

Foresight Programs for Educational Policy:
Program Participants' Perceptions and Experiences with Outcomes.

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ABSTRACT

Increasingly rapid technological and social changes pose significant challenges for educators and educational policymakers in Iceland. To address these challenges, Icelandic policymakers implemented two foresight programs intended to provide anticipatory intelligence and promote long-term perspectives for educational policymaking. Foresight programs are intended to produce intelligence and capacities that encourage stakeholder organizations to adopt long-term perspectives regarding policy change and development. Foresight outcomes have been categorized as: immediate outcomes, resulting from initial program activities; intermediate outcomes, resulting from the transfer of immediate outcomes to stakeholder organizations; and ultimate outcomes, that are expected to occur over the long-term.

This multi-methods case study examined two foresight programs implemented in Iceland, the Iceland 2020 program and the Ministry of Education, Science and Culture's foresight program on technology and education. The programs were implemented to explore, and address, future challenges relating to education, and in the case of the Iceland 2020 program, other related issues. The study used Engeström's (1999) Cultural-Historical Activity Theory (CHAT) to explore how immediate foresight outcomes were transferred from program contexts to program participants' organizational contexts and their affects on organizations.

The study included a survey and semi-structured interviews. Data were analyzed using the constant comparative method to develop themes as they emerged. The data

were further analyzed using the CHAT framework to explore the processes that were involved in the transfer of immediate foresight outcomes between the program and organizational contexts. The findings suggest that foresight program coordinators and planners need to ensure that program participants have a sufficient understanding of foresight and futures methods to recognize immediate foresight outcomes and how to engage others within their organizations with them.

The outcomes of the study provide an empirical foundation for extending current models of foresight processes and outcomes as they relate to educational policy. Furthermore, they help to better inform foresight program coordinators and planners to ensure that program objectives are met.

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FOREWORD

In this dissertation I describe my research on Icelandic policymakers' use of foresight as a tool for planning and developing educational policy between the years 2008 and 2013. I collected my data in 2017 and 2018 to be able to explore the medium-term impacts of national foresight programs on stakeholder organizations that are involved in educational policymaking in Iceland. None of the text or research has been previously published although I have shared some early considerations that arose from the research on my personal website, Education4site (<http://www.education4site.org>).

In my study I chose to pursue a different course than has commonly been taken in comparative education research. I chose to examine how policymakers use foresight and futures studies in their policymaking endeavors. Foresight has received little attention in comparative education literature despite having been actively promoted by international organizations that are among the key players in the field, including, the OECD, UNESCO, and the European Commission.¹ Furthermore, foresight has been institutionalized in several of the countries that are currently among the most influential in the international arena in which discourse on educational policy and practice is taking place, including Finland, Sweden, Australia, and Singapore, and those that others look

¹ Among the few notable examples is Istance & Theisens (2013) brief reflections on the OECD's *Schooling for Tomorrow* program. (Istance, D., & Theisens, H. (2013). Thinking about the future: Insights from an international project. *International Journal of Educational Research*, 61, 111–115.)

to for effective educational policies and practices that can be "borrowed" in the hopes of emulating the successes of the originator.

Policy borrowing has long been a mainstay of comparative education research. It occurs through a complex process of cross-national attraction, decision, implementation, and indigenization, through which policies originating in one context are adapted and transformed to be applicable in the borrower's context (Phillips & Ochs, 2003; Steiner-Khamsi, 2010). However, some education experts, most notably Finland's Pasi Sahlberg (2014), has urged researchers and policymakers to focus less on what other nations do, but, instead, on how they got into their desirable position. It is precisely this that I have attempted to study in my research, i.e. how policymakers go about adopting foresight, a practice that has been used in several European countries and actively promoted by transnational organizations, as a policy development tool as opposed to adopting and transplanting specific educational policies. As such, this study expands on prior research into foresight for policy development in addition to examining a novel area of cross-border learning that affects educational policy and practice, and thus, has significant relevance for the field of comparative education.

After having reviewed opportunities for conducting my research in various countries, two fortuitously presented themselves in my home country, Iceland. The first came about when the Iceland 2020 foresight program launched in 2008, and the latter when the Ministry of Education, Science, and Culture (MESC) launched a foresight program on technology and the future of education in 2013. Both programs met my criteria of being large-scale, forward-looking policy planning initiatives that involved

educational policy. Furthermore, both were situated in a context that I was intimately familiar with, having worked in educational development in Iceland for over 15 years. The opportunity to conduct my research in a familiar setting minimized potential issues relating to contextual understanding and language barriers, but it also brought its own challenges.

Iceland is a very small nation, with a current population of roughly 360,000, of which 60%, or 217,000, live in, or around, the capital of Reykjavík, which is my home. The national community of educational professionals, including teachers, school administrators, and others working in education, is a close-knit one that I am very familiar with, especially after having spent the last 6 years working primarily on professional community development among them, and having been closely involved in the latter foresight program included in the study, the MESCS program implemented in 2013. Through my work, I have developed not only close working relationships but also a personal ones. As a researcher, it proved challenging for me to draw a line between what my data revealed about my subjects that I was familiar with and what I knew about them through long-standing relationships. I felt it was important that I draw such a line to ensure the integrity of my research and to maintain comparability among all research subjects, since there were among them individuals that I was not well acquainted with. It was only by thoroughly anonymizing my data, separating myself from my subjects, and adopting an emic position that I felt that I was able to achieve this. Thus, although I am reporting on, and describing, events and individuals that, in some cases, I was personally involved in or with, I have done as much as possible to bracket myself out of

the equation to be able to ensure that my assumptions, analyses, and conclusions apply equally across all facets of what proved to be a more complex research environment than I had initially anticipated.

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CHAPTER 1: INTRODUCTION

In 2001, Seymour Papert (as cited in OECD, 2001a) claimed that shortsighted educational policies were failing to keep pace with the rapid development of information and communication technologies (ICTs). As the rate of development of ICTs has continued to increase, many policy makers still lack the anticipatory knowledge and coherent visions of the future needed to facilitate the integration of new and emerging technologies into educational practice. This is a significant issue for educators, educational administrators, and policymakers. ICTs are currently one of the most significant forces driving educational change. ICTs have already radically affected the ways that we communicate, the ways that we interact with others, and the ways that we produce, distribute and consume information. Emerging technologies, such as artificial intelligence, robotics, augmented and virtual reality, and ubiquitous computing, are expected to transform our social environments even more; creating new jobs, challenging our sense of what constitutes "reality", and transforming our ideas about what we need to learn, why we need to learn it, and how we learn. Despite strong signals, and growing awareness, of these, and other, impending changes, Papert's warning from nearly two decades ago, still pertains. Educational policies, as they pertain to ICTs, continue to fail to adequately adapt to, and address, changing technological landscapes in a timely manner.

This study looked at foresight programs that were implemented in Iceland to encourage policymakers to anticipate, and get ahead of, foreseeable technological and

social change. Foresight programs have increasingly been implemented to help policymakers address issues relating to rapid technological, environmental and social change and their impacts on education. Foresight programs are anticipatory intelligence-gathering initiatives that aim to provide policymakers with skills and information needed to engage in long-term policy planning (Martin, 2010). They aid stakeholders and policymakers in the application of rigorous futures and forecasting methods to describe and explore possible and preferred futures for relevant policy contexts. Although foresight programs have resulted in useful anticipatory knowledge and visions of the future, how the knowledge generated in them influences policymaking systems is not sufficiently understood.

Foresight programs are expected to produce outcomes that include increased system-wide capacity for long-term planning, new ways to frame policy issues, new policies, and, ultimately, reconfigurations of policymaking systems (Da Costa, Warnke, Cagnin & Scapolo, 2008). Theories derived from foresight research suggest that program outcomes occur in three sequential stages (Schartinger, Wilhelmer, Holste & Kubeczko, 2012; Havas, Schartinger & Weber, 2010):

1. Immediate outcomes: Outcomes that are realized during and immediately following initial foresight activities, during which participants are introduced to futures methods and future-relevant information resources for engaging in collaborative visioning activities.

2. Intermediate outcomes: Outcomes that occur as knowledge generated during the preceding stage is transferred to organizational contexts over an approximate five-year period.
3. Ultimate outcomes: Qualitative changes in policymaking systems which are expected to occur over a period spanning ten years or longer, depending on the specific nature and goals of the program.

The immediate stage produces both tangible and intangible outcomes. Examples of tangible outcomes include documentation of foresight activities conducted during the initial foresight activities and resulting future projections. Intangible outcomes include individual participants' newly acquired knowledge of foresight processes and emerging trends, and newly formed relationships. Immediate foresight outcomes, i.e. outcomes that can be identified and observed during, and immediately following, the initial foresight activities, are categorized here as substantive outcomes, communicative outcomes and subjective outcomes.

- Substantive outcomes - any products that are intended to describe the alternative futures constructed in the foresight process.
- Communicative outcomes – new formal and non-formal networks resulting from interactions between the various stakeholder groups participating in the foresight activities.
- Subjective outcomes - the personal learning that occurs during the foresight activities, including: awareness of the dynamics of technological change;

familiarization with futures methodologies; and increased appreciation for the need for long-term planning.

The second stage, the intermediate stage, involves the transfer of immediate outcomes to individual participants' organizational contexts (Schartinger et al., 2012). The expected outcome here is the change that occurs as organizational practice is adapted to the new knowledge, relationships and visions for the future generated in the foresight program. As organizations adopt new practices and formulate new goals in accordance with immediate program outcomes, they bring their resources to bear on the pursuit of long-term goals, which significantly outweighs individual program participants' capacity to drive change over extended periods of time. Intermediate outcomes are, therefore, a key stage in the realization of the long-term goals of foresight programs because they help to ensure continued momentum for change while pathways linking immediate outcomes to long-term ultimate outcomes are established. Table 1 describes how immediate foresight outcomes are used to progressively expand the scope of foresight activities; moving first to the intermediate stage, where organizational practice is affected, and, finally, to the ultimate stage, in which system-wide change is effected.

Table 1

Outcomes of foresight programs.

Stage	Time-lag	Outcomes
Immediate	During and immediately following the initial launch of program activities (1-2 years).	<ul style="list-style-type: none"> • Program participants' articulation of common visions of the future and long-term perspectives. • Program participants gain increased awareness of forces driving change, technological options and systemic character of change • Key players in policy system are identified along with the diversity of opinions that they represent. • Program participants establish common understanding of challenges and opportunities. • Increased awareness leads to new contexts and new networks among stakeholders.
Intermediate	Approx. 5 years.	<ul style="list-style-type: none"> • Dialogue is continued and expanded to stakeholder organizations on the basis of established common understanding of challenges and opportunities. • Collective learning processes are initiated throughout stakeholder organizations. • Policy recommendations and possible actions. • Obstacles to policy change are identified. • Formation of action networks. • Creation of follow-up activities. • Development of new collaborative projects.
Ultimate	10+ years (depending on defined time-range of the foresight program).	<ul style="list-style-type: none"> • Policy discourse arenas are expanded to involve new actors. • New actors influence policy agendas of key public and private actors. • Increased coherence of policies. • Cultural changes towards longer-term and systemic thinking.

Adapted from: Havas, et al., 2010; Da Costa, et al., 2008; Cassingena Harper & Georghiou, 2005.

Technological Change and the Future of Schooling

Education and rapid technological change

For the last several decades, educators and educational policymakers worldwide have lauded ICT as a powerful and much needed agent of change in education. For the most part, expectations have run high, with predictions of qualitative change toward aspired goals of more personalized and learner-centered modes of instruction. Research has, however, repeatedly demonstrated that ICT innovations have failed to produce the educational change that has been hoped for, largely because of unclear or competing policy goals (Cuban, 2001; Hokanson & Hooper, 2000; Moe & Chubb, 2009). Furthermore, policies are often based on overly ambitious and technologically deterministic notions of ICTs' perceived potential in education, with limited consideration of their broader effect on social relations and patterns of communication in general (Sancho, 2010). These limitations leave open the possibility for unintended consequences, which have, indeed, been frequent. Examples include cyberbullying, sexting, and cheating (Beran & Li, 2005; Manzo, 2009; Nworie & Haughton, 2008). Although many of these unanticipated uses of ICT should have been foreseen, policies have often proven ill suited to respond to them (Becker, 1998).

The emergence of social technologies on the web and the rapid development of personal ICTs, such as smartphones, iPods, and tablet computers, have been a source of concern for many educators and educational policy makers. In fact, many educators and policymakers now regard ICTs as a distraction in the classroom and prohibit students' use of a range of social networking applications and personal ICTs. Yet, the accessibility

of personal ICTs, due to declining costs, and their near-ubiquity among youth, complicate the enforcement of such policies. In most developed countries youth's ownership of personal ICT devices has increased rapidly, with current ownership levels reaching as high as 95% in the UK and US, and almost 100% in Nordic and Asian countries (Hartnell-Young & Heym, 2008; E-learning Nordic, 2006; Katz, 2005; Lenhart, Ling, Campbell, & Purcell, 2010; Rideout, Foehr, & Roberts, 2010, Rideout & Robb, 2018; Anderson & Jiang, 2018).

Historically, schools have been reluctant to allow youth to use their personal ICT devices in schools (Lenhart, et al., 2010; Katz, 2005). Restrictions have, however, seldom stopped students from using them. Lenhart, et al. revealed that, despite bans on the use of personal ICTs in US schools, nearly 60% of students used them during class, with nearly 45% doing so at least once a day.

Debate concerning students' use of personal ICTs in school has increased in recent years following a high profile national ban implemented nationwide in France in 2018 (Rubin & Peltier, 2018). On one side of the debate are those that claim that ICTs distract youth from meaningful schoolwork. On the other side are those who see students' personal ICTs as powerful learning technologies that should be supported and encouraged through their use in schools. Yet, despite whatever potential that modern ICTs hold for learning, and research has shown that youth do use them for learning, educators, educational administrators, and educational policymakers have struggled to integrate them in meaningful ways in educational environments, thus inadvertently increasing their disruptive potential (Ito, *et al.*, 2008; Lenhart, *et al.*, 2010).

Whether one sides with those who wish to ban students' personal ICTs in schools or not, questions regarding the sustainability of such bans remain. As technology continues to develop new devices become available that challenge such bans. Do the bans, for example, extend to smartwatches, that are currently widely available and, many of which, come very close to mirroring the capabilities of contemporary smartphones? What of smart glasses, such as Microsoft's Hololens and Google's Glass, that are currently being developed (Kalantari & Rauschnabel, 2018)? How will educators react when students show up with technologies integrated in their clothing, or even implanted in their bodies (Sobot, 2018)? When we consider where technological development is demonstrably headed, dismissive policies such as those being considered, or already implemented, seem as shortsighted as any that Papert warned about two decades ago. They may resolve challenges in the present, but, over the long term, seem to merely be delaying the inevitable: willingly or not, new technologies will forge their ways into educational environments, as they do other social environments.

Research has shown that ICTs have a significant impact on how youth, and old, learn, whether the technologies are used in schools or not (Project Tomorrow, 2011). For today's youth, the go-to sources for acquiring new skills and knowledge are often YouTube and other social media. There are certainly positive aspects to youth's taking charge of their own learning in this manner, but there are also risks. On the one hand, autonomous learning skills are critical in times of constant change and rapid construction and destruction of knowledge due to increasing flows of information. On the other hand, with autonomy comes considerable responsibility. The Internet is mostly

an unmediated information landscape where the onus is on the user to apply information literacy skills to separate the wheat from the chaff. One study revealed that just under half of U.S. high school students consider the ability to evaluate the authenticity of resources, or detect bias, to be important skills (Project Tomorrow, 2011). As long as critical thinking and information literacy skills are an integral component of school curricula, as is the case in most developed countries today, this point illustrates the continuing importance of formal education for young people's learning. Yet, studies show that formal educational institutions' inability to keep up with technological change has a negative impact on young people's perceptions of them. In one study, youth described what they perceive as a "substantial disconnect" between their school-based technological environments and their personal technological environments (Levin & Arafeh, 2003). Another study asked students, parents and educators whether they felt that their high schools were doing a good job using technology to enhance achievement. Almost 75% of teachers and principles answered yes, 62% of parents answered yes, while only 47% of students answered yes (Project Tomorrow, 2011). These studies suggest that today's technology-savvy youth are keenly aware of the duality regarding the role of ICTs in their learning environments and, more significantly, that they are not complementary. Students do still value formal educational institutions and are not willing to turn their backs on them. However, they are increasingly frustrated by how slow their schools are to adapt to technological changes (Project Tomorrow, 2011).

Young people's increasing reliance on ICTs for their learning demonstrates the significance of ICTs as a driving force of educational change. Whether educational

policy makers embrace technology or not, their policymaking is affected by ICTs nonetheless. Policymakers' reluctance to acknowledge the impact of ICTs on young people's learning environments has resulted in reactive policies that fuel perceptions of a growing disconnect between youth and their educational institutions. Unless policy-making systems change to become more future-oriented, this disconnect is likely to increase. There is ample evidence of emerging technologies that can be expected to have an even more significant impact on, not only the way students learn, but what they need to learn, than the ICTs that policymakers have been concerned with. Augmented reality (AR) is an application of ICTs that makes it possible to provide data overlays about our immediate surroundings (Johnson, Smith, Willis, Levine & Haywood, 2011). For learners equipped with AR capable devices, which includes almost all modern smartphones, questions of the type, "what is...?" or "where is...?" are becoming irrelevant because objects and environments can describe themselves. Artificial intelligence (AI) is another technology that is making quick inroads into our everyday technological environments (Wogu, Misra, Olu-Owolabi, Assibong & Udoh, 2018). Like AR, almost all modern smartphones have built in AI agents. These agents allow us to interact with our devices using spoken commands and by asking simple questions. By making use of data on our information consumption practices and other contextual data, AI agents can even push useful information to us before we have perceived the need for it.

Although both AR and AI are already nearly as ubiquitous as smartphones, there has thus far been minimal discourse on their implications for education. Even the New

Media Consortium's forward-looking 2017 Horizon report on ICT impacts on K-12 schools classified AI as a technology to be implemented in four to five years (Freeman, Becker & Cummins, 2017). Yet, given the data previously described regarding youths' smartphone ownership, at the time that the Horizon report was published, at least 95% of high school students already regularly carried AI agents on their person daily, both in and outside of their schools. It may be argued that there is a difference between merely carrying around a technology and effectively implementing it in education, and that certainly carries some weight. However, as youth interact with new technologies, they are defining them and imbuing them with an identity and role within their daily lives. When educators bring them into the educational environment, their attempts to define them as learning tools may compete with the roles that youth have already given them, forcing educators into a reactive position, i.e. they need to change existing perceptions about the roles of available ICTs before they can proactively construct suitable roles.

There are many reasons to promote long-term, future-oriented planning in education, but, currently, the rapid development of ICTs is one of the most, if not the most, critical and immediate. Policy makers need to increase their capacity for long-term planning so that they can anticipate change and take a more proactive stance toward ICTs in their policy-making. Foresight programs are a well-established method for increasing policy makers' capacity to envision change and formulate future-oriented policies.

Foresight programs

Early literature on foresight programs uses the term “technology foresight” because foresight programs initially emerged to address industrial and commercial research needs in response to rapid technological development. As interest in foresight programs spread across disciplines, the more generic term “foresight” became common. The two terms are often used interchangeably. For the purposes of this study, however, the term “technology foresight” will be used to refer to early foresight programs primarily intended to inform science and technology (S&T) and research and development (R&D) policy, while the term “foresight” will be used to refer to later trends in the development and use of foresight programs to address a broad range of policy concerns. Since foresight programs have been applied to a range of policy areas, several definitions currently exist, depending on what the specific purpose of the program is (Yuan, Hsieh & Chang, 2010). The FOREN Handbook (FOREN Network (JRC-IPTS, PREST, CMI and SI), 2001), which resulted from an international multi-disciplinary initiative to increase foresight capacity in a range of policy areas, defines a foresight program as,

... a systematic, participatory, future-intelligence-gathering and medium-to- long-term vision-building process aimed at present-day decisions and mobilising joint actions. (p. v, original emphasis)

Thus, foresight programs are intended to describe a range of possible and preferred futures based on anticipated developments that can be expected to affect policies in the long-term (Grupp & Linstone, 1999). Especially significant and essential

to the purpose of foresight programs, is that possible futures are not evaluated within the context of the programs themselves, nor do foresight programs generate recommendations for policy action. The anticipatory knowledge generated in foresight programs is intended to highlight potential unintended, or unexpected, consequences of policy decisions, and to suggest possible policy actions to promote desirable futures.

The evidence of a growing disconnect between technology use in schools and students' own technology use for learning is a clear indicator of the need for future-oriented, long-term planning in education. Foresight programs have proven an effective tool for increasing policymakers' capacity for long-term planning in a range of disciplines, although most notably to date in the development S&T and R&D policy (Irvine & Martin, 1984; Martin & Irvine, 1989). Foresight programs have been shown to have contributed significantly to the emergence of some countries as global leaders in specific fields, for example, Finland in the field of telecommunications, and Japan in the fields of robotics and material sciences (Martin & Irvine; Salo & Salmenkaita, 2002). Based on the success of foresight programs for developing S&T and R&D policy, there has been growing interest in applying similar methods to other areas, such as educational and social policy. This interest has especially been bolstered by the considerable academic attention given to recent national foresight programs in the UK and the Netherlands, as well as ongoing initiatives among international organizations, including the European Commission (EC), the Organization for Economic Cooperation and Development (OECD), and the Nordic Council, to promote the use of foresight for

national and regional policy planning (Eerola & Jørgensen, 2002; European Commission, 2009a; OECD, n.d.a).

A mapping exercise, conducted in 2008, of national, regional, and sectoral foresight programs worldwide reveals that of the 871 foresight programs, on which detailed information was gathered, 16% include education as one of the policy areas addressed (European Commission, 2009b). Although, the report does not indicate what levels of education are being addressed in the foresight programs, it is reasonable to assume that higher education dominates due to the historical and ongoing relation between foresight programs and S&T and R&D policy. Nevertheless, there is evidence that there is growing interest in the use of foresight for policy planning at educational levels other than higher education. The OECD launched its “Schooling for Tomorrow” (SfT) initiative in the late 1990s (OECD, 2001b). The initiative promotes the use of foresight to develop long-term policy plans for education at all levels, but with an emphasis on primary and secondary education. Thus far, the initiative has gathered documentation on national and regional foresight programs for educational policy development in 11 countries.

Although foresight programs have been described as “policy instruments” (Georghiou & Keenan, 2006), the question of how foresight programs function within broader policy-making processes has received insufficient scholarly attention. The classical stage model of the policy process includes the following six elements (Fowler, 2004):

- Issue definition: An issue is identified and defined as a policy problem.

- Agenda setting: An identified policy problem is brought to the attention of influential actors within the policy system in the hopes that they will act on it.
- Policy formulation: Means of addressing the policy problem are described and debated.
- Policy adoption: The agreed upon form of the policy, i.e. the outcome of the policy formulation stage, is officially adopted.
- Implementation: The policy is put into action.
- Evaluation: The policy is evaluated to determine whether it is doing what it was intended to do.

Foresight programs can potentially contribute to first three of the policy process stages, although, because foresight programs are generally implemented to address specific issues that have already been identified, they are more likely to be associated with stages two and three. By using methods such as forecasting or scenario construction, foresight programs can identify potential issues worthy of policymakers' attention before they become problematic. Foresight can affect the likelihood that a potential issue is placed on the policy agenda by highlighting potential impacts if the issue is not addressed. Foresight can affect policy formulation by highlighting potential inadequacies or unintended consequences of policy formulations before they are adopted. Foresight programs can also be expected to have an indirect influence on the policy adoption phase by lending authoritative credibility to policy decisions through the involvement of a broad range of influential stakeholders. Thus far, scholars have not

sufficiently addressed how foresight programs can be expected to function in relation to these stages of policy processes.

Foresight programs are intended to create policy impacts. Calof and Smith (2010) outline factors that are likely to contribute to this objective but, as helpful as these may be for planning foresight programs, they do not address the connection with decision-making processes within the policymaking system. Georghiou and Keenan (2008), and Da Costa, Warnke, Cagnin and Scapolo (2008) describe two approaches to foresight in terms of how the programs are intended to relate to policymaking processes. The first, referred to by Georghiou and Keenan as “foresight ‘as policy’” and Da Costa *et al.* as “facilitating policy implementation”, describes situations where foresight can be embedded within policy-making processes and is intended to support long-term and future-oriented policy planning. The second, referred to by Georghiou and Keenan as “foresight ‘for policy’” and Da Costa *et al.* as “informing policy”, describes situations where foresight functions alongside policymaking processes and is intended to generate anticipatory knowledge that is then transferred to key players in the policymaking system. Although this categorization of foresight programs clarifies the potential relationship between foresight programs and policy, it does not sufficiently explain the significance of foresight programs from a policymaking perspective.

Most evaluations of foresight programs have employed the “foresight as policy” perspective and assessed policymakers’ and stakeholders’ perceptions of the value of foresight activities on their own thinking about policymaking processes (Yuan, *et al.*, 2010). It is understandable that evaluators and scholars would adopt this perspective. It

is obviously easier to ask individuals about the development of their long-term thinking throughout their involvement in foresight activities than to devise instruments to measure the impact of foresight programs' outcomes on political consensus decisions that have gone through several iterations in the policy formulation stage (Kingdon, 1984; Sabatier, 1991). Nevertheless, most foresight programs that have received scholarly attention have not been implemented as "foresight 'as policy'" activities. Rather, they were implemented as distinct activities with well-defined scope and tasks (Yuan, *et al.*). In fact, Coates (1985) makes a clear distinction between foresight and planning processes, i.e. policy development, suggesting that the notion that foresight can be fully integrated into policymaking processes, as is suggested by the concept of "foresight 'as policy'", is a mistaken one. Indeed, because foresight involves generating well-defined outcomes, i.e. descriptions of future visions, it would always be a distinct identifiable component even when integrated in the policymaking system. Thus, the question of how foresight activities affect policy decisions remains unanswered.

Research Framework

The purpose of a research framework is to model the object of the study. The framework describes what can be expected to happen in given circumstances and how relevant factors in the environment influence context and meaning. It is especially important that the framework align with the purposes and goals of the study.

Foresight programs involve complex processes that are intended to achieve a variety of objectives extending over long periods. Researchers have examined foresight processes from several perspectives using a range of theoretical frameworks to suit their

purposes. No prior studies have focused specifically on intermediate foresight outcomes. Therefore, there are no clear documented examples of frameworks that can be directly applied to the study being described here.

CHAT and the Policy Process

After considering several existing frameworks that have commonly been applied to studies on policy decision making, including Kingdon's (1984) multiple streams model and Mazzoni's (1991) arena model, an analytical framework was chosen that explicitly addresses the role of learning and change, and avoids most policy models' emphasis on partisan bargaining conflict or other discreet stages in otherwise complex policy systems. The framework that was chosen was Engeström's analytical framework based on Cultural-Historical Activity Theory (CHAT), which describes in systems terms how goal-oriented activity is mediated by artifacts in specific contexts (Cole & Engeström, 1993).

