapt to a different reality. One way to do so might be the Icelandic focus on residents' meetings prior to and during a crisis. Previous research (Bird & Gísladóttir, 2012) suggests that it should be considered to take this a step further by organizing post-crisis residents' meetings as well to meet the needs of affected residents for information. Also, it is not unthinkable that personal interaction, acquaintance and knowledge of the communities in question can substitute for this practice to some extent. Whether that is the case or not, it is evident that institutions representing 330,000 people (Statistics Iceland, 2016b) will not be able to carry out tasks that institutions representing 8.3 million people (Central Bureau of Statistics, 2015) have not resources enough to do.

It has been pointed out that the emergency planning will be marked by the size of each community. Smaller communities are more likely than the larger ones to have fewer written procedures and "be largely reliant upon informal, personal relationships for risk identification, assessment and reduction" (Perry & Lindell, 2003, p. 340). Personal relationships and knowledge of local circumstances, as well as direct and close communication with stakeholders, seem to play a large role in Icelandic crisis communication and in some cases make up for scarce resources. The communication channels between individuals are short and easily accessed, and the fact that they know each other prior to the event gives them a head start in creating common grounds for their communication – a necessary platform for understanding and accepting each other. The cognitive scientists Johansson and Hollnagel (2006) point out that this is especially relevant when time is a scarce resource, as is usually the case with crisis communication.

The study indicates that there is a need for developing a method or a system better equipped to tackle long lasting periods of heavy communication workload under uncertain conditions. The instant need for information is a well-known phenomenon in connection with crisis (Larsson, 2010), but it is important to address and acknowledge the effects of the pressure on working officers, as studies have shown that they are more likely to take shortcuts towards their goals, risking to dismiss important factors (Reich & Korbas-Magal, 2011). Therefore, the endurance of the staff must be ensured. Previous research indicates that developing a virtual team of trusted volunteers, so called Virtual Operations Support Team (VOST), could be considered in this respect. The VOST team is designed to support emergency management communication efforts, using ICTs such as social media for spreading information, without interfering with the ongoing local operations. Experience from a wildlife fire that occurred in the US Pacific Northwest in 2011 show that VOST teams added considerable to the capacity of a local emergency management information team. An additional benefit is that it is located outside the impact area, and is therefore not affected by e.g. power cuts, severe weather conditions or local service disruptions. Also, the team members can work from different time zones, and thus provide a relief to the local crisis communication team during nights at the emergency site (St. Denis et al., 2012).

Some of the lacking but proposed practices, such as better planning and training, might also contribute to a solution of this matter. Also, key institutions in a crisis response that do not employ communication experts should consider to do so if possible, in order to increase their capacity in this respect.

6 Conclusion

This study examines the experiences of a broad group of people, working on official communication efforts, as well as the media on what practices have been successful in crisis communication during recent eruptions in Iceland. It also points out what practices could be improved in this respect.

The study reveals the importance of realizing that methods and approaches in crisis communication are not universal and must be adapted to the reality of the situation and the community they are intended to serve. It introduces a tentative framework of principles that take into account the special conditions and the capacity of a small nation, living under constant threat of natural disasters. Those are i.a. characterized by scarce resources; a greater need for improvisation in the crisis communication process; a great international media interest; a close contact with and good access to the local media; a sense of closeness to the public; and the importance of cooperation between various institutions. Furthermore, the need for proactive communication is prominent in the digital landscape of modern society.

Many of the nine best practices identified for Icelandic crisis communication during volcanic eruptions are in line with practices that already have been identified in the literature and thus confirm to some extent their universal nature. At the same time, some procedures described in the study have been shaped out of the special conditions characterizing Icelandic crisis communication. Lastly, few practices presented in the study represent aspects that are lacking in the Icelandic crisis communication practice, according to respondents.

The best practices presented here are not exhaustive and do not exclude other methods of communicating during crisis. The practices overlap and are interrelated, but at the same time they contradict each other in some aspects. Both phenomena are well known from the literature (Sandman, 2006; Seeger, 2006).

The set of best practices presented here does not substitute guidelines on crisis communication during volcanic eruptions but could serve as a framework for such guidelines.

The study did not reach to international journalists covering the Holuhraun event for foreign media. Also, the experience of the public or other target groups of the communication is not covered by the study. However, previous studies on this were used as a supplement for discussion and elaboration. Currently, a part of the public perception of the communication efforts (e.g. the experiences with the information given on the SO₂ gas pollution) is being studied in another research.

Although crisis communication during volcanic eruptions is the subject of this study, it is possible that the principles presented here could apply to other kinds of natural disasters and even other kinds of crises that public authorities have the responsibility to manage. At the same time, it is important to bear in mind the uniqueness of each crisis situation as well as the uncertainty that derives every time a new crisis strikes.

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