Kingdon (1984) contends that policy changes occur when brief "windows of opportunity" open when three "streams"; the problem stream, the policy stream, and the politics stream, meet to create an impetus for change. The Iceland 2020 program was a very opportunistic program in that it was implemented in a time of crisis (see about the research context below) by a new government that was intent on making an indelible mark on Icelandic society. Thus, Kingdon's model would have provided a useful framework for exploring relationships between policymaking streams and foresight programs. Mazzoni (1991) studied how shifts between different "policy arenas", i.e. where policy decisions are made, can lead to major policy innovations rather than

incremental policy change. Initially, Mazzoni identified two arenas: the subsystem arena, that involves interest groups, local politicians and education committees; and the macro arena, that involves major political forces, mass media, and the general public. Mazzoni later extended the model to include the leadership arena, that involves top-level politicians, and the commission arena, that involves special commissions established by government officials. Thus, Mazzoni's model presented an opportunity to test whether foresight programs might constitute new types of arenas or, if not, what kind of arenas they are.

Both Kingdon's and Mazzoni's models are representative of stage-based models of policymaking, i.e. they portray policymaking as occurring in stages and cycles that can be studied as causal sequences of events, and even divided up to study specific stages. Sabatier (2007) has been highly critical of stage-based theories of policymaking because he sees them as overly simplistic and based on assumptions about causality that are demonstrably untrue. According to Sabatier, and others that he cites, policymaking systems are messy and complex, involving interactions and flows that cannot easily be separated into smaller units for study. He goes on to claim that frameworks for studying policymaking processes must be scientific, empirically tested, holistic, and address the many aspects of policymaking.

Engeström's CHAT framework is an analytical tool for studying human activity in social systems (Cole & Engeström, 1993). The basic underlying premise of CHAT is that human activity, including policymaking, involves interactions among individuals as they adapt, and adapt to, their surrounding environment to achieve common goals.

Through these interactions individuals are assumed to equip themselves with new understandings, concepts and tools that alter their relationship with the world around them. Thus, CHAT is a framework that, rather than seeking to avoid the complexity and chaos inherent in any human endeavor, embraces it and seeks to provide tools for charting pathways through complex systems to illuminate the intricacies of human activity. This presented a good fit for studying foresight programs because it is precisely the purpose and aim of foresight programs to give shape, meaning, and context to complex ideas that have yet to be realized.

Most theories of the policy making process involve a critical agenda-setting stage (Kingdon, 1984), in which participants “make sense” of various issues that are being raised. That sensemaking process, in CHAT, is inherently both individual and socially situated. To give an example, a teacher who is unfamiliar with AI agents, such as Google Assistant and Siri, which are available in most smartphones that are in use today, is likely to regard them simply as artifacts within the educational environment with limited, if any, utility, either for herself or her students. Inevitably, if for no other reason than the pervasiveness of smartphones, the teacher becomes familiar with the capabilities of AI agents, through her observations and interactions with smartphone users or suppliers of relevant apps. As this occurs, the teacher starts to recognize AI agents, not as a mere object, but as meaningful tools that are used to accomplish specific tasks. Thus, AI agents, as they are imbued with meaning, become artifacts that mediate the teacher's actions, i.e. actions that she takes are related to how she perceives AI agents within certain contexts. She may, for example, see that students use their AI agents for

disruptive or distractive activities, such as playing games, or messaging one another during class. This may lead her to implement policies that limit the use of smartphones in the educational environment. Alternatively, she may focus on how AI agents can enhance students' learning by providing new forms of engagement, easy access to information, and creative tools for learning activities. Consequently, the teacher implements policies that encourage students' use of their smartphones for learning activities. Thus, we have two examples involving the same objects, but with very different perceived meanings, that, subsequently, lead to very different policy actions.

The same applies to new concepts introduced into a policy environment. New concepts create new ways to talk about one's environment, thereby providing ways to make more nuanced distinctions and, thus, expanding individuals' sense of the world that they inhabit. Once appropriated, these new tools, whether they be conceptual, material or procedural, become the basis for a range of activities, including the development of newer concepts and procedures, i.e. they serve as artifacts that mediate social activities that, themselves, create new tools for relating to an ever-changing environment.

Key Elements of CHAT

Engeström developed his CHAT framework to analyze activities that involve the creation and use of constructed concepts, tools and processes as mediating artifacts in social interactions (Cole & Engeström, 1993). Engeström (2001) describes five principles that define his CHAT analytical framework:

1. The unit of analysis is a social context in which an activity takes place that is oriented toward a specific goal and is mediated by artifacts, i.e. tools constructed by humans to convey and further develop meaning.
2. The social context in which the activity takes place is a community where many points of view, traditions and interests exist and are represented by multiple actors' roles within the context.
3. The social context in which the activity takes place has been shaped over long periods of times by forces that extend beyond the particular context.
4. Contradictions that accumulate over time and result from internal and external tensions are sources for change.
5. Contradictions within the social context can bring about transformational change in the way that goals are defined and pursued.

The CHAT analytical framework is intended to model the social contexts within which human activity occurs to help identify contradictions that either hinder or support the pursuit of common goals. The model provides significant flexibility because it places the focuses on human activity within a generic conceptualization of social context, rather than emphasizing the roles of specific social institutions, as is the case with Kingdon's (1984) and Mazzoni's (1991) models. Thus, the framework can be applied to any social context in which individuals involve themselves in a shared activity. The important thing is that there is an identifiable context, a common goal, and artifacts through which the activity being studied is mediated. Intermediate foresight outcomes involve a distinct activity, a social context, and mediating artifacts, i.e. they are realized through the

transfer of immediate foresight outcomes to relevant organizational contexts. Thus, the object of the current study fulfills the requirements for a CHAT analysis. The CHAT analytical framework also meets the criteria for a suitable framework for the study:

- The unit of analysis is the social context within each relevant organization.
- The activity to be analyzed is the transfer of knowledge to organizational contexts.
- The goal of the activity is organizational change.
- Organizational change is expected to occur as new meaning is constructed within the organizational context.

The purpose of this study was to develop an understanding of how foresight activities inform educational policymaking processes and the formulation of long-term goals for educational policy in Iceland. Although not specifically formulated as an hypothesis test, the study used the foresight outcome framework suggested by (Schartinger, et al. (2012) and Havas, Schartinger & Weber (2010) as a launching point to explore how immediate foresight outcomes were transferred from program contexts to participants' organizational contexts, and how they were used to contribute to the realization of intermediate foresight outcomes. The two central questions guiding the research were: 1) How are immediate foresight outcomes transferred to organizational contexts? 2) How are immediate foresight outcomes used to effect change in organizations?

Several additional sub questions are central to connecting the sensemaking focus of the CHAT framework to other elements of the CHAT framework. Two relate to the first of the central questions:

1. What do foresight program participants perceive as useful outcomes of the programs that they participated in?
2. What are foresight program participants' perceptions regarding the purpose of foresight activities in relation to educational policymaking in Iceland?
3. How do foresight program participants perceive their role as regards the diffusion of foresight outcomes within their organizational environment?

Two additional subquestions relate to the second central question:

1. What do foresight program participants feel is their role in shaping Iceland's future educational policy landscape?
2. How do foresight program participants see program outcomes contributing to educational policy discourse in Iceland?

A Context for Studying the Policy Application of CHAT

Because of the complexity of the CHAT framework, it has been applied to micro-analysis and small group or organizational settings more often than to larger social processes. In contrast, the argument above suggests that the CHAT framework could illuminate the way in which government-sponsored foresight programs could affect a larger national policy process.

This study focused on two foresight programs that were implemented in Iceland in 2008 and 2013 to address issues relating to education. Responsibility for educational

policy in Iceland is divided between the Ministry of Education, Science and Culture (MESC), municipalities, and individual educational institutions. The MESC issues national policy communications on targeted areas in educational development and is responsible for the national curriculum guidelines for all educational levels.

Municipalities and individual schools have considerable flexibility within the framework of the national curriculum guidelines to establish their own priorities and educational practices. ICT policies for education have been issued by the MESC and there is considerable emphasis on ICT in the national curriculum guidelines.

In 2006, Icelandic educational institutions at all levels were found to be very well equipped with ICTs in comparison with other European countries (Empirica, 2006). The MESC aggressively promoted the use of ICTs in education starting in 1996, followed by a revised policy in 2001, and another in 2005 (MESC, 1996; 2001; 2005). The 1996 and 2001 policies were considered to have been very successful, in that they made resources available to equip educational institutions with needed technologies and significantly expanded the role of ICTs in education (IBM Consulting Services, 2002). The 2005 policy was, however, less productive. The MESC was criticized for its 2005 policy, which was issued under a new Minister, for failing to address critical issues and not making adequate resources available to keep schools' ICTs up-to-date (Capacent, 2007). ICTs have received little attention within the MESC between 2008 and 2013 and no specific revised policy addressing ICTs in education was issued during that time. ICT development in education continued, nonetheless, primarily through small collaborative initiatives among educators and special interest groups. These small-scale initiatives

were not able to sustain the interest and momentum in educational development with ICTs that the MESCS's first 1996 and 2001 policies fueled.

Around 2012 there was renewed interest in ICTs for education which was very much focused on the possibilities afforded by tablet computers. A program launched in Norðlingaskóli comprehensive school in 2012, to equip all ninth-grade students with Apple iPads (Jakobsdóttir, et al., 2012). The project raised considerable interest among educators, policymakers, and even the public, and resulted in renewed interest in ICTs in education. Not only was it regarded as innovative, it also aligned with Icelanders' general interest in seeking out new ways to address social issues, following the collapse of the Icelandic financial system in 2008.

In the Fall of 2008, during the global economic downturn, Iceland's financial system collapsed when the three largest banks operating in the country failed (Jóhannesson, 2009). In the aftermath, the Office of the Prime Minister (OPM) launched a nation-wide foresight program in the summer of 2009, dubbed Iceland 2020, less than a year after the financial collapse had devastated the country's economy (Office of the Prime Minister, 2011). The initiative was intended to address three thematic areas: promote regional strategic planning, construct future visions, and develop plans to increase Iceland's competitiveness. To address the second theme, the construction of future visions, Iceland's first comprehensive national foresight program was implemented to explore possible futures for Iceland over the next decade with the aim of highlighting social, economic, international, educational, and labor policy needs. The program included consultations with over 1,300 members of the general public and the

construction and analyses of future scenarios for Iceland, that involved key stakeholders representing labor unions, employer organizations, educational institutions, and special interest groups, in addition to government officials. The immediate outcomes of the foresight activities were used to compile lists of policy recommendations, objectives, and further activities to contribute to sustainable long-term policy development.

Following the implementation of the Iceland 2020 program, there was increased interest among policymakers in the application of foresight and futures methods to policymaking activities. In 2013 the MESC launched a national foresight program of its own focusing on the future of ICTs and education, and teachers' knowledge needs (Capacent, 2014). The aim of the MESC's program was to gather and disseminate intelligence regarding anticipated futures of education and ICT development, and to promote forward-looking policy initiatives.

These two foresight programs, Iceland 2020 and the MESC's 2013 foresight program are the focus of this study, which examined program participants' perceptions of the immediate and intermediate outcomes of the programs.

Applying CHAT to the Icelandic Policy Context

Both the Iceland 2020 and the MESC's foresight programs were implemented as responses to perceived needs for systemic change. In both cases, relevant issues were ill defined: Iceland 2020 was meant to ensure that a social crisis, like that of 2008, would not occur again, even though it was not entirely clear at the time what had caused it; the MESC's foresight program was intended to prepare the educational system to adapt to technological change, even though it was not clear at the time what that change would

entail. The programs were intended to provide a sense of direction and meaningful context in situations where both were lacking. Thus, the primary objective of both programs was to construct new meaning that would suggest appropriate actions for moving Icelandic society and the educational system forward. The CHAT framework is intended to help researchers and analysts identify the ways that new meaning affects specific activity systems. In the cases of the two programs, both produced a range of outcomes that were expected to be transferred to participants' organizational contexts, i.e. their organizational activity systems, where they would potentially prompt reconsideration, and reconfiguration, of how issues relating to the foci of the programs are addressed. Thus, both programs generated several comparable examples of organizational activity systems being exposed to novel mediating artifacts. Since these examples conform to the criteria for applying the CHAT framework, they offer opportunities to apply the CHAT to foresight programs as a form of knowledge transfer that has, as yet, received little scholarly attention.

CHAPTER 2: FORESIGHT PROGRAMS AND THE ICELANDIC CONTEXT

The previous chapter located this research project in the context of existing research frameworks for studying policymaking. Because the study is deeply embedded in two foresight programs, it is appropriate to introduce more detail about the emergence of foresight both as an approach to policymaking and as a set of tools that have been used in a variety of contexts. In addition, this chapter presents more detailed information about Cultural-Historical Activity Theory (CHAT) and how this study will apply it. Finally, because few people are familiar with the Icelandic education system, this chapter also provides more detailed information about some of the specific historical and current characteristics that reflect the context in which the study was conducted.

Foresight

Technology foresight emerged in the early 1980s as a response to a perceived need for systematic long-term approaches to research and development (R&D) and science and technology (S&T) policy due to the increasingly rapid development of technology and growing global economic competition (Martin & Irvine, 1989). In their seminal work on the subject, Irvine and Martin (1984) describe foresight as a structured activity, usually at the national level, involving a broad range of stakeholders, that uses futures and forecasting methods to affect current decision-making by revealing potential long-term impacts of technological developments.

Irvine and Martin (1984) derived their terminology from their review of “hindsight” studies that traced the origins of practical technological innovations (Martin,

2010). The hindsight studies described by Irvine and Martin were intended to address debates concerning the allocation of public resources to research. Irvine and Martin frame the debate in terms of conflicting beliefs concerning the practical outcomes of two distinct types of research. On the one hand, is basic research, or the “science push” model, i.e. research that is driven only by the inquisitiveness and creativity of scientists that may or may not address specific known issues. On the other hand, is applied research, or the “market pull” model, i.e. research with foreseeable technological, social or economic value. Proponents of applied research argued that basic research has little commercial value and should be considered less of a priority in the consideration of allocation of public funds than applied research. Based on their comparative review of several hindsight studies, Irvine and Martin determined that scientific innovations are generally the result of complex interrelationships between both basic and applied research over long periods of time. Therefore, they proposed that the hindsight process be reversed and extended over long periods of time to address decision-making needs for the allocation of public funds for research. Hence, they adopted the term “foresight” to describe a future-oriented method for generating knowledge about anticipated or preferred long-term trajectories of technological development (Martin, 2010).

The appropriation of such a commonly used colloquial term has proven problematic. Later authors have used the terms “foresight” and “technology foresight” as a technical term to refer to a broad range of future-oriented activities, often only loosely related to the reference originally intended by Irvine and Martin (Miles, Harper, Georghiou, Keenan & Popper, 2008; Yuan, Hsieh & Chang, 2010). In part, the growing

ambiguity of the term is likely a result of scholars' desire for the authoritativeness of a technical term and then conflating it with the colloquial meaning of a common everyday term. Miles, *et al.* suggest that the current ambiguity of foresight terminology is largely the result of scholars wanting to situate their work in the context of a field of perceived growing importance. Therefore, it is necessary to be clear that, although foresight builds on established practices in futures studies and forecasting, it differs considerably in terms of its scope of activities, the way methods are used, and the ontological assumptions underlying its activities.

The evolution of foresight

Irvine and Martin (1984) are most often credited with first defining the term “technology foresight”. They define foresight as (cited in Miles *et al.*, 2008),

... the process which seeks to look into the longer term future of science, technology and economy and society with the aim of identifying the areas of strategic research and the emerging generic technologies likely to yield the greatest economic and social benefit. (p. 10).

Lederman, however, used the term “foresight” in a similar context as early as 1983 and again in an often-cited paper published in 1984 (Yuan, *et al.*, 2010; Lederman, 1984; Lederman, 1983).

Interest in technology foresight grew rapidly in the 1980s. Yet, it was not until the late 1990s and early 2000s that scholarly discourse on foresight programs really took off, and then primarily in Europe. This was partially due to well-publicized foresight programs in the U.K. and the Netherlands that were largely based on Irvine and Martin's

research. Additionally, a significantly increased emphasis on innovation, science and technology on a European level provided further impetus for critical scholarly discourse on the emerging field of technology foresight. Since then, the definition of technology foresight, or simply “foresight”, has evolved to reflect various approaches to foresight as the implementation of foresight programs has spread and developed. Today, multiple definitions coexist that describe a variety of activities that share some characteristics while differing in fundamental ways. In this section we examine the development of the terms “technology foresight” and “foresight” in the scholarly literature.

Irvine & Martin’s definition suggests that the aim of foresight activities is to provide recommendations concerning areas of research and types of technologies worth pursuing based on their potential economic and social impact. This definition differs significantly from the later broader view of foresight developed in the European FOREN project, where foresight is defined as “... a *systematic, participatory, future-intelligence-gathering and medium-to- long-term vision-building process* aimed at present-day decisions and mobilising joint actions.” (FOREN Network, 2001, p. v, original emphasis). The FOREN definition suggests that foresight is applicable to a range of policy areas other than those directly dealing with technology and research. Furthermore, the suggestion that foresight activities provide policy recommendations is not apparent in the FOREN definition. The obvious contrasts between these definitions of foresight indicate a considerable developmental process over time, supporting Georghiou’s (2001) claim that, indeed, a historical view of foresight reveals a generational development pattern.

Georghiou (2001) identifies three distinct generations of foresight activity. Miles, *et al.* (2008) expand on Georghiou's generational development model to include two additional generations. Table 2 describes the most significant differences between the generations of foresight based on their scope, i.e. who participates in the activities, common inputs, and anticipated outputs.

First generation foresight is concerned with technology forecasting and primarily driven by, and intended to facilitate, the continuing development of technology itself. Irvine and Martin's (1984) early definition of foresight is an obvious example of the first generation of foresight. Primary emphasis is on broad social and scientific factors as inputs and on information for stimulating further research and technological development as the sole outputs of the activity. The second generation of foresight adds a market orientation toward technological development and is characterized by concerns about future prospects for product development. Georghiou's (1996) own definition of foresight exemplifies second generation foresight (as cited in Miles *et al.*, 2008, p.11),

... a systematic means of assessing those scientific and technological developments which could have a strong impact on industrial competitiveness, wealth creation and quality of life.

The third generation of foresight maintains the market orientation of the second-generation foresight, but also considers broader social aspects of technological development. The primary difference between second and third generation foresight is that the third generation seeks to include a broader range of representatives of society in the foresight process. Thus, third generation foresight does not differ significantly from

the second generation in terms of how we define the activity, but rather in how the activity is conducted. Miles, *et al.*'s fourth generation is characterized as being more distributed throughout multiple, often self-serving, organizations, but centrally coordinated by a policy-making authority. The fifth generation, like the fourth, is conducted at an organizational level, but mixes foresight with other strategic planning exercises and, therefore, tends to be more oriented toward the inner workings of S&T and innovation systems. The developmental model of foresight described by these generations is not intended to suggest that foresight has transitioned from one generational model to another, only that these different approaches have emerged in a generational manner. Presently, they coexist and provide a range of possible forms of foresight to choose from based on the purpose and aims of the foresight activity.

Table 2

Generations of Foresight

	First generation	Second generation	Third generation	Fourth generation	Fifth generation
Scope	<p>Policymakers</p> <p>Subject area experts</p>	<p>Policymakers</p> <p>Subject area experts</p> <p>Industry</p>	<p>Policymakers</p> <p>Subject area experts</p> <p>Industry</p> <p>Society representatives (special interest groups, general public)</p>	<p>Organizational leaders</p> <p>Subject area experts</p> <p>Industry</p> <p>Society representatives (special interest groups, general public)</p> <p>Policy makers</p>	<p>Organizational leaders</p> <p>Subject area experts</p> <p>Industry</p> <p>Society representatives (special interest groups, general public)</p> <p>Policy makers</p>
Domain	Science and technology	Science and technology	Science and technology Social policy	Science and technology Variable configurations depending on participants	Science and technology Variable configurations depending on participants
Inputs	Social and scientific benefits of technology	Social and scientific benefits of technology Potential product development Markets	Social and scientific benefits of technology Potential product development Markets	Social and scientific benefits of technology Dependent on participants	Social and scientific benefits of technology Strategic plans Dependent on participants
Outputs	Funding priorities for technological development	Funding priorities for technological development	Funding priorities for technological development Public policy Education and training needs	Resource allocation for technological development Public policy Organizational strategies	Resource allocation for technological development Public policy Organizational strategies

Source: Georghiou, 2001; Miles, et al., 2008

Characteristics of Foresight Programs

Ontological Assumptions. Martin and Irvine (1989) claim that foresight is based on the assumption that at any given time in the present, there are multiple possible futures, and that, therefore, the future is not predictable,

... the notions of forecasting and foresight involve very different ontological assumptions about the future. In conventional forecasting, the aim is to arrive at predictions which can be justified ‘scientifically’ ... The underlying assumption is that only one probable future exists, and that this can be linked in a unilinear and deterministic way to the present and the past. In contrast, the goal in foresight is to survey as systematically as possible ‘what chances for developments and what options for action are open at present, and then follow up analytically to determine to what alternative future outcomes the developments would lead.’

This is in stark contrast to Martino’s (1993) definition of technology forecasting as “... a prediction of the future characteristics of useful machines, procedures, or techniques.” (p. 1). Martino’s definition of technology forecasting suggests a deterministic orientation to the future, i.e. that the future is somehow knowable and can be derived from analyses of the present. Martin and Irvine, on the other hand, make no such assumption. They expressly acknowledge the indeterminability of the future. This is indicative of a fundamental difference regarding the perceived role of foresight activities as opposed to technology forecasting. Technology forecasting is a method

intended to reveal what is considered to be the inevitability of the future. Technology foresight, on the other hand, is intended to reveal the multitude of possibilities that the future can hold and to promote proactive actions to encourage the realization of preferred futures.

It should be noted, however, that Martin overstates the role of predictions in future studies. Cornish (2004) states, “The goal of futuring is not to predict the future but to improve it. We want to anticipate possible or likely future conditions so that we can prepare for them.” (p. 65). Although predictions are a normal feature of many futures and forecasting methods, they are often intended to serve as illustrative examples of possible futures rather than conclusive prognoses on future events. For example, scenario construction exercises often produce vivid descriptions of anticipated futures. Lindgren and Bandhold (2003) list several scholars’ definitions of scenario construction that, despite some subtle differences, reflect a general agreement that scenarios are not predictive forecasts. Rather, they aim to describe possible futures based on variable configurations of uncertainty factors. In this sense, the assumptions about the future in regard to scenario construction are very similar to those influencing foresight activities. There is, nevertheless, a fundamental difference between foresight and scenario construction that is inherent in the way that each is practiced. While scenario construction involves specialists isolating specific uncertainty factors for analysis, foresight attempts to take a more holistic and systems thinking approach to future planning (Schwarz, 1996; Martin, 2010). This is most evident in the broad participative nature of foresight activities and the multiple-methods approach. These two crucial

dimensions of foresight are intended to facilitate the integration of multiple points of view and to make them visible in the output of the activity (Loveridge & Street, 2005). This suggests a strong social constructivist leaning as regards assumptions underlying foresight about the forces that shape the future, i.e. that the future is a product of meanings constructed through the experiences, anticipations, and interactions of all members of a society. Forecasting methods, in Martino's (1993) sense, suggest an objectivist notion of the future, i.e. that the future is in some sense "out there" and can be extracted by individuals with specialized knowledge. Although the differences in the ontological assumptions underlying foresight and other future-oriented planning methods are not as great as Martin claims, there remain fundamental differences that distinguish the methods from one another.

Scope of activities. One of the most distinct and intentional characteristic of foresight programs is their broad participative nature (FOREN Network, 2001; Grupp & Linstone, 1999; Georghiou, 1996). As such, foresight is a departure from previously existing futures and forecasting methodologies that are generally dominated by experts in the methodologies involved and specialists, often academics, in the subject-area under consideration (Martino, 1993). Irvine and Martin (1984) discovered that futures and forecasting activities conducted in the 1970s were prone to being overly influenced by the self-interests of the academics and experts involved. In particular, they found that academics who participated in forecasting activities tended to overstate the significance of their own subject areas to ensure future funding for their research. In contrast, they found that a more holistic approach to long-term planning had been developed in Japan

that, although also dominated by experts and academics, involved larger numbers of specialists, often numbering in the thousands, and significant collaboration among participants. Irvine and Martin went on to develop their broad collaborative approach to technology foresight based largely on the findings of their studies of foresight programs in Japan (Martin, 2010).

The broad participative nature of foresight activities serves two purposes. The first is to broaden the knowledge-base from which valuable insights can be drawn and to promote holistic approaches (Smits, 2002). The second is to increase the visibility of policy-making activities and promote broad ownership of potential future developments (Glenn & Gordon, 2004). Foresight activities therefore tend to involve as many key stakeholders as is deemed relevant to the purpose of the activity, including policy makers, subject-area experts, industry leaders, and, in some cases, members of the general public. The holistic dimension is preserved by a central coordinating body, often a public policy-making authority or other organization that initiates the foresight activity, though interaction between stakeholder groups varies (Georghiou, 2001). While some scholars have voiced doubts about the effectiveness of the broad participative approach in foresight activities, or what has been referred to as the “indiscriminate extension of technical decision-making rights”, it remains a critical component of foresight (Rask, 2008, p. 1158).

As crucial as the participative dimension of foresight activities is, it also tends to be problematic, primarily due to the challenges involved in managing large projects (Alsan & Oner, 2004). Nevertheless, however successful the holistic and participative

dimensions of foresight are in practice, they are a critical factor in planning foresight activities and are assumed to affect activities' outputs.

Foresight methods. No methods unique to foresight activities have yet been developed (Grupp & Linstone, 1999). Foresight activities use a broad range of methods that have been developed within other related fields, throughout various stages of the processes involved, ranging from planning the activity to evaluating the outcomes. This multiple-methods approach defines foresight as a process and sets it apart from other future studies and forecasting exercises (Johnston, 2008; Popper, 2008; Coates, Farooque, Klavans, Lapid, Linstone, Pistorius, *et al.*, 2001). Popper (2008) identifies 33 qualitative and quantitative methods that are commonly used in foresight activities. Popper's analysis reveals no specific patterns in the selection or use of methods, but rather emphasizes that, in the context of foresight activities, methods are tools to be assembled according to the needs of each specific activity.

Keenan, Butter, de la Fuente, & Popper (2006) studied the use of methods in foresight activities throughout the world and discovered that most activities use between 4 to 7 methods. Their study also revealed obvious trends in the use of methods in foresight activities, with expert panels and scenario construction being the most commonly used, followed by futures workshops, brainstorming, megatrend analysis, and Delphi. The frequent use of expert panels and scenario construction is not surprising considering that these are both very well established, rigorous, and easily manageable methods. However, Keenan *et al.*'s data suggested that the selection of methods is not merely based on convenience factors or familiarity, but that there is a strong correlation

between the methods used and the purpose of the foresight activity and the time range to be addressed.

The multiple-methods approach is a defining characteristic of foresight activities, but it also introduces a level of complexity that needs to be carefully considered when planning the activities. Certain methods are suited to specific types of foresight activities and mismatches between the methods used and the type of activity planned can prove costly and unproductive. Rask (2008) discovered that this was the case in a foresight program implemented in Malta, where the expert panel and scenario construction methods used were ill-suited for policy makers, who were the key actors in the program, due to their lack of in-depth subject knowledge. However, Harper & Georghiou's (2005) evaluation of the Malta foresight project demonstrated how the mismatch between participants in the program and the methods used was addressed with little disruption in the program activities. This was accomplished by providing methods training for the policy makers involved and the introduction of additional participants with the needed expert knowledge.

An overview of foresight research

There has been a remarkable abundance of research on foresight in its relatively brief existence. Since the mid 1990s two widely cited journals have been published which are entirely dedicated to foresight research, the *International Journal of Foresight and Innovation* and *Foresight*, while several older journals on futures and forecasting have become important outlets for foresight research. Foresight is also actively promoted by several international bodies, including the European Commission (EC), the

Organization for Economic Cooperation and Development (OECD), and the United Nations Industrial Development Organization (UNIDO) (European Commission, 2009; OECD, n.d.b; UNIDO, n.d.).

The rapid increase in scholarly interest in foresight programs likely stems, in part, from the nascency of the approach and the need to refine definitions and methodologies. However, there has also been extraordinary growth in the number of foresight programs implemented in the last decade. The European Foresight Monitoring Network (EFMN) conducted an annual mapping exercise of foresight programs worldwide from 2004 to 2008. According to the 2006 report, EFMN had, by that time, documented over 500 active national, regional, and sectoral foresight programs in Europe alone (Keenan *et al.*, 2006). By 2008, the project had gathered detailed information on over 700 active foresight programs in Europe and brief descriptive information on another 750 programs (European Commission, 2009b).

Most of the scholarly research on foresight has been focused on national foresight programs addressing S&T and R&D policy needs. Since 1994, when the UK implemented its First Technology Foresight Program, which is often considered the start of the current wave of national foresight programs, over 30 countries have implemented national foresight programs, some more than once (Miles, *et al.*, 2008). Yuan, *et al.*'s (2010) extensive literature review on empirical national foresight research published between 1984 and 2005 revealed 117 relevant articles, most of them published between 1999 and 2005. Of the seven most cited authors, identified by Yuan, *et al.*, all but one specifically identifies national foresight with S&T policy-making.

Despite the focus on S&T and R&D, national foresight programs generally cover a number of subject areas. The EFMN's 2005-2006 Annual Mapping Report indicates that manufacturing and transport are the most extensively covered subjects, with social sciences and humanities trailing not far behind (Keenan, *et al.* 2006). This corresponds with the general emphasis on S&T and R&D policy in national foresight programs. The 2009 Annual Mapping Report uses a different categorization scheme to classify subject areas covered in foresight programs, so it is not directly comparable to the 2005-2006 report. Nevertheless, the data show that the social sciences area remains well represented in foresight programs, trailing behind engineering and technology by a mere 4 percentage points (European Commission, 2009b). Yet, despite evidence that the social sciences figure prominently in national foresight programs, the development of social policy, including education, has received little attention in the foresight literature.

Foresight and policymaking

Considering that foresight is clearly defined as a policy instrument, it is surprising how little attention the interplay between foresight programs and policy-making processes has received in the scholarly literature (Calof & Smith, 2010). In part, this is due to the need to address fundamental issues relating to the definition and practice of a new methodology. Scholars have focused much of their attention on the implementation of foresight programs with the purpose of providing information for improving the planning of foresight programs. This is not surprising given that most scholars who contribute to the research literature on foresight have themselves been involved in planning and implementing foresight programs. The lack of scholarly

attention to the relationship between foresight and policy-making systems is also due to the nature of foresight as a policy-making tool. Georghiou & Keenan (2008) refer to foresight as a “soft” policy instrument, meaning that foresight does not produce concrete policy recommendations. Instead, foresight aims to influence policy-making in more subtle ways, often merely pointing policy makers in certain directions in their search for policy solutions. In other cases, the aim of a foresight program is not to address specific policy issues at all, but rather to increase capacity for long-term planning in the policy-making system. These varied roles of foresight make it difficult to position it precisely within the broader context of policy-making systems (Miles, *et al.*, 2008).

Georghiou and Keenan (2008) identify two types of foresight in terms of their role in the policy-making system. The first is foresight “as policy”. In this sense, foresight functions as a capacity building exercise where the intention is to reorient and restructure policy-making processes to support and encourage strategies for long-term planning. The second is foresight “for policy”. Here, foresight functions like a more traditional component of the policy-making system in that it is intended to provide policy makers with information that can have a direct impact on policy decisions. Da Costa *et al.* (2008) refer to the same categories as foresight for informing policy, corresponding to foresight “for policy”, and foresight for facilitating policy implementation, corresponding to foresight “as policy”. They go on to suggest that the generational evolution of foresight, as described by Georghiou (2001) and Miles, *et al.* (2008), is indicative of a shift from the traditional role of informing policy to a role of facilitating policy implementation. If this is the case, then it has implications for how

foresight is positioned within the policy-making system. When foresight serves the function of informing policy, its position in the policy-making system is defined by the types of products that the activity is intended to produce. If the function of foresight is to facilitate policy implementation, then it has no easily definable position within the policy system because it is spread across the policy system. Da Costa *et al.* suggest that such a lack of visibility of the direct impact of foresight could undermine its credibility within the policy-making system. This could prove problematic for foresight practitioners as they struggle to find ways to promote foresight at multiple levels within the policy-making system, while also ensuring that foresight activities produce tangible results.

In the case of national foresight programs, there is, thus far, little indication of a noticeable trend of foresight taking on a role of facilitating policy implementation. Documented cases of national foresight programs show that they are generally well-defined in terms of their anticipated function and outputs and expected to generate useful intelligence for policy makers rather than to serve as mere training exercises (European Commission, 2009b). Nevertheless, there is a need to increase our understanding of how foresight functions within and in conjunction with policy-making systems to ensure that activities are appropriately planned to maximize their impact on policy decisions.

ICT and Educational policy in foresight programs. The EC's 2009 Annual Foresight Mapping Report indicates that education, in particular, is covered by 16% of the 871 foresight programs worldwide that have been documented in detail. No distinction is made between higher education and primary and secondary education in

the data. It is likely that the education subject area is dominated by a focus on higher education and researcher education, as that would be consistent with the general focus on S&T and R&D policy development. This would explain the discrepancy between the moderately high coverage of education in national foresight programs suggested by the Annual Mapping report data and the low coverage of educational and other social policy in the scholarly literature on national foresight (European Commission, 2009b).

Several international organizations have launched projects to promote and monitor long-term policy planning in education, though not all have been explicitly defined as foresight programs. One example is the OECD's "Schooling for Tomorrow" (SfT) project. The OECD launched the SfT project with the publication of a report that describes a series of scenarios organized around the themes, "status quo", "re-schooling", and "de-schooling" (OECD, 2001b). The purpose of the report, and the project as a whole, is to promote the use of future-oriented policy planning methods in education by providing a launching point for national future-oriented policy planning projects. The SfT project has resulted in several reports about future-oriented, long-term planning projects in education in participating countries (OECD, 2001b; OECD, n.d.c). Some participating countries have integrated their projects with currently implemented, or planned, national foresight programs (OECD, n.d.c). Most, however, have not, even though several of them do currently have foresight programs being implemented. Among the countries who have chosen not to integrate their SfT participation in national foresight programs are Sweden and Finland, despite their being among the few countries to have defined an explicit educational component in their national foresight programs

(Academy of Finland & Tekes, 2006; Swedish Technology Foresight, 2000). Thus, there is clear evidence of a growing interest in the use of foresight methodologies for educational planning. The currently available evidence, however, suggests considerable duplication of efforts and lack of coherency in the strategies being pursued.

To date, few systematic future-oriented planning initiatives on educational policy have received scholarly attention. Among the few exceptions is Finland, which has received considerable attention in recent years, primarily due to Finnish students' superior achievement on international student assessments, such as the OECD's Program for International Student Assessment (PISA) (Darling-Hammond, 2009). Although the term "foresight" is not commonly used in relation to Finnish educational policy development, a number of *foresight-like* future-oriented and long-term policy planning programs have had a decisive impact on current educational policy.

The most recent wave of educational reforms in Finland, implemented since the early to mid 1990s, have been based on several programs, referred to by Salo, Brummer, & Könnölä (2009) as "foresight programs". These programs addressed a number of policy areas and have been shown to have been instrumental in developing Finland's capacity for long-term planning for S&T, economic and social policy (Schienstock, 2007). Nevertheless, the term "foresight" has not been commonly used to describe Finland's long-term strategy development in any official documents prior to the launch of its FinnSight 2015 program in 2006 (Academy of Finland & Tekes, 2006). Nevertheless, past projects display several characteristics of foresight programs,

including the involvement of a broad range of stakeholders and the use of scenario construction and expert panels (National Board of Education of Finland, 2001).

The outcomes of Finland's foresight programs have resulted in well-articulated and holistic visions of preferred futures for the nation. As a result, Finland has emerged as a dynamic knowledge society that promotes innovation, creativity, information technology and self-directed continuous learning (Schienstock, 2007; Niemi, 2003). Not only has this contributed to an effective education system, but Finland also routinely ranks among the top nations in the world in terms of innovation and competitiveness (Insead, 2010; Schwab, 2010).

Several scholars have attempted to identify specific practices within the Finnish educational system that contribute to their success (Darling-Hammond, 2009). Indeed, the Finnish educational system does exhibit a number of unique characteristics that are consistent with the long-term strategies developed in their foresight activities. These include their proactive orientation towards ICTs in education as tools for producing information and facilitating collaborative learning, and the focus on fostering creativity and innovation from a very young age (Aho, Pitkänen & Sahlberg, 2006; Alamäki, 2000). Sahlberg and others insist that the key factor in Finland's educational success, and what policy makers in other countries stand to learn the most from, is Finland's systematic future-oriented approach to planning and policy-making (Sahlberg, 2007; Aho, Pitkänen & Sahlberg, 2006; Routti & Ylä-Anttila, 2006). In fact, Sahlberg has warned against indiscriminately appropriating educational policies from Finland,

emphasizing that these policies have been specifically tailored toward the current Finnish context (Sahlberg, 2010).

Since the late 1990s, Singapore has adopted a future-oriented approach to educational policy development. The *Thinking Schools, Learning Nation* (TSLN) initiative launched in 1997, was intended to thoroughly modernize the educational system (Mok, 2003; Gopinathan, 2007). It is, however, questionable to what extent the Singaporean approach constitutes foresight. Firstly, Singapore's *Masterplans for information technology in education*, a component of the TSLN initiative, are short-term plans each covering a period of five years (Luke, Freebody, Shun & Gopinathan, 2005). Secondly, it has proven difficult for Singaporean policy makers and educators to overcome the historical rigidities and centralized authority of the government. Deeply rooted beliefs about students' inherent capacity for learning and tendencies to identify early on in education the winners and losers, goes against the government's stated goals of promoting social cohesion. Thus, Gopinathan claims that, while TSLN has resulted in positive educational outcomes, it has also resulted in inequalities that will negatively affect the government's long-term nation-building plans.

In Thailand, the Office of the National Education Commission (ONEC) launched a foresight program in 2001 on ICT for education (Johnston & Sripaipan, 2008). The stakeholders participating in the program included education and technology specialists, NGO representatives, students, and local "wise men". The program developed several future-visions for expanding the use of ICT for education especially to increase learning opportunities in rural communities. A decision was made to implement components of

the Baan Samka telecenter village model, in which youth take responsibility for transferring ICT knowledge to other village members (United Nations Development Program, 2003). Furthermore, Johnston & Sripaipan found that involvement in the program increased participants overall capacity for, and interest in, long-term policy development.

The eFORESEE program, a foresight program implemented in Malta, also specifically sought to address policy needs for ICT in education. Harper and Georghiou (2005) found that the program produced a number of innovative measures for policy consideration. Among them were the establishment of networks to carry on work related to defining ICT standards and community knowledge needs, and initiatives for promoting ICT and foresight culture in Malta. Furthermore, the foresight program produced several follow-up foresight activities areas unrelated to education specifically.

The experience of countries that have applied foresight to educational policy development demonstrates the value of long-term planning in education. It also emphasizes the importance of the integrated holistic approach to policy planning that foresight programs promote. However, these are but a few cases that differ in considerable ways and have a mixed history of applying foresight to various policy areas. More research of other countries' experiences of applying foresight to educational policy is needed.

Foresight and organizational change.

The focus of this study is on intermediate foresight outcomes, i.e. outcomes that are expected to occur over an approximate five-year period following the

implementation of the foresight program. During this period, and critical to the realization of intermediate outcomes, the scope of foresight activities are expected to be expanded to involve stakeholder organizations in the pursuit of long-term program objectives (Schartinger et al., 2012). This requires that immediate foresight outcomes be communicated to relevant organizations in such a way that internal capacity and motivation to engage in long-term policy discourse and planning is developed.

Some immediate outcomes are more accessible to organizations than others; particularly the substantive outcomes that are described in published reports and other formal dissemination materials. These are intended to make foresight outcomes available to a wide audience, both within and beyond individual organizations including policy makers, stakeholder organizations, professional organizations, and the general public. Subjective and communicative outcomes are initially products of individual participants' learning and, as such, are not as readily shared with individuals or relevant organizations (Argote & Miron-Spektor, 2011). Many of the subjective and communicative outcomes are embedded in individuals' tacit knowledge, i.e. the aspects of human knowledge that are not easily communicated to others (Polanyi, 2009). For these outcomes to be shared, a deliberate effort is needed to make them available to others within the organization. Simply sharing information is unlikely to bring about significant organizational change, just as a textbook on woodworking is unlikely to produce a master carpenter. In keeping with the framework of progressive foresight outcomes, organizations are expected to act on immediate foresight outcomes and make conscious efforts to qualitatively change the way that policy issues are defined and addressed.

Theoretical frameworks on foresight outcomes suggest that organizations absorb and act on immediate outcomes through knowledge transfer. Organizational learning by knowledge transfer occurs when one organizational unit learns from the experience of other units (Argote, 2013). In the case of foresight outcomes, the knowledge transfer is from the context of the foresight program to the organizational context by means of individuals who have represented the organization in foresight activities. Knowledge transfer involves both the explicit and tacit dimensions of knowledge. What is transferred includes the easily identifiable and communicable components of knowledge, for example empirically verifiable factual knowledge and demonstrable procedural knowledge, and the more subtle components, such as the values, assumptions and experiential basis that knowledge is based on. Organizational learning by knowledge transfer has received considerable scholarly attention, most recently in relation to the transfer of learning that occurs within professional networks, communities and organizations (Argote, 2013). Prior research has shown that knowledge transfer is an important and effective means of diffusing new knowledge throughout organizations, promoting organizational change and increasing organizational effectiveness. (Louis & Dentler, 1988; Bryk, Camburn & Louis, 1999; Supovitz, 2002; Maurer, Bartsch & Ebers, 2011).

Foresight researchers have not yet addressed the issue of knowledge transfer as it relates to foresight outcomes. While the results of previous research can likely be applied to some aspects of foresight outcomes, it is worth considering to what extent the transfer of foresight knowledge constitutes a distinct case that merits further research.

In particular, two aspects of foresight knowledge suggest a notable distinction between its transfer and the transfer of other forms of organizational knowledge. The first concerns the relationship between the context where foresight knowledge is constructed and the organizational context in which it is applied. Most research on knowledge transfer that is described in the literature involves transfer within individual organizations or between closely affiliated organizations (Argote & Miron-Spektor, 2011). The transfer of foresight knowledge differs in that it involves an exchange between an external context, i.e. the foresight program, and numerous organizational contexts. It might be argued that the difference here is not significant because the actual transfer occurs between individuals within a specific organization, in particular between the individual who participated in the foresight activities and other members of the organization. However, in the case of foresight programs, the purpose of the knowledge transfer is not merely to diffuse new knowledge within the organization. It is also intended to promote ongoing collaboration between the organizations, institutions and interest groups involved in order to expand continued foresight activities on a system-wide level. So the context of the foresight program cannot be easily dismissed when examining the transfer of foresight knowledge to, and within, organizational contexts.

The second distinction involves the role of knowledge claims in the future-oriented knowledge being transferred. Much of the knowledge that emerges from foresight programs is communicated by statements about possible futures. Although these are often presented in the guise of knowledge claims, they do not conform to accepted definitions of knowledge. If we accept the common definition of knowledge as

justified true belief (Schwitzgebel, 2014), statements about the future would have to be justifiable and true to pass the litmus test of what constitutes knowledge. Statements about the future may be justified on the basis of observable evidence of current states and ongoing trends relating to technological and social development, i.e. available evidence suggests that it is safe for us to assume that foreseeable events will transpire, given certain conditions. However, statements about the future cannot be said to be true, nor false for that matter, since the circumstances being referred to have not occurred (Dudman, 1985; Dancygier, 1998). It may be argued that Morris and Moore's (2000) research on learning from considering how past events might have played out had things gone differently than they actually did, or counterfactual thinking, could be applied to statements about the future. There is an obvious similarity between counterfactuals and statements about the future in that both involve hypothetical descriptions of events that have not occurred. Yet, there is at least one critical difference. Even though counterfactuals are hypothetical, they are, nevertheless, demonstrably false, because the events described by the counterfactual do not correspond with existing evidence of what actually occurred. The truth value of statements about the future, on the other hand, cannot be determined either way since the data that would validate or invalidate them is not yet available to us.

Although statements about the future cannot be said to explicitly communicate knowledge, they do convey a wealth of tacit knowledge. The future scenarios that they describe rest on assumptions concerning human nature, societal values and the role that technology plays in shaping the world that we live in. Inayatullah (1990) states that one

of the primary goals of futures studies is, "... to create a new sense of time; to stretch time by including a longer vision of time within our forecasts, decision making, and living." (p. 131). Statements about the future are tools that we use to achieve the goals described by Inayatullah and it is the tacit knowledge embedded in such statements that plays a key role. They are intended to demonstrate that time is an expansive space that we can stretch in all directions to create conceptual playgrounds in which we can leverage the power of human imagination and creativity to explore ways that possible future changes can affect society, organizations and individuals. It is this tacit dimension of the learning that occurs in foresight programs that is expected to be transferred to organizational contexts by means of intermediate foresight outcomes.

The objective of foresight activities at the intermediate stage is to change the way that policy issues are defined and addressed within organizational contexts (Schartinger et al., 2012). Organizations are expected to institutionalize, and act on immediate outcomes in a manner that contributes to system-wide change. This is a critical stage in the foresight process as it entails the expansion of foresight activities to harness the resources of relevant stakeholder organizations to further the pursuit of long-term program goals. Foresight researchers have yet to address how immediate outcomes contribute to change at the organizational level to produce anticipated intermediate outcomes.

Foresight and organizational theory. Since the purpose of this study is to examine how organizations internalize and act on immediate foresight outcomes, the following need to be adequately addressed to frame the study:

- organizational contexts as units of analysis;
- transfer of knowledge from one context to another;
- outcomes of foresight programs as motivation for change in organizational contexts;
- construction of new knowledge and new meaning within organizational contexts.

Furthermore, it is important for the design of the research to recognize some of the complexities of organizational change. Of particular relevance for this study are the conservative forces within organizational systems, i.e. the norms, values and practices that serve to maintain the status quo.

Schön (1970) claims that organizations are, in general, “dynamically conservative” to the extent that they “fight like mad to remain the same” (n.p.). This is not to say that organizations overtly resist change, but rather that organizational cultures tend to be self-preserving. Thus, even when an organization purportedly adopts new practices and norms, closer scrutiny may reveal that organizational practice remains the same (Argyris and Schön, 1978). Instead of actual qualitative change, novel concepts are used to reframe old practices and norms to present a semblance of change. For intermediate outcomes of FPs to be realized, organizations are expected to demonstrate a commitment to what Argyris and Schön refer to as “organizational learning”, that is that the organization not only acknowledges changes in its environment but also uses its resources to adapt itself to changing circumstances.

Scholarly discourse on organizational learning has advanced considerably since Argyris and Schön (1978) brought attention to the topic. Supovitz (2009) categorizes the current organizational learning landscape into three distinct theoretical approaches. The first is Argyris and Schön's conceptualization of organizational learning, which emphasizes the role of individuals within the organization. They view individuals as the carriers of new knowledge to be taken up in the organization to affect change. The second approach focuses on organizational culture and is commonly identified with Cook and Yanow (1993). Here, the assumption is that organizational learning is a collective activity that involves the organization as a whole. Organizational learning is seen as being deeply embedded in shared values and beliefs within the organization and therefore transcends any individual member. Finally, the systems approach, described by Huber (1991) and Kim (1993), describes organizational learning in terms of systemic procedures and routines that are put in place within the organization to collect and process individuals' knowledge.

The focus of this study is the transfer of knowledge and experience gained by an individual member acting as an agent for the organization in a foresight program. This suggests a close alignment with Argyris & Schön's (1978) individualistic approach to organizational learning. However, the distinctions between the various theoretical approaches are not as clear-cut as may seem. As Kim (1993) points out, whatever meaning we ascribe to organizational learning, "organizations ultimately learn via their individual members" (n.p.). Although any of the three theoretical approaches to organizational learning could be applied to the study, it is most closely aligned to the

individualistic approach ascribed to Argyris and Schön (1978) who describe organizational learning as an adaptive process (p. 29):

Organizational learning occurs when members of the organization act as learning agents for the organization, responding to changes in the internal and external environments of the organization by detecting and correcting errors ... and embedding the result of their inquiry in private images and shared maps of organization.

Argyris and Schön (1978; 1996) contend that actions are performed on the basis of theoretical beliefs, or mental maps, about what a given action entails and what it will achieve. In their research on organizational behavior, they found that, while an organization may claim to base its actions on one theory, closer examination may reveal a very different underlying theory. This is not simply a matter of saying one thing and doing another. Argyris and Schön are claiming that there are two theories of action in play simultaneously within the organization. On the one hand is the theory that governs what the organization claims that it does, referred to as the *theory espoused*. On the other hand is the theory that governs the actions that the organization actually performs when addressing issues, referred to as the *theory-in-use*. Both of these shed light on how and why the organization does what it does when faced with issues that need to be addressed. Thus, if our intention is to determine how an organization reacts to changes in its environment, we cannot simply ask the individuals in the organization, as that is likely to

only reveal the theory espoused. To get at the theory-in-use, we need to look at the actions that the organization actually takes and the context in which those actions occur.

Argyris & Schön's (1976) studies revealed two distinct categories of theories-in-use, which they label Model I and Model II (see Table 3). The governing values associated with Model I theories-in-use inhibit the flow of information within the organization, and promote secretive practices, and deflection of responsibility for actions. Model II theories, on the other hand, promote open communication, self-reflective practices, and commitment to change when needed. When Argyris and Schön (1978; 1996) examined how organizations act, they found that many organizations, rather than resolving conflicts between the theories espoused and theories-in-use, adopt a Model I theory-in-use that serves as an avoidance mechanism to shield the organization from the dissonance that would prompt change.

Table 3

Models I and II of theories-in-use to be investigated

	Model I	Model II
Governing values:	<ul style="list-style-type: none"> • Achieve the purpose as the actor defines it. • Win, do not lose. • Suppress negative feelings. • Emphasize rationality. 	<ul style="list-style-type: none"> • Valid information. • Free and informed choice. • Internal commitment.
Primary strategies:	<ul style="list-style-type: none"> • Control environment and task unilaterally. • Protect self and others unilaterally. 	<ul style="list-style-type: none"> • Sharing control. • Participation in design and implementation of action.
Usually operationalized by:	<ul style="list-style-type: none"> • Ambiguous and covert attributions and evaluations. • Advocating courses of action that discourage inquiry. • Treating ones' own views as obviously correct. • Face-saving moves such as leaving potentially embarrassing facts unstated. 	<ul style="list-style-type: none"> • Attribution and evaluation illustrated with relatively directly observable data. • Surfacing conflicting view. • Encouraging public testing of evaluations.
Consequences include:	<ul style="list-style-type: none"> • Defensive relationships. • Low freedom of choice. • Reduced production of valid information. • Little public testing of ideas. 	<ul style="list-style-type: none"> • Minimally defensive relationships. • High freedom of choice. • Increased likelihood of double-loop learning.

Source: Argyris and Schön, 1978; 1996.

If intermediate foresight outcomes are dependent on organizational change, as Schartinger, et al. (2012) suggest, then it is reasonable to expect that their realization will involve organizational adoption of Model II theories-in-use that increase organizations'

capacity to be responsive to technological and social changes in their environments. This applies in particular to the organization's governing values and primary strategies.

Emerging theory on foresight outcomes, combined with organizational learning theory, serves to clarify key aspects pertaining to this study. Firstly, foresight programs are intended to produce outcomes over an extended period of time. Secondly, intermediate foresight outcomes occur at the organizational level as organizations change to accommodate new knowledge encapsulated in immediate outcomes. Thirdly, organizational change involves a learning process within the organization in which individuals use new knowledge to construct social and cultural contexts that are best suited to the pursuit of long-term goals. While this provides a relatively clear picture of *what* we can reasonably expect to happen as a result of foresight programs, it does not provide ample information about *how* this is to happen. This study, therefore, focuses on how organizations use foresight outcomes to adapt themselves to rapidly changing contexts rather than the specific outcomes, as such. In particular, we want to highlight the pathways that are constructed within organizations to move from immediate substantive, communicative, and subjective outcomes to intermediate outcomes and how the latter contribute to the organizational change needed to sustain continuing progress toward the ultimate outcomes.

Cultural-Historical Activity Theory (CHAT) as Framework for the Study of Intermediate Foresight Policy Outcomes

Russian developmental psychologists laid the foundations for the CHAT framework in the early 20th century; in particular Vygotsky, Leontiev, and Luria.

Vygotsky and his colleagues sought to develop a framework of human consciousness that describes how individuals come to relate to their environment (Yamagata-Lynch, 2010; Cole & Engeström, 1993). They describe an activity system in which individuals interact with their surroundings and other individuals to construct shared meaning, thereby continuously changing and expanding their relationship with their environment. The framework is illustrated with a simple diagram (see Figure 1) often referred to as “Vygotsky’s mediated action triangle” (Cole & Engeström, 1993). The triangle shows how each activity is seen as a process involving a subject, an object, and artifacts through which an activity is mediated. In this process the subject is the individual, or individuals, who are engaged in the activity; the object is that which the activity is intended to produce; and the artifacts include the socially constructed tools that lend meaning to the activity. By engaging in the activity, individuals deepen their relationship with their environment as they negotiate meaning in their given cultural/social context.

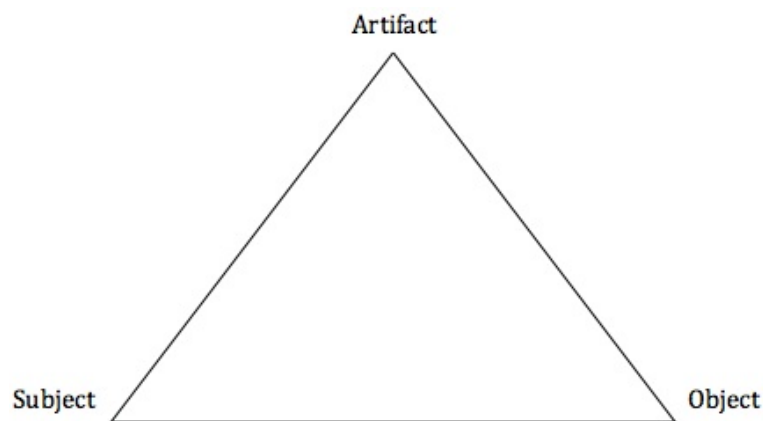


Figure 1. Vygotsky’s mediated action triangle. Source: Cole & Engeström, 1993.

Mediating artifacts can be construed as “carriers” of meaning and knowledge, both within and between activity systems (Wells, 2007; John-Steiner & Mahn, 1996). As such, there is an evolutionary dimension in the process as artifacts convey the history of meaning-making activities within and between systems. Thus, an artifact resulting from one activity goes on to become the mediating artifact in later activities, where it can undergo transformation through renegotiated meaning, producing yet another artifact that will mediate subsequent actions.

The basic CHAT framework is a descriptive framework that lacks the sophistication needed to be useful as an analytical framework. Cole and Engeström (1993) address these limitations to develop CHAT as an analytical tool for studying collective activity involving mediating artifacts. Their primary contributions are the identification of a specific activity as a unit of analysis and the addition of the “community” as a key component of the activity system, alongside the individual and the object of the activity. The addition of community to the theoretical model highlights the relevance of the socio-cultural dimensions that define and regulate activity within the context being studied; in particular the rules, norms and divisions of labor that govern activity in a given context. It is particularly in the community component of the model that we expect to find evidence of practice that is consistent with Argyris & Schön’s (1978; 1996) Model II organizational learning. The extended CHAT framework is illustrated in Figure 2. The upper part of the triangle is identical to Vygotsky’s basic triangle. The lower part includes Engeström’s extensions to the model.

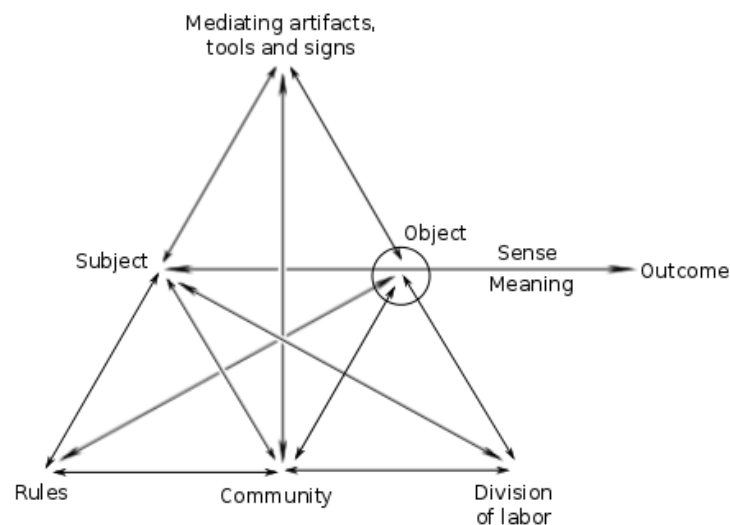


Figure 2. Extended CHAT triangle. Source: Cole & Engeström, 2001.¹

The addition of the community to the CHAT framework allows us to examine how activity is mediated through artifacts while being facilitated or constrained by social norms and roles. Argyris & Schön's (1978; 1996) Model II organizational learning aligns with Engeström's (2001) extended framework in the community component. It is here that we look for evidence of new values, practices and negotiated meaning that inform the theory-in-use and contribute to the organization's capacity to proactively look toward the future for signals of anticipated change that can be expected to affect the

¹ The diagram of the theoretical framework as presented here is not in complete agreement with the source cited. In the source, "Mediating artifacts" are placed on the line that dissects the triangle in the middle. In all other printed references to the framework known to the author, "Mediating artifacts" are placed at the top vertex of the triangle (see other cited references authored by Engeström). The discrepancy in the cited source is not explained, nor even mentioned. The author therefore assumes that the placement of "Mediating artifacts" on the middle line is a misprint.

organization and its environment. In particular, since this study looks at the activities that are initiated to share immediate foresight outcomes, the most significant aspects of Model II organizational learning are those relating to “primary strategies” and “operationalization”. The outcomes of the activity align with Agyris & Schön’s “consequences” but these will figure less in this study since the primary focus is on the activity as opposed to the outcomes. Our goal for this study is to use the extended CHAT framework to identify contradictions within the activity system that can be resolved to improve outcomes.

Researchers using the CHAT framework have published numerous studies that demonstrate its analytical validity and practicality. To name just a few examples:

- Cole & Engeström (1993) describe the application of the extended CHAT framework to a reading acquisition activity and to a study of medical work in a Finnish health center. In both studies, the CHAT analytical framework helped to identify systemic contradictions that, once addressed, led to significant improvements.
- Brown & Cole (2002) applied the CHAT framework to the implementation of the “Fifth Dimension” after-school program in multiple contexts. They found that very different tensions affected implementation in the contexts studied, demonstrating the importance of the community dimension as regards activity systems.
- Engeström (1994) describes a study involving a team of teachers who were tasked with the development of an innovative global-education program.

Using the CHAT framework, the researcher was able to demonstrate how team-members' limited use of mediating artifacts hampered progress.

- Engeström, Engeström & Suntio (2002) used the CHAT framework to examine change processes within a Finnish school, focusing specifically on the organizational level, as opposed to individual classrooms or teachers. They conclude, among other things, that the study demonstrates that the CHAT framework is equally applicable at levels that involve collective activities in broad organizational contexts as at more narrow levels.

The range of these examples demonstrates the flexibility of the CHAT analytical framework. Since the framework builds on a comprehensive systematic overview of complex activities it helps researchers to zoom in on specific dimensions of an activity to identify opportunities or weaknesses and to assess them in relation to the activity as a whole and the context in which it occurs.

Applying CHAT to immediate and intermediate foresight outcomes

Intermediate foresight outcomes are realized in organizational contexts that do not directly interface with the relevant foresight programs themselves. For these outcomes to occur there needs to be a transfer of new knowledge and meaning from the context of the programs to organizational contexts. Using Engeström's CHAT framework we can diagram the transfer process as a social activity in which immediate foresight outcomes are the mediating artifacts, individual program participants are the subjects, and the object is to produce organizational change within program participants' organizations.

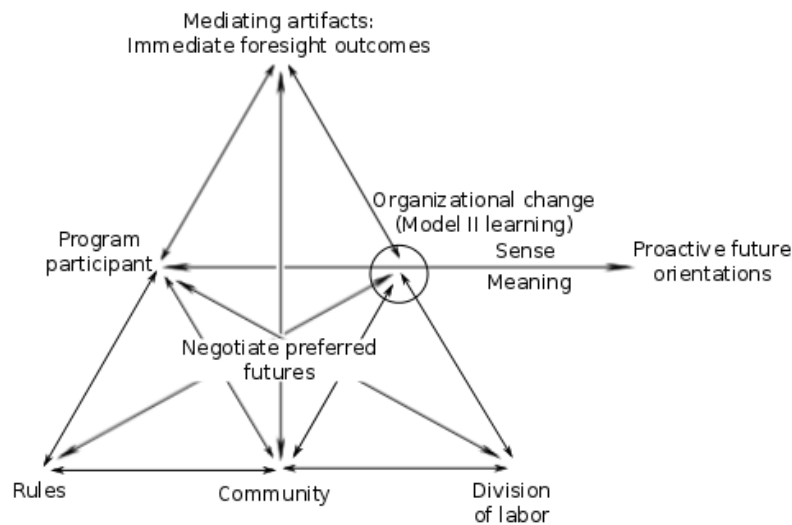


Figure 3. Extended CHAT triangle modeling activities relating to intermediate foresight outcomes.

Figure 3 illustrates how intermediate foresight outcomes within a specific organizational context can be modeled using Engeström’s extended CHAT framework. The individual that participated in the FP on behalf of the organization initiates the activity and presents the mediating artifacts. The mediating artifacts include all of the immediate outcomes of the FP: the substantive, communicative, and subjective. The question is then, what processes are initiated in this activity system to facilitate the realization of the object? Also, what conflicts in the organizational context (the extended “community” part of the triangle) hinder the activity? On the whole, what we are looking for is evidence of dialogical activities in which the meanings represented by the mediating artifacts are considered, negotiated, and reframed to suit the organizational

context. Rules, norms, and divisions of labor should be carefully coordinated to not work against the objective. The extended triangle shows quite clearly what sorts of things we have to consider, for example:

- What opportunities does the subject have to introduce the mediating artifacts to the organizational context?
- By what authority will changes in organizational practice be implemented?
- How are the mediating artifacts used to facilitate dialogue?
- How is new meaning and knowledge constructed and communicated throughout the organization?

In the answers to these types of questions we should be able to identify strengths and weaknesses within the organizational context that facilitate or hinder the realization of intermediate outcomes of FPs. A better understanding of how immediate outcomes are transferred to organizational contexts can be very helpful for planning and implementing FPs. Armed with this knowledge, program planners can lay the groundwork for successful knowledge-transfers in the initial program implementation. Without successful knowledge-transfer to organizational contexts, change processes are likely to be disrupted, which can jeopardize the realization of the long-term goals of the program.

Educational System and Policy in Iceland

The Icelandic public educational system developed very late compared to other European countries. The first comprehensive legislation on public education was passed in 1907, based on the recommendations of Guðmundur Finnbogason, who had spent two years researching educational systems in Europe, especially in the other Nordic

countries (Guttormsson, 2008). Finnbogason's opinions about education largely mirrored the utilitarian and humanitarian ideologies prevalent in other Nordic countries at the time, emphasizing the purpose of education as enabling individuals to reach their true potential within the society. Public education in Iceland remained aligned with educational systems in other Nordic countries, particularly Denmark, throughout most of the 20th century (Lindblad, Johannesson & Simola, 2002). This was primarily due to the close political, cultural and educational ties between Iceland and Denmark.

The Icelandic government was slow to act on the power granted them by the 1907 legislation on public education. In the early 20th century, educational infrastructure was simply non-existent in much of the country. This was especially the case in rural areas, where most Icelanders lived at the time. There were very few schools and most children were homeschooled, or received tuition from travelling instructors, most of whom had no formal qualifications. The first national curriculum was not published until 1926 (Guttormsson, 2008). The first major reform did not take place until 1976, although there were some incremental changes before then (Guttormsson). By the mid 1960s, elements of the educational system had become considerably outdated due to increased enrollments and new thinking about education in general (Guttormsson). The gradual pace of early reforms is demonstrative of the reactive tendency that prevailed in Icelandic educational development, with major changes being introduced only after problems had reached a critical stage. For example, despite legislation having been passed in 1995 that guaranteed all children full days of school, nearly 35% of Icelandic schools during the 1995-1996 school year were forced to divide school days into two

sessions, with half of the students attending the first session, and the other half attending the latter session, due to lack of space and teachers (“135 skólar einsetnir”, Morgunblaðið, November 5, 1996).

Although there were lingering problems immediately following the 1995 reform, it, nevertheless, signaled a major shift in thinking about education in general and was considerably more anticipatory in nature than prior educational policy. Previous policies had mostly sought to address domestic concerns and needs. The 1995 policy gave more consideration to educational needs in the context of an increasingly globalized economy (Iceland, Lög um grunnskóla, nr. 66, 1995). The primary reason for this was that, in 1994, Iceland signed on to the agreement between the European Free Trade Association (EFTA) countries, which include Iceland, Norway, and Liechtenstein, and the EU, establishing the European Economic Area (EEA). The agreement grants the EFTA and EU countries mutual access to each others' markets and requires them to respect the EU's “four freedoms”; the free movement of goods, capital, services, and people (Agreement on the European Economic Area, 1994). Thus, the 1995 policy was intended to anticipate major economic, labor, and societal changes resulting from the EEA agreement. The 1995 reform also anticipated the growing importance of ICT for education and future work contexts. The law was the first to mandate a specific ICT curricular component for the compulsory school level (grades 1-10).

The MESCS's policy on ICT in education, first published in 1996, was a further sign of a more anticipatory approach to educational policy-making in Iceland. This optimistic policy primarily addressed infrastructure needs, including linking schools to

the Internet and equipping them with modern computers. According to an evaluation of government ICT policies commissioned by the Office of the Prime Minister (IBM Consulting Services, 2002), the 1996 policy was exceptionally effective. Over the course of four years the availability and use of networked computers in Icelandic schools had grown considerably. However, as the availability of technology increased, its effectiveness was hindered by the fact that Icelandic teachers were not sufficiently trained in the use of ICT to fully realize the potential benefits of the technology that the policy had equipped them with (Mýrdal, Jónasson, Gissurardóttir & Jakobsdóttir, 1998). A revised policy, issued in 2001, sought to increase the effectiveness of ICTs in education, primarily by promoting teachers' ICT skills and the development of educational software. This policy also received a very positive evaluation (IBM Consulting Services). A third ICT policy, published in 2005 under a new Minister, was found to be considerably less effective than the 1996 and 2001 policies. An independent evaluation of the policy criticized the MESC for poor implementation and the lack of any measurable targets (Capacent, 2007).

The MESC's 2005 ICT policy, along with reorganization within the ministry that, among other things, dissolved the unit specifically responsible for ICT development, resulted in a significant decline in the momentum for ICT development that had been built up with the 1996 and 2001 policies. Since then, fewer public resources have been allocated to ICT development in education and the discourse on ICT is less visible than it had been (MESC, n.d.; Menntagátt, n.d.). Furthermore, prior to the reorganization within the MESC, the ministry's ICT department was in the process of drafting a list of

actions and targets intended to accompany a revised ICT policy. Although preliminary drafts were produced, the task was never completed because the ICT department staff was assigned new duties (A. Guðmundsson, personal communication, April 5, 2011). No new ICT policy has been published since 2005.

Iceland's educational policymaking system.

There is very little literature on Iceland's educational policymaking system. What little there is available is in the form of reports written for international organizations that Icelandic authorities collaborate with. These reports are generally not research-based, nor analytical, and tend to focus only on activities within, or coordinated by, the MESCC. The limited information on Icelandic educational policy-making processes shows that a broad range of stakeholders, including government officials, specialists, teachers' organizations, labor market representatives, and the general public are often involved at various stages of the policy-making process (MESCC, 2010). Specialized commissions are commonly established early on in the process to provide policy recommendations and can be very influential in the policy-making process.

Commissions are engaged in almost all major educational policy development initiatives. Labor market representatives also play a major role in policy-making processes through their participation in "occupational councils" that are responsible for recommending educational outcomes based on labor market needs (Eurydice, 2010). Labor market representatives are also able to influence policy in collective bargaining processes between the state and labor unions, which include provisions relating to social welfare in general, and education in particular (Eurydice). When the general public is

engaged in policy-making processes, it is usually the result of some event that has brought the issue to the attention of the public. The general public can influence policy-making to some extent through advocacy efforts, but their impact is usually reliant on support from representatives of other, more influential, stakeholders.

Educational policy-making in Iceland tends to have considerable visibility. Debates concerning specific issues are often carried out in the mass media, especially in national newspapers. Participation in these public debates is not necessarily limited to members of the key stakeholder groups previously mentioned. Members of the general public often use the mass media to voice their opinions on policy debates as well. Jóhannesson (2001) describes one particularly heated debate that was initiated by the rise of a reformist movement among educators in the 1980s that advocated for “discovery-based” learning in Icelandic schools. A group of proponents of a more traditional approach to education, many of whom were not educators, launched a debate in *Morgunblaðið*, Iceland’s most widely distributed national newspaper at the time, claiming that the reformists were essentially trying to abolish well-established knowledge and practice from the educational system. Eventually, the reformists managed to steer the policy discourse in the direction of educational theory and the reform was passed.

Although there has been little research conducted on Icelandic educational policy-making system, it is clear that educational policy-making is a process that engages a number of stakeholders in various processes. The ability of stakeholders to

influence policy decisions through their participation in policy-making processes is considerable, even though government officials make final decisions.

Summary

The increasingly rapid development of ICTs is a strong indicator for the need for foresight in educational policy planning. Research has shown that today's youth are quick to adapt to emerging technologies and integrate them into their social lives. Furthermore, ICTs affect young people's learning, whether they encounter ICTs in their formal educational environments or not. Young people use ICTs for a range of activities, including their formal, informal and non-formal learning. Research has shown that foresight programs can have a positive impact on policy by promoting long-term planning. The results of several early foresight programs for S&T and R&D policy have led to countries being able to differentiate their industries from those of other countries to emerge as global leaders in their fields. The limited research available on the use of foresight programs for educational policy planning suggests that carefully planned foresight programs can be expected to have similar effects. There is, however, a gap in the research literature on foresight programs for policy planning representing policy makers' perspectives. It is critical that this gap in the literature be addressed since foresight programs are initially implemented and coordinated by policy making institutions. The results of research addressing policy makers' perspectives will provide useful knowledge for planning and implementing effective foresight programs in the future.

CHAPTER 3: METHODOLOGY

Research Design

This chapter describes the design of the study and the rationale for the design.

The study is a mixed method multiple case study intended to provide insights into how participants in two foresight programs implemented in Iceland, the Iceland 2020 (Iceland 2020) program and the Ministry of Education, Science, and Culture's (MESC) foresight program on the future of ICT and education, launched in 2013, transferred immediate foresight outcomes to their organizational contexts, and what was done with those outcomes in their organizations. The research questions guiding this research include two central questions, each of which include subquestions:

1. How are immediate foresight outcomes transferred to organizational contexts?
 - 1.1. What do foresight program participants perceive as useful outcomes of the programs that they participated in?
 - 1.2. What are foresight program participants' perceptions regarding the purpose of foresight activities in relation to educational policymaking in Iceland?
 - 1.3. How do foresight program participants perceive their role as regards the diffusion of foresight outcomes within their organizational environment?

2. How are immediate foresight outcomes used to effect change in organizations?
 - 2.1. What do foresight program participants feel is their role in shaping Iceland's future educational policy landscape?
 - 2.2. How do foresight program participants see program outcomes contributing to educational policy discourse in Iceland?

Epistemological Assumptions

Underlying the study is the author's basic assumption that it is the aim of researchers in social sciences to reveal and explain aspects of the world as perceived and experienced by persons living in it. As contended by numerous 20th century philosophers and scholars, including Martin Heidegger, John Dewey, James J. Gibson, Ernst von Glasersfeld, and others, a researchers' greatest challenge is that they cannot assume a privileged position in the world, as relates to their research topics or subjects, since they are, themselves, living in that very same world. Researchers, like others in a given society, are situated in a reality that is constructed and bounded by collectively constructed meaning. Researchers cannot separate themselves from their social reality and, thus, need to be aware of social norms, meaning and other constructs that can limit their capacity to examine their research subjects' world from an objective distance. They must reconcile themselves to view the object of study from within the world that they inhabit. Researchers cannot, for example, simply ask, "What is a community?". They must rather ask, "What am I asking about (what is my understanding of 'community')?", "What does 'community' refer to in the given social context?", "What does the subject

mean by 'community'?", and how do each of these relate to each other? It is important, therefore, that researchers are keenly aware of their own beliefs of what constitutes the "real" world, for them and their subjects, as they seek to uncover evidence related to the object of study.

Merriam (1998) states that the critical first step for researchers, when considering what research approach best suits a project, is to first consider their own beliefs about the nature of reality. The philosophical position described above closely aligns the researcher with constructivist epistemologies. Variations on constructivist thinking differ in terms of views concerning the role of the individual and society in the construction of meaning (Doolittle & Hicks, 2003). All constructivists, however, share the fundamental belief that objective reality, i.e. that which exists outside the consciousness of individuals, becomes meaningful and knowable when acted upon by individuals or social entities. According to the constructivist, what constitutes knowable reality is not directly derived from an "objective reality" but rather a function of individuals' experiences of reality and their reflections on its purpose and nature, both individually and within their social context. Thus, the constructivist researcher is tasked with peeling back the layers of experience and meaning, uncovering their sources, and finding how they relate to each other, to unravel the story of how an individual comes to relate to their environment the way that they do.

Constructivists see collective meaning and knowledge as emergent and developmental, changing as individuals continually shape their social and physical surrounding, and their own being, to meet their needs. Social researchers' role is to

provide opportunities for subjects to share their unique perspectives and understandings, and to frame them in appropriate historical and social contexts to increase common understanding of what shaped them (Crotty, 1998). Constructivist researchers do this by engaging their subjects in dialogue, using open-ended questions for example, to explore, together, the foundations of, and processes that led to, subjects' current understandings as they relate to the object of the study. Because in social sciences, the object of study tends to be the social situation in which that which is being studied occurs, the focus is less on the individual in the social context, and more on the patterns formed by multiple individual experiences.

This study was motivated by the author's desire to understand how foresight programs affect individuals' perceived ability to engage with, and influence, the future of education within their organizational contexts. In line with the philosophical assumptions described, these perceptions are seen as the products of meaning that individuals actively construct by means of their interactions in given social contexts. The foresight programs studied are, therefore, viewed as constructed social contexts that are intended to produce outcomes that influence the ways that participants perceive and address challenges relating to the policy focus of the program. This suggests an epistemic position that aligns most closely with constructivist theories of what constitutes the world around us.

The interpretive research approach is the best suited to the study as it provides a framework for the researcher to provide a platform for subjects to reflect on their

personal experiences as they relate to their participation in the Iceland 2020 Foresight Program.

Carr and Kemmis (cited in Merriam, 1998) describe three general approaches to social research; positivist, interpretive and critical. As described in Table 4, each of these approaches is based on a set of assumptions about reality and how it is discovered and experienced by individuals. The categories are not entirely distinctive, although they are sometimes treated as such. Positivist researchers have to be just as aware of the qualitative aspects of their research environments, even though they would primarily use quantitative instruments. Similarly, constructivist epistemologies may suggest a focus on qualitative data methods that are shaped, in part, by the subjects, but they do not necessarily proscribe survey data. Even the most carefully constructed quantitative instruments may still be based on subjective measures if there are no established metrics for gauging differences among responses, while studies that are primarily qualitative may draw on supporting survey or other quantitative data. Rather than a study being wholly situated in any single category, a multi-method approach is likely to be prioritize one over the other (Sieber, 1973).

Table 4

Research Approaches, Assumptions and Methods

Approach	Assumptions	Methods
Positivist approaches	Objective, observable, stable reality	quantitative methods identify measurable and generalizable qualities relating to the object of study

Interpretive approaches	"Reality" is a social construct	Qualitative methods reveal concepts and meanings used to describe experiences in social contexts
Critical approaches	Social institutions reproduce or transform social values	qualitative methods uncover perceptions of power and equality in social contexts

Source: Merriam, 1998

Of the three approaches, the interpretive is most consistent with the constructivist epistemological position, suggesting that the study will benefit most from the use of qualitative methods to identify themes related to subjects' involvement in the social context of the foresight programs studied. Surveys and quantitative methods, can provide useful data for categorizing qualitative data. Demographic data, in particular, can add significant analytical depth by revealing additional social contexts that individual participants identify with, including their everyday work context, their educational and vocational backgrounds, and their overall experience with the topics focused on in the course of the programs studied. Thus, a combination of the interpretive qualitative approach and the positivist quantitative approach was determined to be suitable for this research. This allowed for the solicitation of study participants' personal experiences, while also helping to identify the individual and social characteristics and contexts that shaped their perceptions of the programs studied.

Case Study Design

The specific method used in the study was the case study method. There has been considerable scholarly discussion about the nature of case studies and how they should

be defined. Among those who have most influenced contemporary definitions of case studies are Stake (1995), Yin (2003), and Merriam (1998).

In his definition of a case study, Yin (2003, pg. 13) emphasizes the process involved:

A case study is an empirical inquiry that

- investigates a contemporary phenomenon within its real-life context, especially when
- the boundaries between phenomenon and context are not clearly evident.

Stake (1995), on the other hand, focuses on the object, citing Louis Smith as the originator of the notion of a case as a "bounded system" (pg. 2). Stake goes on to explore what it is that bounds the case to make it viable as a subject for study, noting the relevance of time, activity and the individuals involved. Merriam (1998) concludes, after having considered several definitions of case studies, that "the single most defining characteristic of case study research lies in delimiting the object of study, the case." (pg. 27). Thus, a case can be anything that can be "fenced in" (Merriam, 1998, pg. 27). In other words, a case can be anything that can be defined as a distinct unit of analysis, be it bounded by walls, individuals, time, or activities.

Defining the specific unit of analysis, or the "case", in this study was somewhat problematic. Given the nature of foresight programs, there are three potential units of analysis. In the first case is each program itself, which can constitute a valid unit of analysis bounded by the time it was implemented and activities that took place. In the

second case are the individual participants in the programs with whom the researcher interacted as part of the data collection process, each of whom could constitute a valid unit of analysis. In the third case are the organizations that individual program participants represented in the programs, each of which can also constitute a viable unit of analysis. Thus, to adequately define the unit of analysis, we have to consider what the specific roles of the programs, the program participants, and the organizations involved were, as they relate to the study.

Yin (2003) describes four distinct design-types for case studies. These are illustrated in Table 5.

Table 5

Design-types of Case Studies

Design-type	Description
Holistic single-case	Study consists of a single case within one distinct context.
Embedded single-case	Study consists of multiple units of analysis constituting a single case within one distinct context.
Holistic multiple-case	Study consists of multiple cases each within a distinct context.
Embedded multiple-case	Study consists of multiple cases, each within a distinct context. Each case further consists of multiple units of analysis.

Source: Yin, 2003, p. 46-47.

Figure 4 provides a graphical description of the distinction between the four design-types.

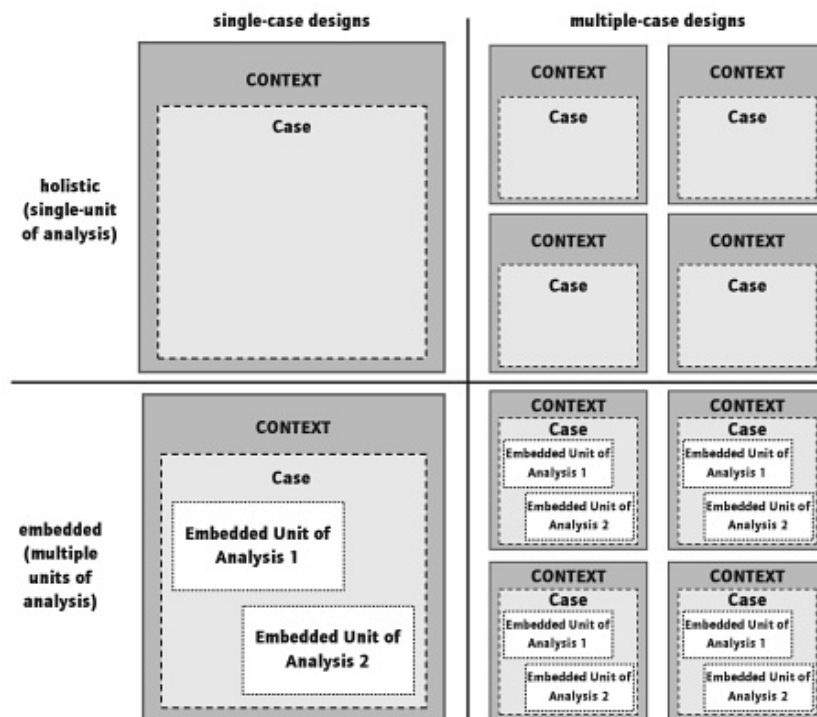


Figure 4. Graphical description of design-types of case studies. Source: Yin, 2003, pg. 46.

Multiple case design to study foresight programs. In designing the study, the first consideration was whether it constituted a single-case design or a multiple-case design. A single-case design is appropriate when the case is a unique occurrence or is representative of a certain type of occurrence (Yin, 2003). The original research design only included the Iceland 2020 program, for which the single-case design seemed an obvious fit because as a national Icelandic foresight program it was, when it began, unique. The addition of the MoE's foresight program, initiated later, provided an opportunity for a multiple-case design. The multiple-case design aligned with the study's focus on understanding a variety of organizations and their representatives in the

programs. In addition, in multiple-case designs, individual cases effectively function as replicable “experiments” within a single framework. The organizations involved in this study were not, nor were they considered to be, repeated instances of individual cases. Each organization represented a distinct case with all of the cases bound together by their connections to the two distinctive foresight programs that representatives of the organizations participated in. The foresight programs were considered to be replicable instances of an established format for conducting future-oriented, long-term policy planning, which fit the criteria for a multiple-case design, with each program defined as a distinct case.

Within each of the cases, the organizations and their representatives in the programs constituted multiple units of analysis, each relating to one of the two distinct cases. Thus, they were defined as embedded units of analysis within each case. The resulting embedded multiple-case design included a single context, i.e. foresight in educational policy planning in Iceland, two cases, i.e. the Iceland 2020 program and the MESC's foresight program, and multiple organizations, each constituting individual units of analysis, embedded in each case. The research design is shown in Figure 5.

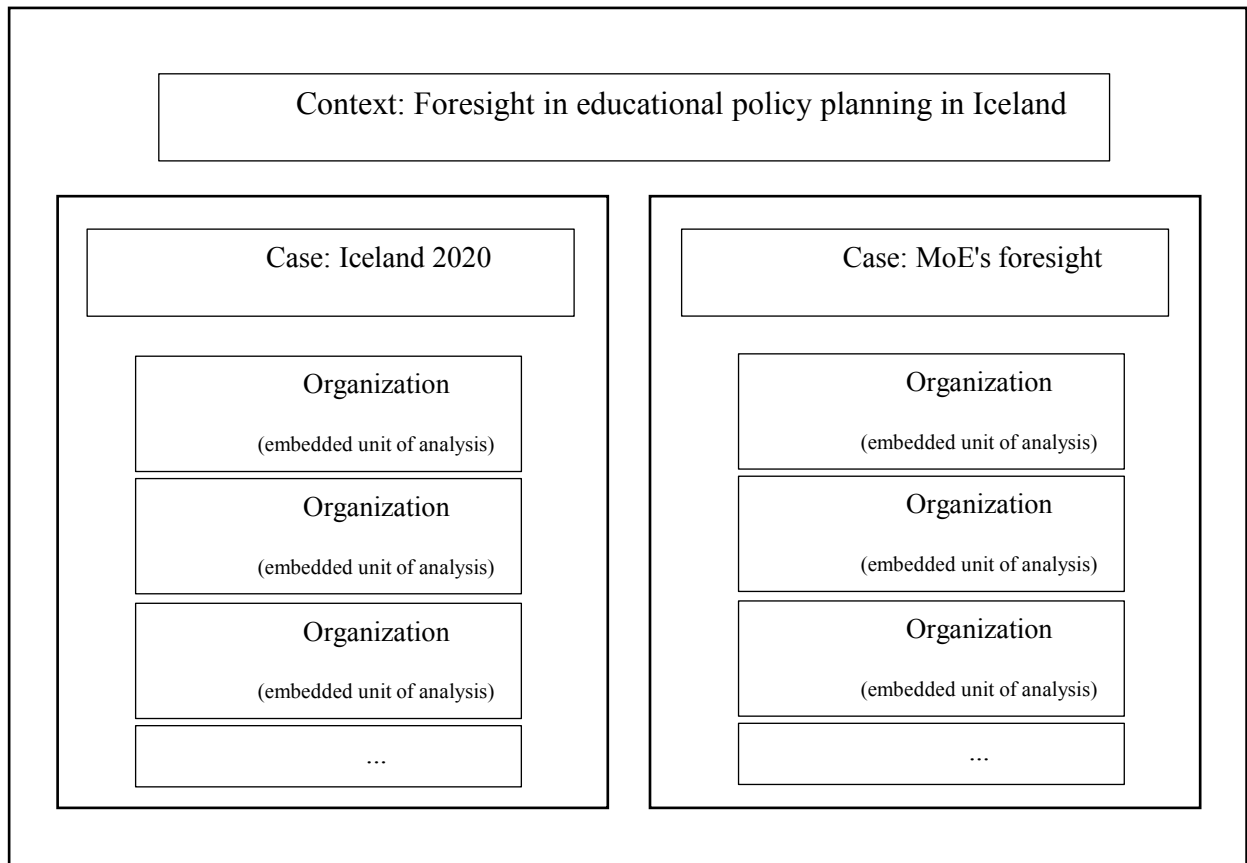


Figure 5. The study's embedded multiple-case design.

Respondent Sampling Plan and Recruitment

The sampling frame for the study originally included all 48 members of the management committee for the Iceland 2020 program. With the addition of the MESC's foresight program to the study, the sampling frame increased to include all 75 participants in the MESC's foresight program, making for a total of 123 individuals, . The individuals included in the sampling frame represented a broad range of organizations and institutions that are involved in the formulation of educational policy in Iceland, including teacher organizations, educational institutions, industry representatives, employer representatives and public agencies. The management

committee of Iceland 2020 was involved in the planning of the program and was responsible for reporting on the immediate outcomes of the program. Some participants in the MESC's program took part in planning and implementing the program, but all participated in all program activities and provided inputs to the program's immediate outcomes.

Since the sampling frame included individuals representing a broad range of organizations and institutions, a simple random sample was unlikely to produce a sample that accurately represent the sampling frame as a whole, as significant stakeholders could have been omitted from the sample. The sampling frame was relatively small and, given Iceland's small size and short lines of communication, the individuals included could be easily approached. Therefore, all individuals in the sampling frame were invited to participate in the initial part of the study, a web-based survey with quantitative and qualitative components (see below). For the latter part of the study, consisting of semi-structured interviews, the constant comparative method (CCM) was used to develop themes as they emerged. In accordance with common practice when using the CCM, participants were purposefully selected to ensure that emerging themes reached saturation. The CCM is discussed in further detail below.

Participants were invited to respond to the web-based survey before the MESC's foresight program was added to the study. Initially, the response rate was very low, resulting in only eleven complete responses after two reminders had been sent out. Therefore, it was decided to alter the design of the study to shift the focus from the survey data to interview data.

After the MESC's foresight program was added to the study, the new potential participants were invited to complete the web-based survey, and an additional reminder was sent to participants in the Iceland 2020 program who had initially not responded, or only partially completed the survey. This resulted in a greater response rate with a total of 38 responses from the 123 invited to participate in the study. However, since the research design had already been changed it was decided that the primary data source would be gleaned from the interview data.

The final study participants are indicated in Table 6 below.

Table 6

Study participants according to foresight program that they participated in

	Iceland 2020 program	MESC's foresight program	Total
Survey participants	14	24	38
Interviewees	5	6	11

Data Collection

The purpose of the data collection instruments was to provide data from which to make inferences regarding study participants' experiences relating to their participation in the Iceland 2020 program and the MESC's foresight program, and, in particular, how their organizations received and, if applicable, acted on the programs' immediate outcomes. Thus, the data collection instruments seek to reveal both what intermediate organizational changes occurred as a result of their participation in the foresight programs, and how they occurred, as perceived by the research subjects.

A mixed method approach was used for data collection. This consisted of a thorough analysis of documents relating to the planning and implementation of the foresight programs and their reported outcomes, a web-based survey of participants in the programs, and semi-structured interviews with a selection of program participants.

Document analysis. The purpose of the document analysis was to provide data relevant to the overall context of the case study and the specific cases, i.e. the Iceland 2020 program and the MESC's foresight program. Documents were analyzed to help reveal what Atkinson and Coffey (1997) refer to as the "document reality" of the foresight programs. A document reality represents the way an organization presents itself, or its activities, through the documents it produces for internal and external audiences. It is often a deliberate attempt to portray the organization or activity in a certain light. Relevant documents can include documented communications between individuals, promotional materials, and documentation of artifacts produced by the organization. In the case of the programs included in the study, the documents gathered included instructions and descriptions of expectations regarding the program that were communicated to participants before the programs were implemented and throughout the program.

Documents that were considered likely to influence the way that program participants perceived the programs and their roles in them were collected, including; project proposals relating to the programs; communications between program coordinators and participants relating to the programs, ex. letters of invitation, instructions for specific activities, interim reports, etc.; and official publications relating

to the programs and their outcomes. The documents categorized according to the following themes:

1. Motivation for the program: Documents that described why the programs were implemented and how they were expected to help address the relevant issues.
2. Goals of the program: Documents that describe what the programs were expected to achieve and how goals would be achieved.
3. Expectations for participants: Documents that directly and indirectly instructed participants about what they were intended to do in relation to the programs.
4. Program outcomes: Documents that communicated specific outcomes of the programs.

The resulting document reality was considered to be a representation of program planners' and coordinators' definitions of the purpose, processes, and objectives of the programs. In terms of the embedded multiple-case design, the document reality provided the substance for both the overall context and descriptive data relating to the two cases, i.e. the programs included in the study.

Participant survey. A web-based survey was administered to individuals who participated in the programs as representatives of key stakeholder organizations involved in educational policymaking in Iceland. This included representatives of public authorities, local authorities, administrators and staff in educational and academic organizations, employers' and employees' unions, and representatives of relevant

professional and public organizations, such as parent organizations and student organizations. The purpose of the survey was twofold. First, to sensitize participants to the study, and second, to gather descriptive data on participants for categorization in later stages of the study. The survey was conducted electronically using the Qualtrix electronic survey system.

Yin (2003) claims that the purpose of surveys in case study research is to address the "what" questions of the study, i.e. what was done within the organization to facilitate the transfer of foresight knowledge to the organizational context. The survey included both quantitative and qualitative items. The purpose of quantitative survey items in what was primarily a qualitative study was to make it possible to categorize data to perform comparisons across the subunits of analysis (Gillham, 2000). Qualitative survey items were intended to provide data that can be applied to the CHAT analytical framework described below. Thus, the primary focus of the survey was on qualitative characteristics of the participants and their organizations and what was done within the organizations in reaction to the programs' intermediate outcomes, including subjective, communicative, and substantive outcomes.

Interviews. Interviews were conducted with a selection of survey participants. Yin (2003) claims, interviews are primarily intended to get at the "how" questions relevant to the unit of analysis. Thus, the purpose of the interviews was to dig deeper into the study participants' perceptions, expectations, and reactions to the foresight programs and their outcomes to understand what motivated their actions during program activities and in their organizations following the implementation of the programs.

The interviews were semi-structured with guiding questions derived from existing scholarly literature and a preliminary analysis of the results of the web-based survey already described. Interviews are an effective means of gathering qualitative data in case study research because it allows the researcher to engage directly with the subjects on the topic of interest (Kvale, 1996). Traditional face-to-face interviews can, however, also be problematic and time consuming (Gillham, 2000). Furthermore, errors can enter into the data in the transcription process and poor planning can result in data that is not useful to the researcher's purposes. Semi-structuring interviews using prior relevant data addresses limitations to some extent by framing the interview topics within a set boundary, thereby minimizing potential off-topic discussions (Silverman, 2006). To further mitigate limitations relating to access to interviewees, participants were given the option to complete the interviews using online conferencing solutions, such as Skype, or more traditional face-to-face interviews.

It was hoped that some interviews would be conducted using text-based conferencing software. Conducting interviews using online text-based chat software eliminates the need to transcribe recorded audio since a textual record of the interview is generated in the process of conducting it, thereby ensuring the accuracy of the data and saving considerable time. However, because the interviewer is not physically interacting with the interviewee, visual cues, such as gestures or other body language, are sacrificed. Crichton & Kinash (2003) found that, when conducting interviews using text-based conferencing software, the lack of visual cues could be a strength rather than a weakness. They claim that interviewees were more mindful of the need to use language

to precisely convey their intended meaning, which resulted in a richness of data that often surpassed that acquired in face-to-face interviews. However, no interviewees chose to use text-based conferencing software. Most chose to be interviewed in a traditional face-to-face setting. Two chose to be interviewed using Skype audio conferencing.

Researcher positionality in the interviews. Salmons (2012) reminds us that the convenience of conducting interviews online is not in itself sufficient justification for choosing such a method. The method and medium used to conduct interviews must also align with the purpose of the study. Salmons particularly highlights the importance of the researcher's position in relation to the case being studied and what perspective it affords. On the one hand, the researcher can be in an *etic* position, i.e. an outsider looking in, and on the other, an *emic* position, i.e. an insider who is intimately involved with the case. In some cases, the nature and objectives of the study will dictate which is appropriate. For example, in participant observation studies, the researcher is by necessity deeply embedded in the object being studied and is, therefore, always in an emic position. Other research designs provide more flexibility in terms of the researcher's position, such that the researcher can choose to adopt either an emic or etic perspective. Nevertheless, the researcher should be clear on which perspective is intended to guide the study in order to preserve scholarly integrity and rigor.

For the purposes of this study, the researcher aimed to adopt an etic position in order to be able to objectively consider the data to be collected. The researcher was not involved in the Iceland 2020 program and lacked the insights and experience needed to adopt a purely emic position. However, given that the researcher had over 15 years of

experience working with the educational policy community in Iceland, and that the community is very small and relatively close-knit, there was the possibility that interviews would inadvertently take on an emic character. Conducting interviews online, with no face-to-face contact, could have created a degree of separation between the researcher and interviewees and, thus, increased the objectivity of the data collected. All interviewees who participated in the Iceland 2020 program, however, chose to be interviewed in a face-to-face setting.

Objectivity was more of a concern for the interviews with participants in the MESC's foresight program because the researcher was, himself, involved in that program, both in the planning stages and implementation. Yet, to ensure comparability of data between the two programs included in the study, the researcher felt it was important to adopt an etic position when interviewing participants of the MESC's foresight program, like with the participants of the Iceland 2020 program. To accomplish this, the researcher tried to ensure that the interviews with participants in the MESC's foresight program adhered more strictly to the interview protocol than was done with participants in the Iceland 2020 program.

Data Analysis

Qualitative methods were used to analyze the data collected for the study. The survey administered to study participants included both quantitative and qualitative methods. However, because of a low initial response rate, sophisticated qualitative methods were unlikely to provide reliable and useful information. Survey data were, therefore, only analyzed descriptively to provide insights into who the study participants

were and the nature of the organizations that they represented in the foresight programs. Documentary data were categorized according to the purpose of the documents, ex. publicizing the programs, instructing participants, disseminating outcomes, etc. Interviews were recorded and transcribed in the original language, Icelandic. Since the researcher is a native speaker of Icelandic, interview data were not translated for analysis to maintain the integrity of the data. Parts of interviews were translated to English for reporting purposes only.

Interview data were analyzed using the Glaser and Strauss' constant comparative method (CCM) to generate grounded theory (Glaser, 1965; Glaser and Strauss, 1967; Strauss, 1987; Glaser, 1992; Boeije, 2002). Incorporation of the CCM also affected the sampling strategy since the method uses theoretical sampling, or purposive selection of subjects in order to allow the researcher to focus on specific emergent themes.

The CCM is an inductive method that is used to inform the construction of developmental theory to describe change processes (Glaser, 1965; Glaser and Strauss, 1967; Strauss, 1987; Glaser, 1992; Boeije, 2002). Glaser (1965) refers to the CCM as a "third approach" to the analysis of qualitative data. Rather than the familiar approaches of provisionally testing hypotheses or inspecting data for hypotheses, the CCM focuses on the generation of plausible suggestions of theory with no provisional testing. When using the CCM, the researcher analyzed and coded data as it was collected, then comparing results from previous interviews to inform adjustments to following interviews to fully explore emerging themes. The data analysis using the CCM included four stages:

- Comparing incidents applicable to categories identified in the coding process.
- Integrating categories and their properties as they emerged.
- Delimiting theory by conceptual reduction.
- Writing theory to describe major themes.

The goal of the qualitative data analyses was to reach theoretical saturation, or the point at which comparisons between incidents no longer elicited new properties or dimensions within categories that had been identified (Boeije, 2002). To achieve theoretical saturation, the researcher engaged in theoretical sampling to purposively select subjects who were likely to provide data that were theoretically relevant for the development of emergent categories.

Themes that emerged from the initial analysis using the CCM were used to diagram how participants in the foresight programs engaged their organizations in the foresight process, and how program outcomes were transferred to their organizations, using Engeström's cultural historical activity theory (CHAT) (Engeström, 1999; Engeström, 2001; Engeström, Engeström & Suntuio, 2002). The CHAT framework is intended to model and describe how organizations act towards a specific objective when presented with a mediating artifact that prompts change. Although the CHAT framework is primarily used as a diagnostic tool to assess organizational issues, it was used by the researcher as an analytical tool to diagram the processes of transferring program outcomes to organizational contexts. Using the CHAT framework, this process was modeled as a social activity, in which immediate foresight outcomes were treated as mediating artifacts, individual program participants as the subjects of the activity, and

with the object to produce organizational change within program participants' organizations.

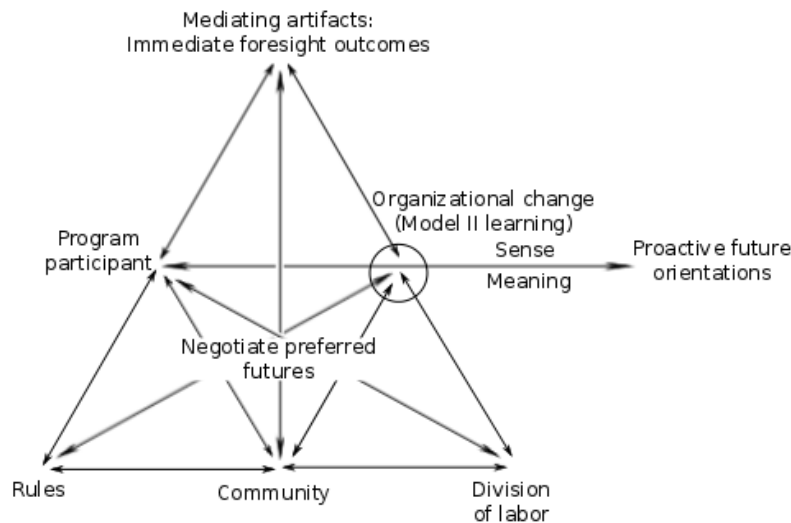


Figure 6. Extended CHAT triangle modeling activities relating to intermediate foresight outcomes.

Figure 6 illustrates an example of how intermediate foresight outcomes within a specific organizational context were modeled using Engeström's extended CHAT framework. The individual that participated in the FP on behalf of the organization initiated the activity and presented the mediating artifacts. The mediating artifacts included all of the immediate outcomes of the FP that were recognized by the participant, including, as relevant, the substantive, communicative, and subjective. The question to be addressed by the analysis was, what processes were initiated in the activity system to facilitate the realization of the object? Also, what conflicts in the organizational context (the extended "community" part of the triangle) hindered the

activity? The analysis was intended to reveal evidence of dialogical activities in which the meanings represented by the mediating artifacts were considered, negotiated, and reframed to suit the organizational contexts. The extended CHAT triangle in Figure 6 demonstrates the elements that needed to be considered in the analysis, including:

- What opportunities did the subject have to introduce the mediating artifacts to the organizational context?
- By what authority were changes in organizational practice implemented?
- How were the mediating artifacts used to facilitate dialogue?
- How was new meaning and knowledge constructed and communicated throughout the organization?

Validity and Reliability

All data collection was conducted in Icelandic, the native language of the study participants and the researcher. The qualitative data collection instrument, the web-based survey, was piloted and necessary adjustments made before being administered to study participants. Because of the relatively limited sample frame, participants in the pilot were not participants in the foresight programs included in the study. Rather, they were chosen from individuals known to the researcher who were intimately familiar with the programs in their planning stages or follow-up activities. Validity of qualitative data was ensured by inviting interviewees to review and comment on transcriptions of their interviews.

Since study participants were promised anonymity, all identifying data was stripped out of both quantitative and qualitative data and replaced with codes to ensure the integrity and traceability of the data across all analyses.

Quantitative data were analyzed only descriptively. Microsoft Excel software was used to organize and tabulate data, calculate frequencies, and generate graphs. Since no sophisticated statistical analysis was carried out, more specialized statistical software was not needed.

Qualitative data were analyzed using the CCM described above. Interviews were transcribed in the original language and coded and tagged to identify emergent themes relating to the aims of the study. A brief profile of each interviewee was developed highlighting key themes based on the coded and tagged interviews to be used for subsequent case comparisons. Examples of these profiles are included as vignettes in chapter four.

Qualitative data were coded in a two-step process. The first step involved identifying basic themes in the data and developing the coding scheme for more detailed analysis. The second step involved a more interpretive analysis to highlight specific patterns in the data. The detailed coding scheme resulting from the first step was tested by an independent coder for reliability. Results from the independent coder were used to refine the coding scheme before the second step was completed. Validity was further addressed using what Cho and Trent (2006) refer to as transactional validity, i.e. achieving accuracy by repeatedly revisiting the sources of data. This was achieved by means of triangulation using the three data sources, i.e. document analysis, survey and

interviews, and member checking, i.e. sharing interpretations and outcomes with study participants and eliciting their feedback.

CHAPTER 4: RESULTS AND ANALYSIS

In this chapter we present a preliminary overview of the results from the surveys and interviews. Analysis of the data is presented and the themes that emerged discussed. Two key themes emerged that suggest that foresight program participants' perceptions of foresight outcomes are shaped by their previous experiences with foresight and futuring, and their previous experiences of working with the program coordinators, who in the programs studied were the Office of the Prime Minister (OPM) and the Ministry of Education, Science, and Culture (MESC). Program participants' experiences influence their perception of program ownership and their sense of their role regarding the transfer of program outcomes from program contexts to their organizational contexts.

An Overview of the Programs and the Survey respondents

Thirty-eight individuals completed the online survey on their perceptions of foresight programs and their outcomes. The survey data reveal considerable breadth in terms of who responded and the types of organizations that respondents represented in the programs that they participated in. However, the results must be interpreted cautiously because of the small number of respondents.

The organizations represented include educational organizations, unions and professional organizations, public or government organizations, private organizations and employer organizations. The majority of respondents were affiliated with educational organizations, or 42% of the total represented. This is followed by unions and public organizations, each of which represent 29% of the total. Public and

government organizations account for 21%. The remainder are private organizations, with 11%, and one respondent representing an employer organization.

When asked about the position occupied in the organization represented, most respondents, or 53%, reported being in leadership positions, i.e. were executives or board members of their organizations. The second most populous position reported, somewhat smaller than the leadership group at 32%, was middle management, which includes department heads, project managers and team leaders. The remainder, totaling 37%, reported being in a variety of other types of positions, including instructors, scholars, and specialists in fields pertaining to their organizations work.

Most of the respondents, or 38%, had only worked with the organization that they represented for 0-5 years. The second largest group, at 32%, had been with their organization for 5-10 years, and the third largest, at 18%, for 10-15 years. Of the remainder, a single respondent had been with the organization represented for 15-20 years and five, or 13%, for 20 years or more. All but eight of the respondents were still employed by the organization that they represented in the foresight program at the time that they participated in the study, which accounts for 79% of the total.

Respondents' Assessment of Organizational Impacts

Initial reviews of survey data suggested that respondents' perceptions regarding immediate foresight outcomes varied considerably. When asked about their level agreement or disagreement with the statement, "Future thinking increased in my organization as a result of the foresight program", roughly half of the respondents (47%) indicated that it increased little or not at all while the remainder felt that it had increased

some or a lot as is shown in Figure 7. The result was similar whether looking at the whole group of respondents or looking at respondents by individual program. This suggests that respondents' participation in a foresight program left them with some ambivalence about its value in meeting one of the key program objectives, i.e. to promote futures thinking within the organizations represented by program participants. However, a simple categorization of participants into those who perceived change and those who did not is inadequate to describe participants' overall perceptions of program objectives. The majority, in fact a full 82%, responded that they "somewhat agreed" or "somewhat disagreed" with the statement, placing them somewhere between these two poles.

Future-thinking increased in my organization as a result of the foresight program.

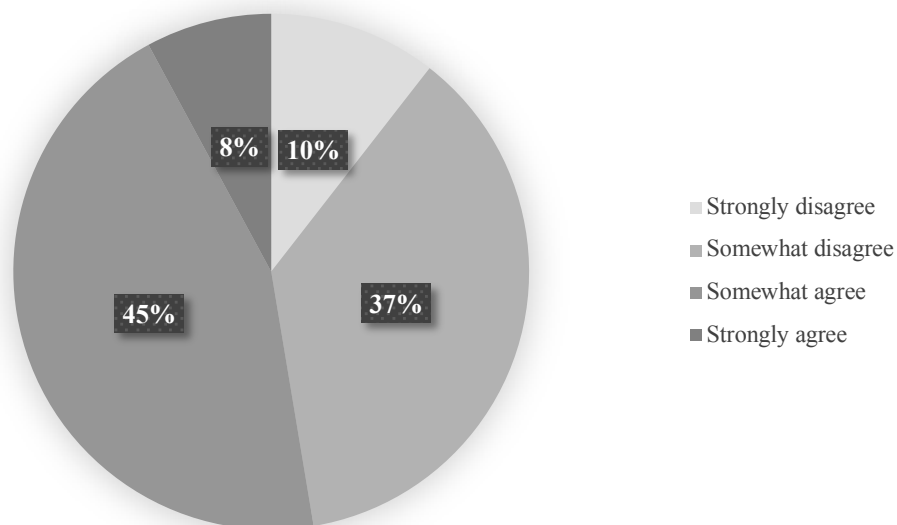


Figure 7. Survey responses regarding the impact of foresight on organizations.

Survey responses on how immediate outcomes were communicated to others in their work setting revealed different but also ambiguous patterns. First, respondents were asked whether they felt that their co-workers within their organizations were aware of their involvement in the foresight program. Overall, 69% of respondents stated that they somewhat or strongly agreed that their co-workers were aware of their involvement. However, the opposite was the case when respondents were asked whether their co-workers were aware of outcomes of the foresight program that they were involved in, with 66% stating that they somewhat or strongly disagreed that this was the case. There was little difference between the two programs studied in this regard.

To shed more light on how immediate foresight outcomes were communicated between the program and organizational contexts, respondents were asked what was done to share outcomes with colleagues in their organizations in the time since the program was launched. In this question, no distinction was made between types of immediate outcomes, i.e. the substantive, communicative or subjective outcomes. Rather, respondents were asked about program outcomes in general. Data regarding communicative and subjective outcomes were collected by other means and are discussed later.

Possible responses to the question about sharing of immediate outcomes were:

6. No particular action was taken to share or act on foresight outcomes.
7. Foresight outcomes were made available to colleagues.
8. Foresight outcomes were formally presented to colleagues.

9. Foresight outcomes were presented and their relevance for the organization discussed.
10. Foresight outcomes were used to launch new initiatives or actions within the organization.
11. Other.

The response categories are intended to represent a progression in the sophistication of follow-up approaches, and were mapped thus, with the level of sophistication ranging from a value of 0 to 4:

0. No follow-up.
1. Making foresight outcomes available to co-workers.
2. Sharing foresight outcomes and experiences in formal settings.
3. Engaging co-workers with foresight outcomes.
4. Acting on foresight outcomes within the organization.

These data were then used to explore possible categorizations of respondents based on the sophistication of their follow-up activities, or lack thereof. These data revealed stark differences between respondents. Almost half of all respondents (47%) reported that foresight outcomes were not shared within the organization and no follow-up activities were initiated. The sophistication of organizational follow-up activities among the remainder varied. Most common was that perceived program outcomes were disseminated and discussed within the organization. A minority of cases included further follow-up activities to process and make use of the immediate program outcomes. On this basis, respondents were categorized in the following three groups:

1. No dissemination - Immediate foresight outcomes were not shared within the organization and no follow-up activities were initiated.
2. Minimal dissemination - Immediate foresight outcomes were shared within the organization but few or no follow-up activities were initiated.
3. Developmental follow-up and brokering - Immediate foresight outcomes were shared within the organizations and follow-up activities were initiated.

Respondents were asked to what extent futuring methods have been employed within their organizations as an indicator of subjective foresight outcomes, i.e. what individuals learned about futuring and futures thinking as a result of their involvement in the foresight program. Respondents were specifically asked to indicate what futuring methods have been used within their organizations with the following possible responses:

1. None.
2. Informal discussions relating to the future.
3. Environmental scanning - tracking technological and social developments with possible future impacts in mind.
4. Facilitated futures workshops - organized activities aimed at exploring possible futures with no specific formal futures methods.
5. Scenarios analysis - a formal futures method for exploring possible futures.

Possible responses were categorized according their sophistication ranging from unstructured futuring activities to the use of formal futures methods, thus:

0. No futuring activities.

1. Unstructured activities - informal discussions.
2. Unstructured activities with some formalization - environmental scanning.
3. Structured activities with no specific formalization - futures workshops.
4. Structured activities using formal methods - scenario analyses.

Responses regarding the subjective program outcomes suggest that they had a greater impact within organizations than the substantive outcomes. Of the total respondents, 26% reported no futuring activities within their organizations. However, 24%, reported that unstructured futuring activities had been used in their organizations. An even greater number reported a relatively high level of sophistication of futuring activities where they have been used. Most respondents who reported use of sophisticated futuring methods indicated that a mix of approaches was used. In particular, scenarios were used alone or along with other approaches by 38% of respondents. Futures workshops were also commonly used alone or with other methods, with 18% of respondents reporting that futures workshops had been conducted within their organizations. Figure 8 and Figure 9 describe the sophistication of follow-up futuring activities initiated in program participants' organizational contexts.

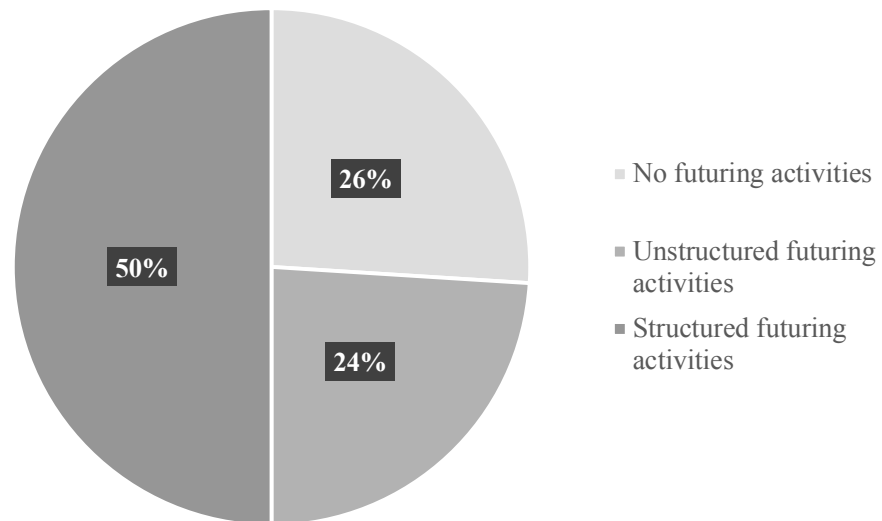


Figure 8. Follow-up futuring activities in respondents' organizations. Percentage of organizations in which unstructured or structured futuring activities were initiated.

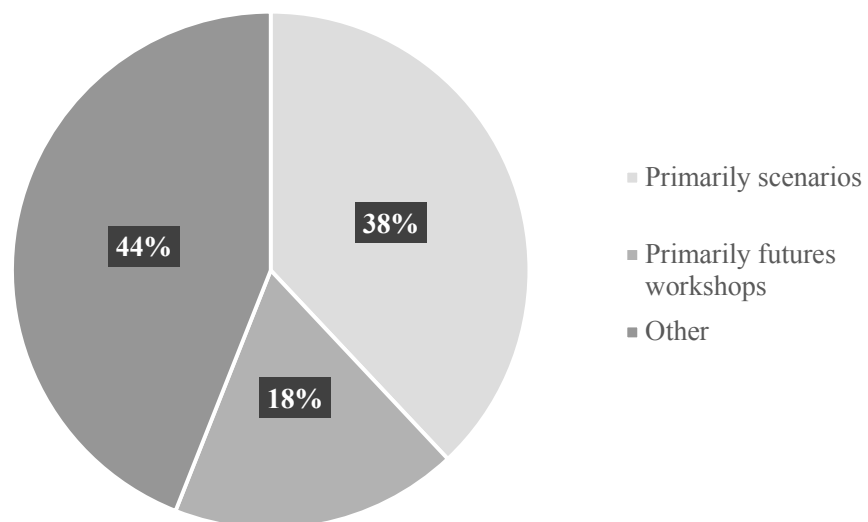


Figure 9. Futuring methods used in structured activities. Futuring methods were primarily used in structured futuring activities in organizations.

Respondent characteristics appear to have played a critical role in the ways that overall foresight outcomes were communicated between program and organizational contexts. In particular, those who had more tenure in their work settings were more active in communication and brokering follow-up activities. Of the respondents that had been employed with their organization for 15 years or more, only one reported no follow-up activities. In contrast, 48% of the 25 respondents who had been employed with their organization for 0-10 years reported no follow-up activities in their organizations. Organizational centrality also appears to have been important. Respondents who held a leadership position reported more developmental follow-up activities, i.e. immediate foresight outcomes were processed to initiate new organizational activities, than those who occupied other positions. Of the five respondents who reported developmental follow-up activities, one was not in a formal leadership position but was a specialist whose position suggested responsibility for cross-work unit coordination.

Respondent characteristics also appear to play a role in the communication of subjective foresight outcomes. Most respondents who reported use of the more sophisticated futuring methods in their organizations occupied leadership positions. Only three respondents who reported the use of scenarios alone or with other methods were not. They, however, all occupied middle management positions. Conversely, only 5% of respondents who were in leadership positions reported no use of futuring methods while 21% of middle managers and respondents in other non-leadership positions reported no use of futuring methods.

Profile of the Foresight Programs Included in the Study

Two national foresight programs were implemented in Iceland over the past ten years: Iceland 2020, implemented by the OPM in 2009, and the MESC's foresight program on ICTs and the future of education that was implemented in 2014 (referred to as the MESC's foresight program). Descriptions of these programs in Chapter Three reveal that the programs differed in their purpose and the participants involved but were similar in their structure. The analysis of documentary evidence gathered pertaining to each program reveals in more detail specific similarities and differences between the programs. These are summarized in Table 7.

Table 7

Comparison of Two Icelandic Foresight Programs

	Iceland 2020	MESC's foresight program
Implementation year	2009	2014
Purpose	Social and economic policy	Educational policy
Motivation	Recent financial and political crisis	<ul style="list-style-type: none"> - Government's new ICT policy - New national curriculum
Visibility	<ul style="list-style-type: none"> - Highly visible - Widely promoted - Considerable public involvement 	<ul style="list-style-type: none"> - Little visibility - Not publicly promoted
Stakeholders involved	<ul style="list-style-type: none"> - Political parties - Social partners - Private enterprise - Public authorities - General public 	<ul style="list-style-type: none"> - School administrators and teachers - Upper-secondary students - Private educational enterprises - Public authorities - Social partners
Primary futures methods	<ul style="list-style-type: none"> - Scenario construction - Scenario analysis 	<ul style="list-style-type: none"> - Scenario construction - Scenario analysis
Activities	<ul style="list-style-type: none"> - Expert management committee - Consultations with experts - Consultations with futurists - Consultations with general public 	<ul style="list-style-type: none"> - Expert management committee - Consultations with experts - Consultations with educational community
External influences	<ul style="list-style-type: none"> - Application for EU membership - Reconstruction of national financial system - Recent elections 	<ul style="list-style-type: none"> - Rapid technological change - Influx of new ICTs in education (esp. tablet computers) - Changes in teacher education and certification
Substantive outcomes	<ul style="list-style-type: none"> - Published final report - Action plan - Measurable objectives 	<ul style="list-style-type: none"> - Final report posted on MESC website

The Iceland 2020 foresight program. The Iceland 2020 program was implemented in 2009, only one year after Iceland had suffered a devastating collapse of its financial system. In the fall of 2008 the three largest commercial banks in Iceland failed, bringing down with them the national financial system. Consequently, Iceland's

currency, the Króna, lost significant value and large portions of Icelanders' pensions and savings were wiped out. The financial collapse was followed by considerable political upheaval and Icelanders took to the streets to protest what they saw as a corrupt financial system backed by cronyist politicians. By January, 2009, the then ruling majority in Parliament, backed by the conservative Independence party, the Social Democratic Coalition, and the centrist Progressive party, had been dissolved. Following a parliamentary election in May, 2009, a new majority, led by the Social Democratic Coalition and the Left-Green party, was formed that was the first left-of-center majority in the Icelandic Parliament for many decades. In the majority agreement, it was stated:

The government will launch collaborative initiatives under the leadership of the Office of the Prime Minister to develop action plans for all parts of the country to strengthen employment and quality of life in the future. The aim is to formulate a collective vision for the future and integrated plans for transportation, communication, tourism, regional development, and in addition to strengthening regional governance. (Iceland 2020 final report, p. 5)

The new Parliamentary majority immediately launched a number of initiatives intended to aid in the resurrection of Icelandic society on the principles of equality and inclusiveness. This was to include a rewriting of the nation's constitution, an official application to join the European Union, and the Iceland 2020 foresight program, in which the entire nation would be invited to participate in laying the groundwork for Iceland's future social and economic development.

Because of the promises made by the new government and its early initiatives, Icelanders already had a general sense that they were active participants in the reconstruction of a nation when the Iceland 2020 program was launched. The Iceland 2020 program was presented as an opportunity for the society as a whole to have a very direct and concrete impact on that process in partnership with the nation's political forces. This was particularly the case in the scenario-planning component of the program. A group of 150 representatives of various interest groups, professional organizations and government institutions first developed a number of scenarios. These were presented to the public at workshops that were held all over Iceland to get public input regarding the scenarios that had been developed. In all, 1,231 Icelanders participated in these workshops.

Participants in the Iceland 2020 program who were interviewed for the study expressed that they perceived the program as holding personal relevance due to the program's participatory element. As one respondent described, "[When the banks failed] people around me were worried that they were going to lose their houses. One of my children even. [The program] at least gave me a way to do something." Furthermore, participants felt that the program provided them with an opportunity to ensure that a crisis of the magnitude that Icelanders had recently experienced would be avoided in the future, which added to the perceived relevance of the program and an appreciation of its long-term future perspective. As one respondent succinctly put it, "We had to make sure that something like this can never happen again." Thus, participants felt that they were not only engaging in something important, but also that they were doing something of

the utmost necessity that would change society for the better. Prime Minister Jóhanna Sigurðardóttir accurately captured program participants' hopes when, at a conference announcing the program outcomes, she stated that, "The future seldom turns out the way we anticipate but what we think and say today has an impact on the future." (quoted in Jóhannsson, 2010).

Respondents involved in Iceland 2020. Of the 38 individuals who participated in this study, 14, or 37%, were involved with the Iceland 2020 foresight program. The types of organizations represented by these individuals cover a broad spectrum. Some respondents classify their organizations in more than one category. Therefore, the distribution of the types of organizations is not equal to the total number of organizations represented in this part of the study. The types of organizations include six public or government organizations, five educational organizations, three unions or professional organizations, and one each of a private and employer organization.

Most of the respondents who participated in the Iceland 2020 program, or 64% were in leadership positions in their organizations, i.e. either executives or board members. Two were middle managers, and three were scholars holding academic positions in academic institutions. Two of the participants also indicated that they were teachers or instructors in addition to being in a leadership position in one case, and a scholar in another. All participants in the Iceland 2020 program had been employed by their organization for more than five years when they participated in the foresight program. Half of the participants were employed for 5-10 years, 29% for 10-15 years, and 21% for more than 20 years. A majority of respondents who participated in the

Iceland 2020 program were still employed by the organization that they represented in the program at the time of the study, or 71%.

Ministry of Education's Foresight Program. Preparations for the MESC's foresight program started in the Fall of 2013. The purpose of the program was twofold: First, to develop initiatives for Iceland's educational system in support of the Ministry of the Interior's policy on the Icelandic information society; and second, to support the implementation of the Ministry's new National Curriculum in which ICTs figured more prominently than in previous curricula (Ministry of the Interior, 2013; Ministry of Education, 2013)

The MESC's foresight program differed from Iceland 2020 in that it focused solely on education and Iceland's educational community, whereas education was only a component in a broader framework in the previous program. Furthermore, the MESC's foresight program was not as publicly visible as Iceland 2020, in part because of its narrower focus and target audience. Thus, there was little fanfare surrounding the MESC's program and it was little known outside of the group of people that participated in its planning and implementation. Specific organizations were invited to nominate their representatives to participate in the program to ensure that relevant and influential stakeholder organizations from Iceland's educational community would be represented.

The Ministry of the Interior's policy on the Icelandic information society specifies several actions that fall under the auspices of the MESC and that relate to the MESC's foresight program:

1. To strengthen ICT education at the primary, secondary and tertiary levels,

2. Introduce elective courses in ICT at the lower-secondary level and specialized ICT tracks at the upper-secondary level,
3. To strengthen teacher training in ICT, both in initial training and continuing professional development,
4. Increase the number of ICT specialists in schools,
5. Increase the number of women specializing in ICT in schools.

In addition to these specific objectives relating to the MESC's foresight program, there were various events in Icelandic society and in the educational environment that relate to the program. In particular, the rapid diffusion of tablet computers, smartphones and other portable technologies were seen to be affecting educational environments in both positive and negative ways.

Respondents involved in the MESC's foresight program. Of the 38 individuals that completed the web-based survey, 24 participated in the MESC's foresight program. The most commonly represented types of organizations in the MESC's foresight program were educational organizations, or 46% (11) of the organizations represented by participants in the program. The next most common were unions and professional organizations, accounting for 29% (7), followed by public organizations at 17% (4) and private organizations at 13% (3).

In the MESC's foresight program, ten of the 24 (42%) respondents were in leadership positions in their organizations. An equal number described their position as middle managers, i.e. department heads, project managers, or team leaders. The remaining four (17%) describe their positions as specialists.

Several respondents claimed to occupy more than one position. One respondent in a leadership position and one in middle management also claimed to be instructors. One middle manager also claimed to be a specialist and another middle manager claimed to be both an instructor and specialist.

The majority of respondents who participated in the MESC's foresight program, or 54% (13), had been employed only 0-5 years in their organization. Of the remainder, 21% (five) had been employed for 5-10 years, 13% (three) for 10-15 years, 4% (one) for 15-20 years, and 8% (2) for over 20 years.

Almost all respondents who participated in the MESC's foresight program, or 83% (20), were, at the time of the study, still employed by the organization that they represented in the program.

Part II: Ownership and Responsibility: Whose Program Is This Anyway?

Two overarching themes emerged from the interview data that are relevant to the study, both of which dealt with ownership and responsibility: (1) the program's ownership and intended target group, particularly which groups it was meant to influence; and (2) the locus of responsibility for creating some use or outcomes of the program. These themes shed significant light on what program participants perceived as relevant outcomes for their organizations and their perceived roles in transferring the outcomes from the program contexts to their organizational contexts. Three categories of participants emerged that are defined by the way each related to these themes. The categories are: The Advisers, The Believers, and The Preachers. Here we look at how the two themes emerged and how the participant categories were derived from them.

Whose Program? – The Target Group.

We find two distinct senses of ownership expressed in the interview data that will be defined here as external and internal ownership. External ownership refers to the practicalities of program management and organization, i.e. funding program activities, coordinating program activities, organizing events, etc. The external owner is the party that is most associated with the program: the external owner of the Iceland 2020 program was the Office of the Prime Minister (OPM), the external owner of the MESC's foresight program was the MESC. Internal ownership is more concerned with the processes and products that emerged during program activities, i.e. what issues were addressed, how they were addressed, participants' inputs to the program, whom the program served, and what the program ultimately produced. Internal ownership is more shaped by perception and is related to the level of responsibility and perceived influence that participants felt that they had for what occurred in, and came out of, the programs.

Interviewees were unambiguous and almost unanimous in their perceptions of the external ownership of the two foresight programs included in the study. Interviewees described the programs as being owned by the parties that the programs were primarily associated with, i.e. the OPM and the MESC. Interviewees routinely referred to the programs as the "OPM's program", or the "MESC's program". As the sponsoring authorities, the OPM and MESC were regarded by all interviewees as the parties responsible for all practical aspects of the programs. One slight difference in this regard was that some interviewees at times ascribed external ownership to specific individuals within, or associated with, the sponsoring authority. This was particularly the case with

the Iceland 2020 program, which a few interviewees sometimes called "Dagur's program", referring to Dagur B. Eggertsson, the OPM appointed chair of the program's management committee. Nevertheless, even the interviewees who referred to "Dagur's program" more often referred to the program as the "OPM's program".

Interviewees were more ambiguous concerning how they perceived internal ownership. Although no interviewees explicitly stated what their perception of internal ownership was, their views were suggested in the way that they expressed their relation to the program and its outcomes. Three distinct categories emerged in this regard: the individualist perspective, where the interviewees primarily focused on their personal contributions to the program; the collaborative perspective, which emphasized the collective impacts of program participants; and the communal perspective, in which program activities and impacts were related to broader social contexts beyond the immediate scope of the program.

The individualist perspective. The primary characteristic of the individualist perspective was that interviewees tended to use first-person pronouns when discussing the programs and their relation to them, ex. "*I* was invited to participate in the program..." and "[the program] provided an opportunity for *me* to engage with others..." (emphasis added by the author). Three interviewees fell into the individualist category, one participated in the Iceland 2020 program, and two participated in the MESC's foresight program. All of these individuals had significant professional experience and had been in leadership positions within their field or organization for 10 or more years.

None had had much exposure to, or experience with, futures or foresight work prior to their participation in the programs.

The individualists rationalized their participation in terms of potential contributions that they felt that they could make to the program rather than the programs' relevance for their organizations or other social entities:

A: I was contacted by email to ask if I would participate in this program. I wasn't really sure what the program was supposed to be about, but I suppose I figured that my experience was relevant. So, I said yes.

B: There were several of us [from my department] involved in the program, but since it seemed related to my field, I guess I thought it natural that I would be involved.

When discussing their involvement in the programs, the individualists seldom, if ever, referred to their organizations, other program participants, or other potential beneficiaries of the programs' outcomes. Rather than representing their organizations or other social entities, they regarded themselves as individuals who were recruited for the programs based on their individual merits, knowledge, and experience. They saw themselves less as collaborators and more as qualified contributors who could provide a service to the programs' sponsors. As stated by one participant in the MESC's foresight program:

I was disappointed. I had put considerable time and effort into [the program], but I never saw any outcomes. Really, it was a bit of a waste of time.

A participant in the Iceland 2020 program, put it differently:

At times I felt like my input wasn't appreciated. At one point I saw that the process was being hijacked by people who had less experience and insight than I did. I sort of made a last-ditch attempt to convince the others that we should be going in another direction. I don't think that what came out of this process ended up being particularly useful.

In line with this view of their personal roles in the programs, the individualists made little distinction between external and internal ownership. To them these were essentially one and the same, and the individualists considered external owners, i.e. the program sponsors, to be responsible for all aspects of the programs, including identifying outcomes and disseminating them beyond specific program activities. When pressed about their role in disseminating program outcomes within their organizations, two individualists responded:

A: I never got anything to share with my colleagues. I would have gladly done so, but there never was anything.

B: The results of the program were published by the [sponsoring authority]. They disseminated them. I didn't see it as my responsibility to share them.

The collaborative perspective. The primary characteristic of the collaborative perspective was that these individuals regarded themselves as members of teams, both within the program contexts and in their organizational contexts. When discussing their participation in the programs they commonly used the pronoun "we", referring variously to program participants, colleagues within their organizations, or colleagues within their professional communities. Five interviewees fell into the collaborative category. Three

participated in the MESC's foresight program and two in the Iceland 2020 program. One was a high school principle, one was a preschool teacher, one was a researcher, one was a program manager for a public agency, and one was responsible for education and training for a union.

In contrast to the individualists, the collaboratives saw the programs more as cooperative engagements intended to pool the capacities of multiple players involved in relevant fields of practice. They saw themselves as representatives participating in the programs on behalf of a larger organizational entity who were meant to convey the experiences, views, and needs of that entity within the program contexts. One upper-secondary school principal described the general attitude of the collaboratives succinctly:

We [schools in Iceland] have to work together to figure out how we're going to deal with the changes that are happening around us. We've placed a lot of emphasis on integrating new technologies at my school and we want to share our experiences. We see a lot of other schools around us struggling with things that we've already overcome, and we want to help them. For us, it's best if everyone can be on the same, or at least a similar, page because then we can work together to address new issues. [...] We always jump on opportunities like [the one provided by the foresight program] because it gives us a chance to share our experiences while reflecting on our practice at the same time.

As collaboratives discussed program activities, they often expressed their thoughts about group dynamics and their perceived roles within their workgroups. In

particular, they wanted to be sure that their organizations' or professional communities' concerns were effectively communicated to the program contexts and taken into consideration in the programs' group activities. For example, one individual who worked extensively with international programs and felt it important that the international dimension was considered in the group discussions:

I work with international programs and I've seen how effective international collaboration can be for educational development. [...] My primary concern in the program was to make sure that that international dimension figured in whatever came out of our discussions.

The collaboratives were not only concerned about ensuring that their organizations' and professional communities' concerns informed the foresight programs' outcomes. For them, delivering their organizations' concerns to the program context was also a means of ensuring the relevance of the outcomes for their organizational contexts:

For us [my professional community] everything is about international collaboration. If there isn't that component, then we're unlikely to pay much attention to it. So, in part, I saw it as my role to make sure that the outcomes were relevant for us.

Like those who fell into the individualists category, the collaboratives were quite clear that the sponsoring authorities, i.e. the OPM and the MESCC, were the external owners of the programs. However, they differ significantly in terms of perceived internal ownership. For the collaboratives, ownership of the processes, products, and outcomes of the foresight activities was theirs. They saw it as their responsibility to ensure that the

programs produced something that was relevant and useful for them, and that they could take back to their organizations or professional communities. As one study participant put it:

We saw the program as an opportunity. It was an opportunity to refocus our efforts, to try something new. So, we wanted to be a part of reshaping the landscape to make that more feasible.

Another directly addressed the issue of internal ownership, equating it with accountability:

In the end, it's our names [the program participants] that are on whatever comes out of the program. It's us [the program participants] that are going to be accountable.

The collective perspective. Like the collaboratives, a key characteristic of the collective perspective is that the individuals in this category saw themselves as acting on behalf of a social context greater than themselves as individuals. However, their view of the social context that they were serving was significantly broader than that of the collaboratives. The collectives saw themselves as working, not only for their organizations or professional communities, but society as a whole. Three interviewees fell into the collective category. All had participated in the Iceland 2020 program, had been in leadership positions within their organizations, and all had previous experience with foresight and futures work.

Like the collaboratives, the collectives also tended to use plural pronouns, i.e. "we" and "us", when discussing their relation to the programs. At times they used them to refer to their organizations, but often they were referring to society in general:

A: We [Icelandic society] need to make sure that something like this [the 2008 financial collapse] never happens again.

B: We finally had these people discussing this stuff together!

C: [Foresight] isn't insignificant. It's something that we as a society have to figure out.

The collectives viewed their organizations as essential components of the national social fabric that, as such, act on behalf of national interests, in addition to the organizations' specific interests. The collectives regard the organizations that they represented as somewhat unique in this regard:

At [my organization] we deal directly with technological change. We have to make sure that our people are prepared to work with new technologies as they emerge, preferably before they emerge. Without our people, Icelandic society won't be adequately prepared to use the newest technologies.

The collectives' perceptions of internal ownership were shaped by their views of the social relevance and value of the work that the organizations that they represented in the programs do. In their view, the processes and products of the program ultimately belonged to the Icelandic society as a whole. They saw it as their responsibility to use their knowledge and positions to effectively represent the needs of the society and to ensure that different points of view were presented, even those that were not their own.

The collectives expressed more concern than other groups about who was represented in the foresight programs and tried to fill perceived gaps on their own. Their goal was to produce something that would serve the whole society, rather than only their fields of practice, organizations, or themselves as individuals.

The collectives, like the individualists and the collaboratives, recognized the external ownership of the public authorities sponsoring the foresight programs. Broad internal ownership, on the other hand, was seen as a program objective. The collectives saw it as their goal for the program to produce something that the greatest possible number of Icelanders would want to claim ownership for.

Program participants' engagement with outcomes. Interviewees were asked about their expectations regarding program outcomes. The interview data suggests that program participants' expectations regarding outcomes varied. The analysis of these data revealed that differences regarding expected outcomes were, in some ways, aligned with participants' perceptions of program ownership and responsibility. There were also notable differences between interviewees' expected outcomes depending on which program they participated in, the Iceland 2020 program or the MESC's foresight program.

The interviewees largely related their expectations of the programs to their prior experiences. The relevant prior experiences were not limited to interviewees' experiences with related or similar programs. They included interviewees' prior experiences working with the program sponsors, i.e. the OPM and the MESC. One

interviewee described how her previous experiences shaped her expectations of the program:

I tend to be a bit of a sceptic, especially with these types of ministry-sponsored things. I've been in too many of these where nothing really useful has come out of them and, to tell the truth, I didn't expect anything different this time. [...] For me, the program was really more of an opportunity to get out of the office and network with the school-folks than anything else. A little break from the office humdrum. I can't really say that I had high hopes in terms of the outcomes.

Another, who had also participated in numerous ministry-led initiatives, had a similar story to tell:

I've worked with the ministry a lot of policy initiatives. I didn't see this one as being significantly different even though the format was a little different. I guess the main thing for me as a school-person, and especially coming from a school outside of Reykjavík, was to keep things realistic - to make sure that what came out was actually doable.

Even those who had little or no experience with ministry-led initiatives related their expectations to their lack of experience. One interviewee, who had recently been shifted to a new position when she participated in the MESC's foresight program, described her expectations thus:

I had just taken over [projects relating to education] when I learned about the program. I had never participated in an initiative like this

before. My boss and I mostly saw it as an opportunity for me to get acquainted with the broader educational community. We weren't thinking much about what would come out of the program. [...] I guess at some level I expected some sort of report to be produced, but I didn't give it much thought at the time.

A statement made by a more experienced interviewee, who had worked with public authorities conducting foresight and futures work, further demonstrates how experience influenced participants' expectations:

You have to keep in mind that when we're being asked to do things like this, it's because we are the authorities. We're the people with the relevant knowledge and experience. The people at the ministry aren't the specialists. So, we have to take control of the process and make sure that it's going to move along what needs to be done.

Interviewees described how their previous experiences and the context in which the foresight programs were implemented played a role in shaping their expectations regarding program outputs and outcomes. All of the interviewees expected that the programs would produce some sort of substantive outcomes, i.e. written summary reports that would include policy recommendations. Not necessarily because they had been informed that this was a goal, but rather because, as one interviewee put it, "This is what programs like this do." Most interviewees expressed the same, i.e. that when public authorities organize initiatives with stakeholder involvement, it is assumed that the organizers will gather, document, and disseminate relevant outcomes in a publication, or

what has been referred to here as a substantive outcome. For all interviewees, this was an expected outcome whether or not they had any recollection of the organizers stating that this would occur. In fact, when interviewees were asked whether they had been informed that the foresight program would produce substantive outcomes in the form of publications, almost all dismissed the question as superfluous. They regarded substantive outcomes as the primary purpose of the program. Although all interviewees had an expectation that the program organizers would produce substantive outputs, their views of the purpose of the substantive outputs varied. Some regarded the substantive outputs merely as documentation of what occurred in the initial program activities while others expected them to provide tools for follow-up activities.

Expectations in this regard corresponded with interviewees' perceptions of program ownership and responsibility. The individualists, who focused primarily on external ownership, expected substantive outputs to describe and communicate the external owners', i.e. the OPM and MESC, policy recommendations and directives for implementing policies, mentioned repeatedly that substantive outputs should communicate "what the ministry wanted [or expected] to happen". The collaboratives, who were more attuned to their own internal ownership of program outcomes, expected substantive outcomes to highlight practical initiatives that they themselves had developed during initial program activities and to provide instructive roadmaps for follow-up activities. The collectives, who had more experience with futuring and foresight than the other interviewees, and viewed their program in a broader context, expected more sophistication in terms of the substantive program outcomes. They not

only expected that the substantive outcomes would communicate actionable policy recommendations, but that they would also describe a shared holistic vision for the future of Iceland in general.

Interviewees' expectations regarding subjective and communicative outcomes corresponded with their previous experience with futuring and foresight programs. Those who had little, or no, previous experience with futuring and foresight did not offer information about their expectations for subjective or communicative outcomes until they were asked about them specifically. Those who had some prior experience with futuring and foresight stated that they initially hoped that they and their colleagues would learn more about futuring and foresight processes during the program. Those who had the most experience with futuring and foresight regarded the initial program activities as a platform for launching a new discourse that would focus on Iceland's future and long-term policy. Their expectations were that the programs would increase policymakers' and stakeholders' capacity to engage in meaningful and productive dialogue about the future. They considered the subjective and collective outcomes of utmost importance, and even more critical than the substantive outcomes. Thus, they had high expectations as regarded the subjective and collective outcomes, not only for themselves, but for all of the program participants and the organizations that they represented collectively. One interviewee succinctly summed up this perspective:

I inserted myself into the [Iceland 2020] program very deliberately because I saw in it an opportunity to do what [I] had been trying to do for quite some time - to make policy dialogue more future-oriented.

Before the program, [I] had done work with several organizations and municipalities. But, whenever I had felt like I was making some headway, I saw whatever progress there had been fade away when the people I had been working with had to deal with others. Then they would start looking for new common ground and the future always went out the window pretty quickly. So, I thought we needed something bigger to get everyone on the same page. The grand scale of the Iceland 2020 program was a chance to sort of orient everyone at once, get all of these parties talking together on the same level.

To this interviewee, the substantive outcomes, while certainly relevant, were secondary to the subjective and communicative outcomes because he considered the latter more enduring and more conducive to systemic change, which he saw as the ultimate goal of the program. In contrast, an interviewee who had had some, albeit very little, prior experience with futuring and foresight, had this to say when she was specifically asked about the subjective and collective outcomes of the MESC's foresight program:

Of course, I picked up some things about the scenario method that we used in the workshops, but that wasn't really the purpose of the program. It was more a means toward the goal. Still, I guess you could say that I'm more aware of futures as a way of exploring issues. [...] I wouldn't say that I've used that consciously since then. It's more like one of those things that might subtly change your perspective.

Other interviewees expressed positions falling between these two opposing views. One who had some expectations regarding subjective and collective outcomes felt that, nevertheless, what did come out of the MESC's foresight program fell short of what she had hoped for:

One of the things that I was looking forward to was getting some methods that I could take back to [my organization] to get people there involved in this process. [The organizers] had always said to us that we would learn about futuring and it certainly did expand my perspective. But, no one ever really explained to us what we were doing and there wasn't enough about it in the results to be useful. I tried doing some things with my co-workers, but they didn't really get it and I felt like I didn't know it well enough to do much with it.

CHAPTER 5: OWNING THE OUTCOMES

On the basis of the themes analyzed in the previous chapter, three categories of program participants were defined as:

1. “The Advisers”, those who fail to identify relevant program outcomes and do not transfer outcomes to their organizational contexts;
2. “The Believers”, who identify some outcomes and attempt to use them to initiate follow-up activities in their organizational contexts; and
3. “The Preachers”, who gather all foresight outcomes and inject them into their organizational contexts to continue foresight and futuring activities launched in the programs.

In the remainder of this chapter, the behavior of these three groups will be explored, primarily through the voices of participants in each of the above groups. Then, the sensemaking process will be interpreted within the CHAT framework.

Perceived Outcomes

Interviewees' expectations regarding program outcomes influenced their perceptions regarding actual outcomes of the programs. For those whose expectations were limited to substantive outcomes, their perceptions of actual outcomes were really reflections on the quality of the substantive outcomes that they experienced. One participant in the MESC's foresight program, was the most extreme case in this regard. His expectation was that the program organizers would produce a report with policy recommendations and follow-up actions and deliver it directly to him. The MESC did

produce a report detailing outcomes of the workshops conducted during the program, but it was only published electronically on the MESC's website and not distributed to program participants or promoted in any other way. This was far from this participant's expectations who declared, when asked about actual program outcomes, "There were no outcomes." As for the program's impact on his organization, there was none because, he claimed, there were no outcomes to present to the organization.

Another participant in the MESC's program, saw things very differently. She was aware of the electronically published report, but she had also anticipated both subjective and communicative outcomes to some degree, and this was reflected in her perceptions of actual program outcomes:

They should have done more with the report. I thought it was almost insulting that [the MESC] kind of buried it on their website. There were some really good things in it that we could have worked more with. But, even though they didn't follow-up with the report, I feel like there is an increased awareness about future thinking. People around me are thinking more long-term and thinking about future technologies. I think it's, in part, because of the program.

This participant was more attentive to the MESC's broader goals of increasing future orientations system-wide, i.e. not only among program participants but also within the organizations that they represented. Thus, she shared her experiences from the program with her colleagues in her organization and this is clearly reflected in her perceptions of the program outcomes.

A similar pattern was perceived in all interviewees' responses regarding perceived outcomes. When reflecting on actual outcomes, they looked for those that matched their expectations, leaving little room for unanticipated outcomes. The question, "What were the actual outcomes of the program?", was essentially treated as being synonymous with, "Were your expectations regarding program outcomes met?"

Program participants' perceptions of program outcomes were also closely aligned with their perceptions of the internal ownership of the program. The individualists, who essentially made no distinction between external and internal ownership, anticipated that the external program owners would supply them with relevant outcomes, and that whatever they supplied were the totality of the outcomes. Thus, for them, there were only ever expectations of substantive outcomes, i.e. whatever the program coordinators published and disseminated following the initial program activities. The collaboratives expected a broader range of outcomes but hoped that the external program owners would help them to recognize those that would be most significant and relevant for their organizations and any follow-up activities that they might initiate. Most of them were newcomers to the field of foresight and futuring, and even though they were eager to learn about the processes and methods involved, and make further use of them, they were not confident in their ability to identify what was most important for them and their organizations. The collectives were well aware of what foresight programs could produce, because of their previous experiences with such programs. They saw the programs that they participated in as opportunities for them to identify and fill their own knowledge gaps. Thus, even when outcomes that they anticipated were not clearly

identified among program outcomes, they, themselves, pulled them from what they had to make more concrete for others in their organizations.

The relationship between perceived internal ownership of the programs and perceived outcomes can be addressed in terms of how different participants would respond to the question posed earlier, "Were their expectations regarding program outcomes met?" For the individualists, all that was needed to meet their expectations was a published report summarizing the program activities and results shared by the program coordinators with them. For those who participated in the MESC's foresight program, this expectation was not met since the program report was neither announced nor distributed, only made available on the MESC's website. For the collaboratives, their expectations were partially met. They were more likely to be aware of the substantive outcomes produced, and were aware of the subjective and communicative outcomes, but needed help to make adequate use of the latter two in their organizations. The collectives' expectations were met because, even if there were gaps in the perceived substantive, subjective and communicative outcomes that were immediately available to them, they completed the information that they felt that they needed themselves.

Taking Up Ownership: Varying Responses

The themes already discussed influenced interviewees overall perceptions of the programs that they participated in, which in turn influenced the ways that information, knowledge, and experiences resulting from the programs were transferred to organizational contexts. Three general categories of program participants were defined to highlight interviewees general perceptions of futuring and foresight, the foresight

programs included in the study, and how program outcomes were transferred to organizational contexts. These are defined as the Advisers, the Believers and the Preachers. Table 8 shows how interviewees perceptions of program ownership and responsibilities aligned with the categories described here.

Table 8

Interviewee categories and their perceptions of program ownership and responsibilities

	Advisers	Believers	Preachers
individualists	N=3	N=0	N=0
collaboratives	N=1	N=4	N=0
collectives	N=0	N=1	N=2

There was strong agreement between interviewees' perceptions of program ownership and responsibilities and their overall perceptions of the programs that they participated in. The individualists, who took little, if any, ownership for the programs and considered the program coordinators to be responsible for all aspects of program activities and follow-up actions, all fell into the Advisers category. The collaboratives, who took some ownership and responsibility for program activities, were most likely to fall into the Believers category. The collectives, who took the broadest view of ownership and responsibility, considering the programs more as a society-wide initiative, rather than being limited to participants or coordinators, were most likely to fall in the Preachers category. It should also be noted that in the Believers category were some borderline individuals that shared characteristics with either the Advisers or the Preachers but were ultimately categorized as Believers.

In the category labelled “the Advisers” are interviewees for whom the outcomes of the program that they participated in did not meet their expectations. Their

expectations are based on their view that foresight programs are not opportunities for personal or organizational development, they are information exchanges in which they participate as subject area experts whose task it is to feed the processes, not to feed off it. Their expectations regarding outcomes tend to be traditional in that they focus primarily on concrete substantive outcomes, in particular, published reports and other tangible, easily disseminated outcomes. The primary indicator of an Adviser is that they do not readily acknowledge program outcomes that are not tangible, or do not consider non-tangible outcomes to necessarily result from the program. This is particularly evident when concrete outcomes are not published or widely publicized. For them, there are, then, no reportable outcomes at all, and nothing to share within their organizational contexts. The Advisers typically have little experience with futures work and little knowledge of what it entails. Furthermore, the Advisers have little insight into the rationale and purpose of foresight programs in general, and are not sure how to make use of the outcomes of the program that they participated in, neither concrete outcomes or others. Their general view is that the outcomes are to be used by others, primarily the program coordinators, who they regarded as responsible for all aspects of the program and any follow-up activities.

The category labelled “the Preachers” are the polar opposites of the Advisers. These are individuals that have prior experience with futures work, even extensive experience, in some cases. They are particularly interested in increasing futures perspectives within their fields and their organizations. For them, the foresight program was seen as an opportunity to raise awareness of how futures work can benefit their

colleagues and society in general. The Preachers have a broad view of the potential outcomes of the program, including the substantive, communicative and subjective outcomes. They seek out opportunities to use those outcomes in any way that they think will deliver an optimal impact whether within their organizations or on a broader level. The Preachers in this study were all in senior leadership positions within their organizations, which affects their ability to inject program outcomes into the organizations practices. They expect, and have the authority, to align organizational policy with program outcomes and can dedicate organizational resources to that task, including soliciting external resources to help plan and conduct any organizational activities needed to do so.

If we consider the categories being described here as a continuum, the Believers fall between the Advisers and the Preachers. They are likely to have some familiarity with futures work but have little experience working with it in a strategic manner. Like the Preachers, they are interested in finding ways to increase futures perspectives within their fields and organizations and come to the foresight programs looking for ways to do this. In particular, they are interested in futures methodologies and how they can promote their use within their own organizational context. Thus, their interest in participating in the foresight program is driven somewhat by their wanting to learn about futuring and they, therefore, focus more on the subjective and communicative outcomes than the Advisers. For them, subjective and communicative outcomes are personal development gains and they struggle with finding ways to transfer those gains to their organizations. In some cases, they feel that they do not have the authority initiate

processes conducive to knowledge transfer within their organizations. In others, they do not know how to go about it, including how to present future-relevant knowledge and information in a meaningful way or how to organize and conduct futuring and foresight activities with their colleagues.

Vignettes

The following vignettes are intended to describe in more detail the characteristics of the categories of respondents, i.e. the Advisers, the Believers and the Preachers. There are three vignettes representing an exemplar of each category constructed from the data provided by interviewees who participated in the study.

The following vignettes use the interview data and results of the analyses to highlight respondents' expectations from the program that they participated in and their perception of the program outcomes. The subjects of the vignettes are listed in Table 9. To protect the identity of participants in the study, the vignettes are based on aggregate data and pseudonyms used instead of real names. Thus, each vignette is not representative of any single individual but rather groups of individuals who described their experiences in similar ways.

Table 9

Vignette Subjects

Respondent Category	Respondent (pseudonyms)	Program participated in
The Adviser	Lisa: Mid- to upper-management at educational and training provider.	MESC's Foresight Program

The Believer	Klara: Mid- to upper-management involved with educational development.	MESC's Foresight Program
The Preacher	Gunnar: Upper-management in stakeholder organization.	Iceland 2020

The Adviser.

Lisa. Lisa works in mid- to upper-management at a public organization that provides general or specialized educational and training opportunities. Lisa has significant experience working in education, having risen through the ranks over a period of 15 years or longer. Lisa considers herself to be an expert in her field due to her extensive and diverse experience.

When Lisa was asked what impact she thought that engaging with the future in the MESC's foresight program would have for her organization, she responded,

For me, the program was never literally about the future, any more than other initiatives like this. We might frame the issues that way as an exercise but, as we say [in Iceland], "Enginn veit hvað framtíðin ber í skauti sér," or "No one knows what the future will bring."

Lisa had some exposure to futures-related work before participating in the MESC's foresight program, but it is clear that, for her, "the future" is merely a means of emphasizing possible implications of current issues. She regards the future scenarios that she was presented with in the foresight program as purely speculative, and makes little, if any, distinction between the futures methods used in the foresight program and

methods that she has been exposed to in other collaborative policy development projects. In fact, when asked specifically about the methods that were used in the program, she replied that she was not aware of any particular methods used, the people in her group just discussed the scenario that they were presented with.

Lisa considers her organization to be fairly forward-looking, but what that means for her is shaped by her understanding of what “the future“ is in relation to policy and policy making. As examples of how the future is addressed within her organization, she mentions that articles on matters relating to the organizations operations are regularly circulated and discussed among staff. These are, however, not articles that are especially addressing future-relevant topics or framing issues in a future-relevant way. Thus, for Lisa, keeping up with contemporary discourse is the essence of preparing for the future.

Lisa was happy with the program activities overall. She felt that the discussions in her team had been interesting and fruitful and delivered insights that exceeded his expectations. She was, however, not happy with the program overall because she never received any documentation of the program outcomes. In the end, she considered it a waste of time and effort that delivered little in terms of tangible results.

Lisa had looked forward to reading the recommendations resulting from the program and exploring what impacts they might have in her own work environment, but after the program activities she never heard from the organizers. As she states, when asked what was done with the program outcomes in her workplace, "As much as I would have like for something to happen, nothing did because I never received any outcomes."

The Believer.

Klara. Klara is in mid- to upper-management in an organization that is actively involved in developing novel practices for education. Klara currently works in education but has a diverse background that includes other non-related fields. She likes to think that her experiences provide her with some unique perspectives on education but sometimes feels somewhat out of place among colleagues with more experience in the field of education.

Klara was excited about the MESC's foresight program. Not so much because of the focus on the future, she was more interested in discussing ICTs in education in general. She felt that it had been a long time since there had been serious policy discussions about ICTs in education and that such a discussion was sorely needed. The futures focus was, for her, mostly just an interesting way to frame the discussion. Furthermore, the program was an opportunity for her to get out of her everyday routine and engage with others involved with educational development. At the same time, she was somewhat skeptical about the MESC's ability to conduct the foresight activity in a fruitful manner. She had participated in a number of similar exercises that she felt seldom produced much of significant value.

Despite her skepticism, Klara quickly saw how discussions about the future can inform the present. She found it quite fascinating and surprising, especially how the future focus prompted her to think about technology and education in new ways:

When we started talking about how technology will shape the society of the future, it sort of hit me, that when we're using technology in the

classroom, it isn't just about using the tools that we have available, we are shaping our students' perceptions of their own futures.

Klara was sold! After participating in the program, she felt that foresight for educational planning, "... isn't an option. It's what we have to do. It's what we owe students at our schools." Back at her organization she scheduled symposia for her staff about the future of education. She brought speakers in to talk about what we are likely to see in the future and how it might affect education. But, eventually, reality set in, and Klara had an organization to run. In the end, she had to concede that, "I'm busy putting little fires out all around me every day. Thinking about the future is a luxury that I can seldom afford." Asked whether she thinks that there is any chance that her organization would change if she put more effort into promoting the outcomes of the program, she responds, "My organization is sort of like a big, lumbering oil tankers out at sea. It's going to take more than my efforts, alone, to change its course."

The Preacher.

Gunnar. Gunnar is in upper-management at a stakeholder organization that, though not directly involved with education, contributes to educational policymaking. The services provided by Innova range from courses on how to start a business to technological research and advanced prototyping for product development. The organization is quite diverse and includes many different departments, some of which focus on its internal work, and others on work with external partners.

Gunnar is no stranger to futures-oriented work and describes himself as, if not a futurist, at least a consistent forward-looking leader. He has studied futures methods,

uses them extensively in his work and is a strong advocate for the use of futures methods in organizational, as well as social, development. He has produced materials relating to futures for people in his organization, and in some cases, the general public.

Gunnar not only participated in one of the foresight programs studied, he also played an active role in planning and coordinating the program activities. Gunnar had great hopes for the program and felt that it was an opportunity to launch an ongoing discussion about Icelanders' aspirations for the future. As such, Gunnar felt that education had to be a central focus for the program because it, "... is not an option. We see the accelerating rate of change all around us. These are changes that we have to get ahead of if education is to have any meaning at all." However, as the program progressed, he became aware that the government officials involved in coordinating program activities had very different ideas about the program than he did. Gunnar says,

I was full of ambition after the initial program implementation because things had gone so well. Finally, we had a dialogue going on with parties from all corners of society, serious discussions about the future that people want for Iceland. I started talking about ways that we would continue the dialogue. But, the government officials said, "No, we've done what we promised. Now it's time to get a report out before the next election." And that was to be it. In the end it became all about politics.

Although Gunnar was disappointed with how the program ended, he was very happy with what happened before it was subsumed by the political process. In particular

he feels that the program raised awareness of future-oriented policy planning where there was little to begin with. This was especially important when he was promoting futures work at his organization. Because the foresight program that he participated in was so publicly visible, he felt he finally had a familiar point of reference that he could use to demonstrate the types of activities that he advocates for in his daily work.

Settings Matter: The organizations represented in the study

A key theme that emerged regarding the organizations represented in the study was the way in which they interface with other organizations in networks and collaborative activities, and the nature of their inter-organizational relationships. Networking was widely acknowledged as a valuable outcome of the foresight programs, and for some participants, it was stated as their primary motivation for partaking in the foresight program. Thus, the organizational context is relevant to the systemic analysis that will follow.

The organizations represented in the study fell into three broad categories that were labeled as hot, warm and cold organizations. The labels refer to the way that the organizations treat flows of resources through networks and how they are perceived as networking partners by others.

Hot organizations. The hot organizations were characterized by a predominant outflow of resources. They were seen by others as an attractive ally because they were perceived as potential sources for valuable resources. This made them something of a networking magnet, as they attracted the interest of others with little effort. The primary function of the hot organizations, and the reason that they were perceived as attractive

allies, generally involves enabling and supporting other organizations' efforts to produce value. The hot organizations, themselves, do not produce much in the way of tangible products. Rather, they provide knowledge, services, or funding to external organizations. For the representatives of the hot organizations, the foresight programs presented opportunities to interact with the parties that they network with, a luxury rarely afforded them because of the loose internal networks within the organizations.

Of the organizations represented by interviewees in the study, two were categorized as hot organizations; one that administers various public grant programs that fund research and development projects, and one that provides funds and services for innovators and entrepreneurs. Interviewees representing these organizations both described them as having weak internal structures, where individuals mostly focus on their own project portfolios, with little interaction with other members of the organization. They primarily interact with external networks made up of individuals and other organizations. The result is that, although they are employees of their organization, they do not necessarily consider themselves to work *for* that organization. Rather, they work for individuals and organizations in their external networks.

Because of their loose internal structure, hot organizations do not rapidly internalize new information or knowledge. New knowledge and information is likely to be redirected to individual organization members' external networks rather than flowing through the organization itself. Thus, change within the organization is unlikely to occur as a result of new information and knowledge gleaned by individual organization members, but rather from pressures exerted from outside of the organization as new

information and knowledge flows through those networks. It is worth repeating here the words of one of the interviewees that represented a hot organization, who described her organization as "... a big, lumbering oil tanker out at sea. It's going to take more than my efforts, alone, to change its course."

Warm organizations. The warm organizations were characterized by relatively equal in-flows and out-flows of resources. The warm organizations build their networks to gain access to resources that are fed into the internal organizational structure, transformed into new knowledge and information, and then disseminated back to external networks. Interviewees described the warm organizations as having strong internal networks with high levels of expertise in their fields. This allows them to rapidly diffuse new knowledge and information throughout the organization.

The warm organizations were perceived as attractive allies for external partners due to their outflow of resources, but also because of their ability to transform in-flowing resources to create something new. Warm organizations were seen as likely to cultivate and maintain extensive external networks, but, unlike the hot organizations, theirs are well supported by strong internal networks.

For most representatives of the warm organizations, the attraction of foresight programs was the opportunity to collaborate with colleagues on shaping their shared futures. The programs also functioned as forums for gathering new information to feed into the organization, sharing the organizational view of the relevant state of affairs, and expanding existing external networks.

The warm organizations represented in the study were all involved with education and training in some manner. They included all levels and types of formal educational organizations, research organizations, unions, and other professional organizations. Most of the organizations represented by interviewees participating in the study were categorized as warm organizations, or nine of them.

Warm organizations can fairly rapidly adapt to changing external and internal circumstances due to their access to new information and knowledge, and the strength of their internal networks. Change may, however, be hindered by conflicts that can arise between organizational responsibilities to external partners, who provide resources, and internal organizational politics that affect the organizations' outputs.

Cold organizations. The cold organizations represented in the study cultivate networks primarily for their own purposes. They seek to bring resources into the organization that are transformed to create products and services that are made available for purchase by others. Cold organizations have strong and highly structured internal networks and carefully maintain business relationships with external organizations. Thus, the flow of value within the organizations' networks is primarily from the external networks to the cold organization. Because of this, the cold organization is not easily regarded as an attractive ally and it has to expend considerable effort in forming and maintaining its external relationships. Only one of the organizations represented by interviewees in the study was classified as a cold organization; a private company that develops commercial technology products and services for the education sector. The associated interview data regarding the interviewee's perceptions of the foresight

program was not included in the analysis for reasons previously explained. However, the organization is included here to complete the emergent theoretical model relating to the organizations represented in the study.

Cold organizations' representatives' motives for participating in the foresight program were primarily driven by marketing interests. They saw the programs as opportunities to promote products that they currently make available and for intelligence gathering with future products in mind. This was demonstrated by the one interviewee who represented a cold organization in the study when she effectively ignored the collaborative interaction in a workshop that she participated in, and, instead, used it as an opportunity to present a business proposal that had been prepared prior to the launch of the program.

Applying CHAT to the Knowledge Transfer Processes

A final step in the data analyses involved charting knowledge transfer activities by study participants within their organizations, i.e. the transfer of the immediate outcomes of the foresight programs to participants' organizational contexts. Engeström's CHAT framework and his extended activity triangle were used as the analytical framework. The primary purpose of charting the knowledge transfer activities in this manner was to identify contradictions that arose within the organizational activity system as the immediate outcomes of the foresight program were diffused within it. According to the central tenets of CHAT, it is these contradictions that are the impetus for change within activity systems. When contradictions occur, and they do always occur, the activity system attempts to resolve them to minimize the tensions that they

cause. Thus, organizational change is the result of these tensions within organizational activity systems being resolved.

In this study, I looked at the interaction between two activity systems. First, the foresight program constitutes an activity system with the objective of producing immediate foresight outcomes. Second, participants' organizations are a distinct activity system that, in our cases, are expected to appropriate mediating artifacts produced by the foresight program's activity system, i.e. the foresight programs immediate substantive, communicative, and subjective outcomes. Thus, there is an inherent possibility for a quaternary contradiction between the program's activity system and the organizational activity system. That is to say that the program's activity system, as a neighboring system to the organizational activity system, introduces new knowledge and practices that can potentially disrupt the organizational activity system.

Our primary focus here is on the activity within the organizational context, not the activity within the foresight program. Thus, only the organizational activity systems are modeled in detail, but in relation to the foresight programs' activity systems' outputs. The basic structure for the model is presented in Figure 10. This basic model is intended to illustrate the expected activity suggested by the theory underlying foresight programs, namely that the foresight program produces immediate outcomes which are transferred to the organizational context, where they are used as mediating artifacts to produce the intermediate outcomes.

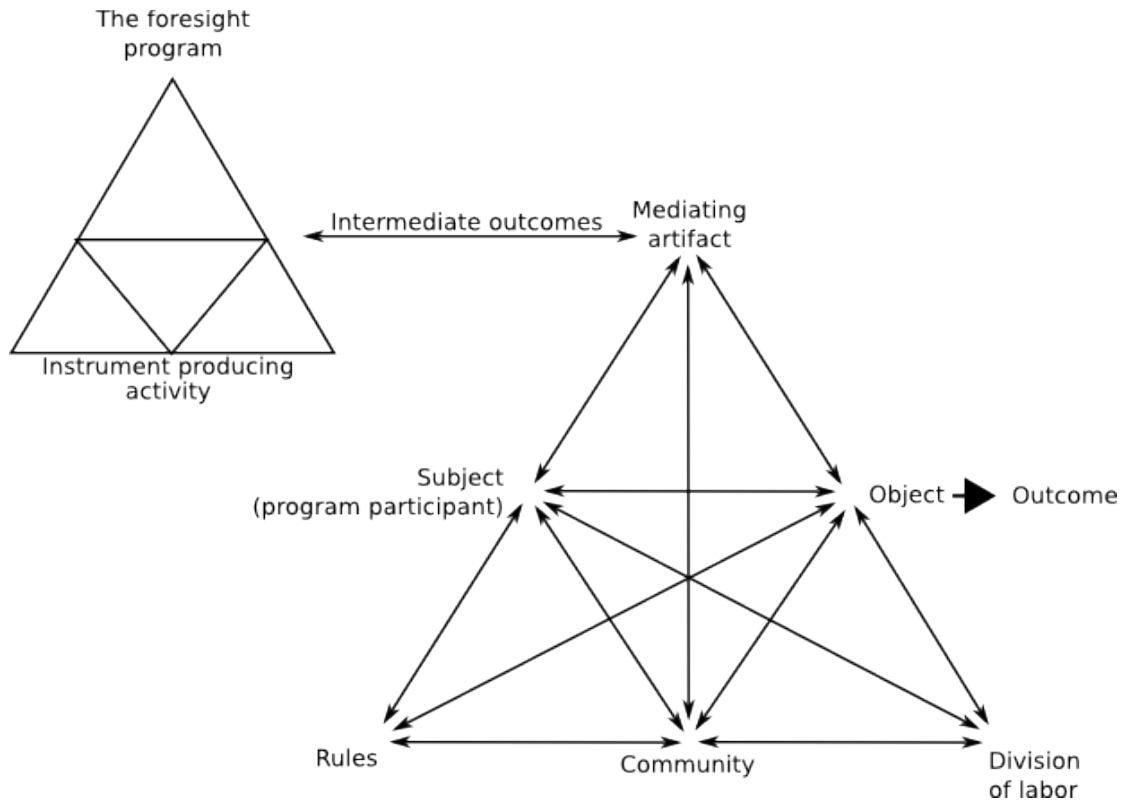





Figure 10. Basic CHAT model used for modeling organizational activity systems.

The three exemplar cases previously described were analyzed using the CHAT framework and are modeled below to indicate contradictions arising from the foresight programs' immediate outcomes within the organizational activity systems.

Contradictions are represented in the diagrams according to the following legend:

-  Primary contradiction
-  Secondary contradiction
-  Quaternary contradiction

Case 1. Lisa: Mid- to upper-management, education and training organization.

Lisa's key characteristics: Adviser, warm organization.

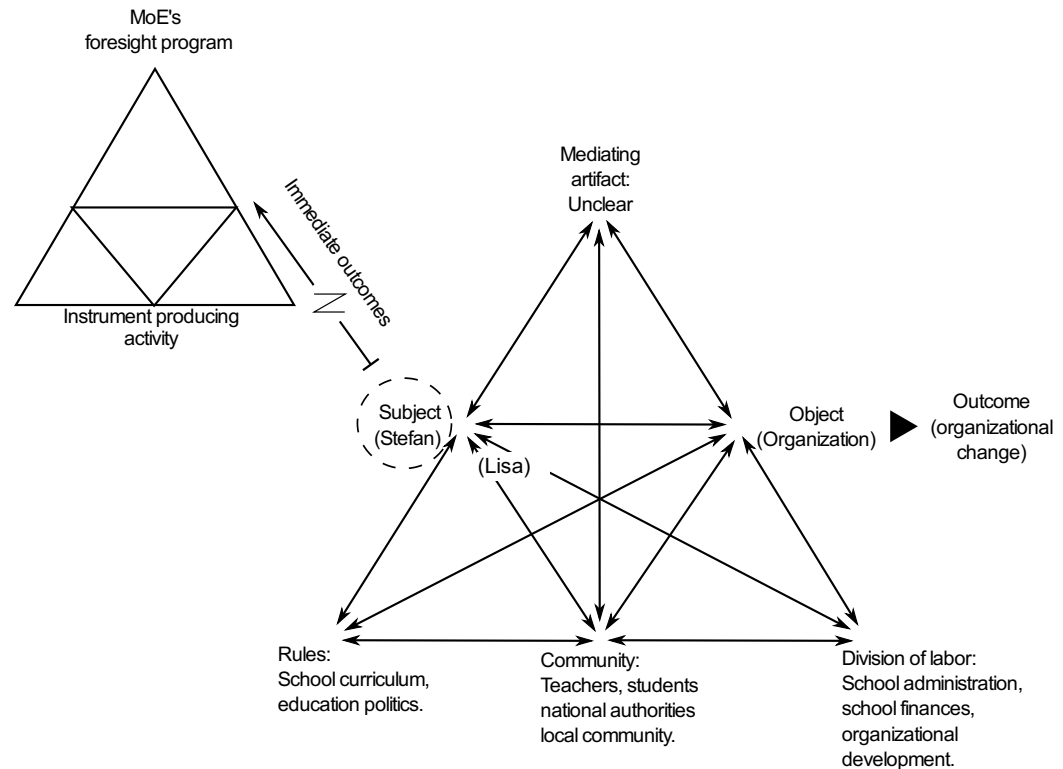


Figure 11. CHAT diagram of Lisa's organizational activity system.

Lisa's perception that the foresight program produced no outcomes kept any potential mediating artifact from being presented to the organizational activity system. There are no contradictions within the organizational activity system that can be said to result from the program. Furthermore, it is not clear that there would have been a mediating artifact even if Lisa had acknowledged the program outcomes. As she stated,

she anticipated that any follow-up actions would have been communicated and coordinated by the MESC as the party responsible for the program.

Only two contradictions are identifiable in Lisa's activity system that can be traced to the foresight program. One is the quaternary contradiction inherent in the interactions between two neighboring activity systems. The second is the primary contradiction that Engeström claims to always exist within individual members of organizations who have to balance personal and organizational life. Lisa's primary contradiction is relevant here because, as an individualist Adviser, it is questionable to what extent she was representing her organization as a participant in the foresight program, and to what extent she was simply representing herself. Lisa's reflections on her participation in the program, suggest that her personal concerns overpowered her concerns for her organization. Therefore, the primary contradiction is relevant to understanding how Lisa's organizational activity system responded, or did not respond, to the program outcomes.

Case 2: Klara, Mid- to upper-management in educational development.

Klara's key characteristics: Believer, warm organization.

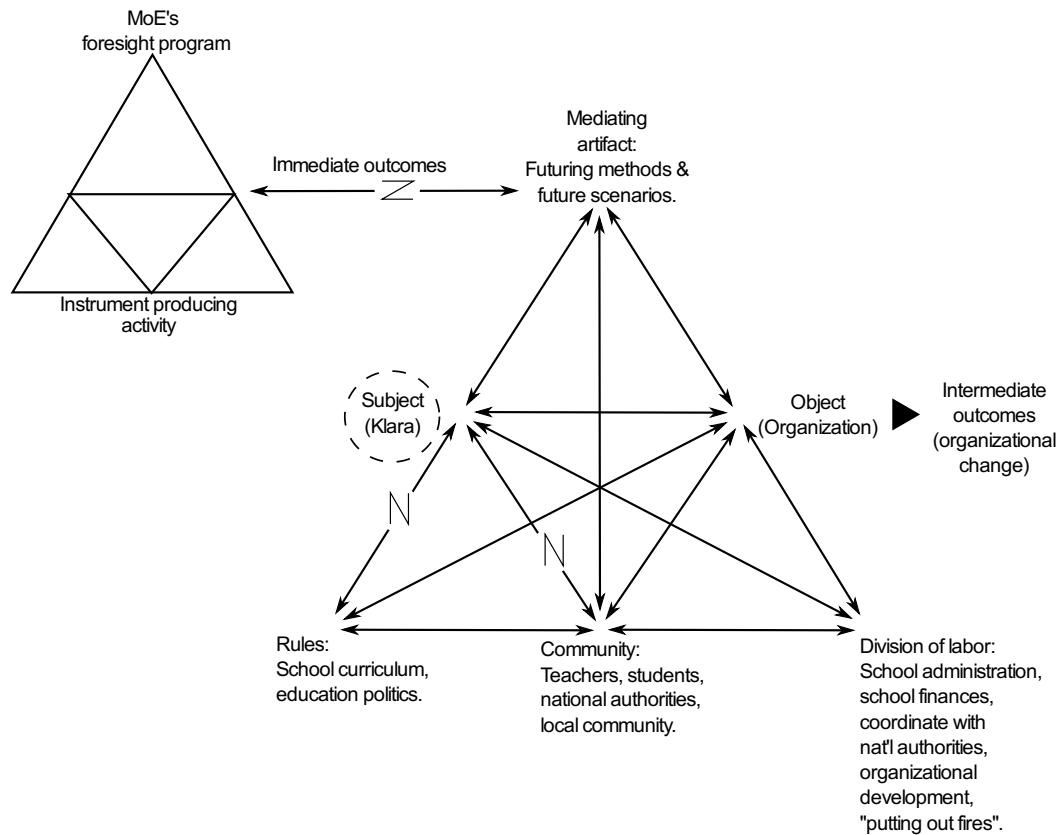


Figure 12. CHAT diagram of Klara's organizational activity system.

Klara both recognized the value of the immediate outcomes and is able to communicate them in meaningful ways to the community in her activity system. Klara's difficulty in realizing the intermediate outcomes stemmed from a lack of a sense of urgency relating to the foresight program's outcomes. Other issues that were perceived as more pressing took precedence and both she, and her employees, focused their attention on them instead. Thus, although there was a contradiction between the immediate program outcomes and existing practice, that contradiction was overpowered by other pre-existing unresolved contradictions that required Klara to devote her time

and effort to “putting out fires”. Furthermore, because Klara was not sure how to advance the activity within her activity system, she was unable to fully mobilize her organizational community. Nevertheless, the initial introduction of the mediating artifact, i.e. the foresight program's immediate outcomes, produces contradictions that remain unresolved. Hence, although intermediate outcomes have not yet been realized, there is still potential for the organization to do so, so long as the contradictions persist.

Case 3. Gunnar: Upper-management in stakeholder organization.

Gunnar's key characteristics: Preacher, hot organization.

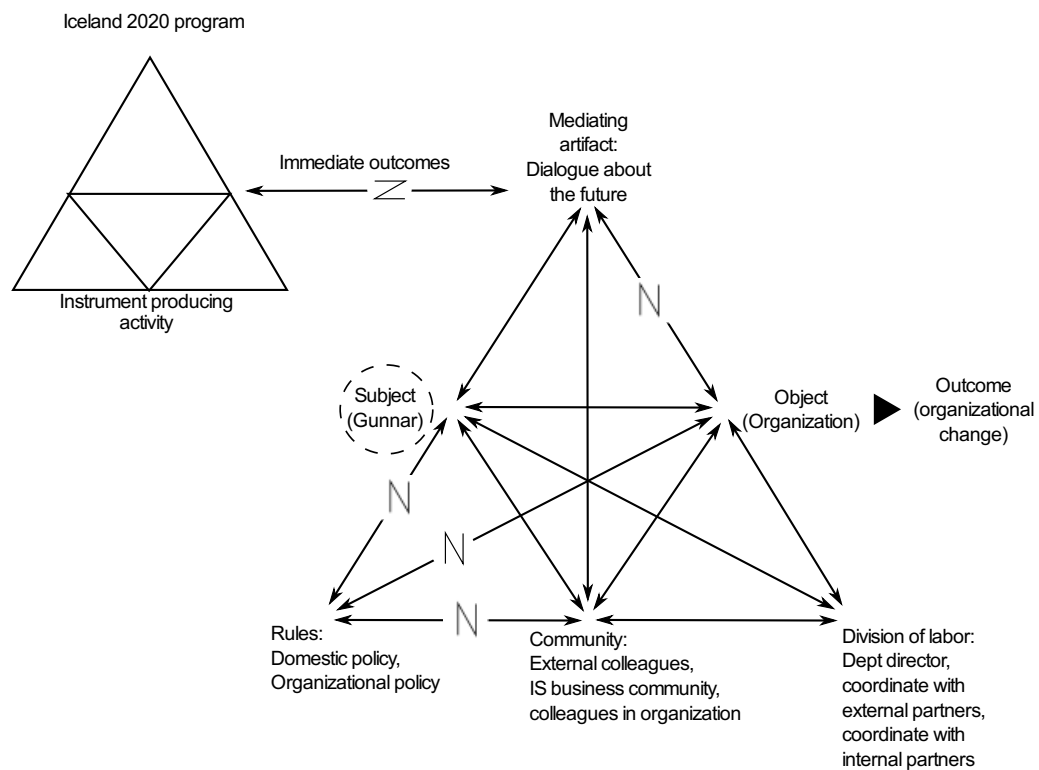


Figure 13. CHAT diagram of Gunnar's organizational activity system.

The community in Gunnar's activity system mostly involves individuals and parties that are external to his organization. Gunnar recognized the value of the shared dialogue that occurred as a result of the foresight program. This recognition opens a way for the immediate outcomes to affect Gunnar's activity system because there is clearly an artifact to share between the two neighboring activity systems, the program's activity system and the organizational activity system. Gunnar primarily works with external networks. However, his senior leadership position affords him access to, and influence over, the internal organization enabling him to introduce the foresight program's immediate outcomes, i.e. the artifact, into his organizational activity system. Thus, Gunnar was able to use his seniority to inject the program's artifacts into his organizational activity system, giving rise to contradictions that prompted organizational action, increasing the potential for intermediate outcomes to be realized. The perceived urgency of the foresight program that Gunnar participated in also helped to overcome the potential hurdles faced by a hot organization and the organization was able to mobilize to work toward organizational goals.

Expanded CHAT Analysis.

Primary contradictions: The subject. As previously stated, Engeström claims that there is always a primary contradiction relating to individual organization members' struggle to balance personal and organizational life. These primary contradictions do not always have a significant affect on the activity being analyzed. In the cases of the Advisers, however, the primary contradiction inherent in the subject, i.e. the individual who represented the organization in the foresight program, was relevant. The Advisers'

individualist perspective regarding their involvement in the programs is a critical factor in understanding why program outcomes did not have a significant affect on their organizational activity systems.

Secondary contradictions: mediating artifact - object. In the organizational activity systems where the foresight programs' immediate outcomes had the greatest impact, there was a secondary contradiction between the mediating artifacts, i.e. the programs' immediate outcomes, and the organizational activity systems' object that raised awareness of the need for organizational change. It was only in the Preachers' cases that that contradiction emerged. In part this was due to the Preachers' prior knowledge of, and experience, with futuring and foresight. It is likely that they had already prepared their organizations for precisely such an outcome before the programs were implemented. At least Gunnar stated that he had already engaged his organizations in some form of futures-related work before he participated in the foresight programs.

The contradiction between the mediating artifacts and the organizational activity systems' object raised awareness of secondary contradictions between other nodes within the organizational activity systems'. In particular, they raised awareness of the need for the organizations to do things differently, highlighting secondary contradictions primarily between the rules and object and between the rules and object, but also between the rules and other nodes in the system.

Secondary contradictions: rules - object. The key difference between the Believers' and the Preachers' organizational activity systems was the emergence of a secondary contradiction between the rules nodes and the object nodes. This contradiction

became the impetus for the Preachers' organizations to focus on producing actual change in the way that they conducted their general affairs. This happened relatively quickly because the Preachers' organizations were already receptive to the secondary contradiction between the mediating artifacts and the organizational activity systems' object. In contrast, the Believers' organizations needed to be sensitized to the emergent contradiction between the mediating artifacts and the activity systems' object before the contradiction between the rules and object could be confronted. This lag provided a gap during which the organizations' members' attention was diverted toward other pressing issues. Nevertheless, the contradiction between the mediating artifacts and the activity systems' object persists and the organizations may still attempt to resolve. However, change will take more time to be realized than in the Preachers' organizations.

Because the Advisers did not effectively transfer the programs' immediate outcomes to their organizational contexts, the contradiction between the mediating artifacts and the activity systems' object was lacking. Thus, the potential contradictions between the rules and object were not brought to organization members' attention and there was little impetus to produce change within the organization, and little to suggest that such an impetus would emerge at a later stage without some sort of direct intervention.

Quaternary contradictions: program activity system - organizational activity system. For all of the cases observed in this study, the individual representing an organization in a foresight program is a key component in the transfer of artifacts between the neighboring activity systems. This is due to the nature of the artifacts

produced in the program's activity system, in particular the intangibility of some outcomes, especially the communicative and subjective outcomes. The substantive outcomes are different because they are generally produced in the form of a tangible publication that anyone, whether they were directly involved in the program or not, can access. Therefore, the substantive outcomes can become a mediating artifact in an organizational activity system without the involvement of the individual that represented the organization in the program, ex. if another member of the organization comes across the published program report and introduces it to the organization. The data collected in this study suggests that the communicative and subjective outcomes are ambiguous, in that some program participants recognize them as outcomes relevant to the organizational activity system, whereas others do not. Consequently, there can be no expectation of uniformity across cases in regard to the nature of the mediating artifact that is transferred between the neighboring activity systems, i.e. the programs' activity systems and the organizational activity systems. The quaternary contradiction inherent between neighboring activity systems is moderated by the experiences and perceptions of the individual who represents the organization in the program, and, therefore, differs from one case to another.

Summary

The themes that emerged from the data analysis revealed categories that, combined, led to three general classifications of the study participants: the Advisers, who perceived a mismatch between their expectations for the program and what actually occurred; the Believers, who recognized and valued what the program produced, but did

not have an adequate understanding of foresight and futuring processes to be able to fully engage others in their organization in follow-up activities; and the Preachers, who used their prior knowledge and experience of foresight and futuring, along with their leadership positions, to ensure that their organizations were fully receptive to foresight outcomes and able to engage with them. Thus, the themes and categories provided insights into how immediate substantive, communicative and subjective foresight outcomes were, or were not, transferred from program contexts to organizational contexts, and why the transfers occurred the way that they did. The data analysis revealed that there were no individual participant characteristics that increased the likelihood that participants' organizations were successfully engaged in follow-up activities, but that, rather, there were sets of characteristics, and these are captured by the three participant categories.

CHAPTER 6: DISCUSSION OF THE FINDINGS

This study was conducted to examine how immediate outcomes of foresight programs are transferred from program contexts to program participants' organizational contexts. Foresight scholars have suggested that this transfer is critical for the realization of intermediate foresight outcomes, which are defined as long-term outcomes that systemically reshape policy landscapes to promote more future-oriented approaches in policymaking. Engeström's (1999) CHAT theory provides a model of how outcomes from one activity system, in this case the foresight programs, affect a neighboring activity system, i.e. program participants' organizations. The study used Engeström's CHAT theory to examine how outputs of initial foresight activities, referred to as immediate outcomes, are introduced to and disseminated to program participants' organizational activity systems, referred to as intermediate outcomes.

A summary and discussion of the findings, as they relate to the research questions that guided the study, are presented. Following the summary, implications for foresight theory and practice are provided. The chapter concludes with suggestions for further study on foresight and futures relating to education and educational policy.

Summary of the findings

Question 1: How are immediate substantive, communicative, and subjective foresight outcomes transferred to organizational contexts?

The qualitative interview data and the CHAT analysis provided insights into how participants' personal perceptions of the programs affected the transfer of immediate

program outcomes to organizational contexts. In particular, individual participants' capacity to recognize the different types of immediate outcomes, i.e. the substantive, communicative, and subjective outcomes influences, not only what is transferred, but also how outcomes are transferred. Participants' capacity to recognize these outcomes is in turn affected by a range of factors that are not necessarily directly related to the program in question, including, their attitudes toward the programs that they participated in, their attitudes toward the parties that implement the programs, and their perceptions the internal workings of their own organizations. Consequently, there are varied levels of ambiguity regarding participants' personal perceptions of immediate foresight outcomes. What is transferred to organizational contexts, and how, is contingent on what individual participants perceive as immediate outcomes. Foresight programs' substantive outcomes are the most easily recognized by participants, and others, and are the most easily shared. Communicative and subjective outcomes are not as readily acknowledged by foresight participants as outcomes of program activities. Therefore, they can prove to be more difficult to diffuse within program participants' organizational contexts. The categories of program participants, i.e. the Advisers, the Believers, and the Preachers, that emerged in the analysis of the qualitative data, differed in regard to what immediate foresight outcomes were shared, and how they were shared. The unique characteristics of each category shed light on the circumstances under which the various types of immediate foresight outcomes were, or were not, transferred.

The interview data analyzed in this study shows that, in the cases of the two foresight programs included in the study, transfer of immediate foresight outcomes from

program contexts to participants' organizational contexts varied depending on the individuals who represented the organizations involved. Three categories of participants, described in Table 10, emerged that highlight the characteristics that determine what immediate foresight outcomes were transferred and why.

Table 10

What Immediate Foresight Outcomes Did Program Participants Share with Others in their Organizations?

Category	Characteristics	What was shared
The Advisers	<ul style="list-style-type: none"> - General skepticism toward program coordinators based on past experiences. - Personal expectations not aligned with goals of the foresight program. - Little or no experience with, or understanding of, foresight and futuring. - Little or no sense of ownership or responsibility for program. 	<ul style="list-style-type: none"> - No outcomes directly shared with others in participants' organization.
The Believers	<ul style="list-style-type: none"> - Good understanding of the goals of the foresight program. - Some experience with foresight and futuring and rudimentary understanding of methods. - Sense of shared ownership and responsibility for program with program coordinators. 	<ul style="list-style-type: none"> - Substantive and communicative outcomes shared using established channels within organization. - Attempts to share subjective outcomes mostly unsatisfactory due to limited knowledge or opportunity.
The Preachers	<ul style="list-style-type: none"> - Extensive prior experience with foresight and futuring. - Strong sense of ownership and responsibility for program and program outcomes. - Well articulated personal goals that look beyond own organization. 	<ul style="list-style-type: none"> - All immediate outcomes, including substantive, communicative, and subjective outcomes, shared with others in organization as they become available.

While members within each of the categories share characteristics, the categories are not clearly delimited and are better described as a continuum extending from the

Advisers, who shared few, or no, outcomes with others in their organizations, to the Preachers, who strived to ensure that all outcomes were diligently presented to others in their organizations, and, even, in their extended networks. The categories overlap to some degree as individual program participants may share particular characteristics with individuals in categories other than their own. For example, one participant was categorized as a Believer, but represents a borderline case because she shared the Advisers' skepticism regarding the program coordinators. However, like other Believers, she came to appreciate what the program aimed to accomplish and did her best to distribute relevant outcomes to her colleagues through appropriate channels. Another borderline case is categorized as a Preacher, but shares characteristics with the Advisers, indicated by her frustration when she felt that the program had been subsumed by political interests that were not entirely compatible with her goals. Nevertheless, she went on to distribute relevant outcomes within her organization and, like other Preachers, initiated organizational follow-ups and promoted a broad vision for long-term change in accordance with the foresight program's immediate outcomes.

Although the participant categories are not clearly distinguished, the interview data helps to identify key personal factors that demonstrate why members of each shared immediate foresight outcomes with others in their organizations the way that they did. These are shown on a continuum with the categories in Figure 14. This is followed by a discussion of each participant category and a general CHAT model of how each category transferred immediate foresight outcomes to their organizational activity systems.

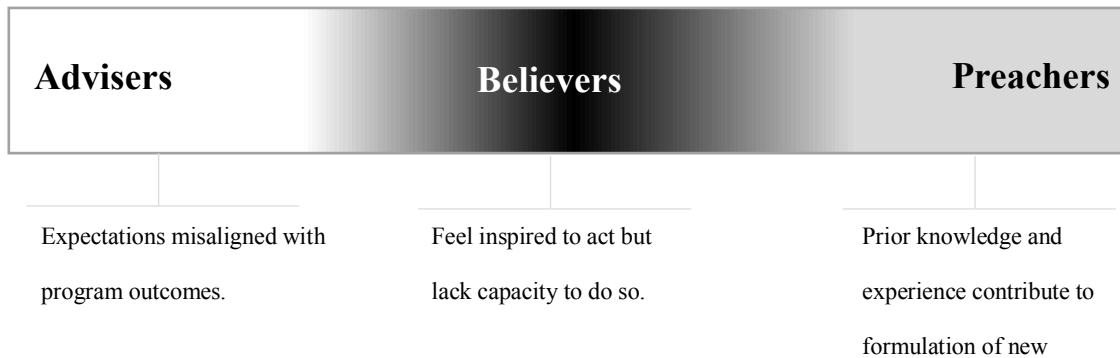


Figure 14. Categories of program participants and their key characteristics.

Sharing immediate foresight outcomes: The Advisers. The Advisers' expectations for the foresight programs were primarily based on their previous experiences with the program coordinators, i.e. the OPM, the MOE, and other public authorities, and had little to do with the foresight programs, themselves. They did not consider how the foresight programs differed from what they had previously experienced and made little, if any, attempt to align their expectations with those of the program coordinators, even though the program coordinators had provided them, and other participants, with ample information about planned program activities and outcomes. Thus, the Advisers found themselves in a situation that was vastly different than what they had anticipated. The discrepancy between what they expected and what they experienced resulted in a conflict that they either chose not to, or did not know how to, resolve. Rather than exploring ways to resolve it, they tended to dismiss the programs and whatever outcomes it may have produced and did little to initiate any transfer of immediate foresight outcomes from the programs' activity systems to their organizational activity systems.

For the Advisers, their inaction regarding the transfer of immediate foresight outcomes to their organizations was easily justified because they felt little sense of responsibility for the programs and the dissemination of their outcomes. Whether their lack of a sense of responsibility is related to the conflict between their expectations for the programs and what they experienced is hard to say. The data collected in this study does not allow for such claims. Nevertheless, it is clear that the way that the programs were implemented and how immediate outcomes were promoted did little to change the Advisers' attitudes in this regard. Consequently, the Advisers generally felt no obligation to share any immediate outcomes with others within their organizations and even less obligation to initiate any sort of follow-up activities within their organizations. For them, such matters were in the purview of the parties responsible for the programs, i.e. the OPM and the MOE.

Modelling how the Advisers shared outcomes using CHAT is problematic because they did not adhere to the general tenets of how neighboring activity systems are expected to interact according to CHAT theory. Thus, in terms of CHAT, the Advisers present a bit of a challenge. Their expectations regarding the overall flow of information and knowledge between the foresight program and organizational contexts were systemically at odds with what was anticipated, based on existing literature on foresight and CHAT theory. To use Argyris & Schön's (1996) terminology, the Advisers' *theory-in-use*, i.e. the view demonstrated by their actions, was essentially an inverted version of the *theory espoused* by the program coordinators. This mismatch is illustrated with a CHAT diagram in Figure 15.

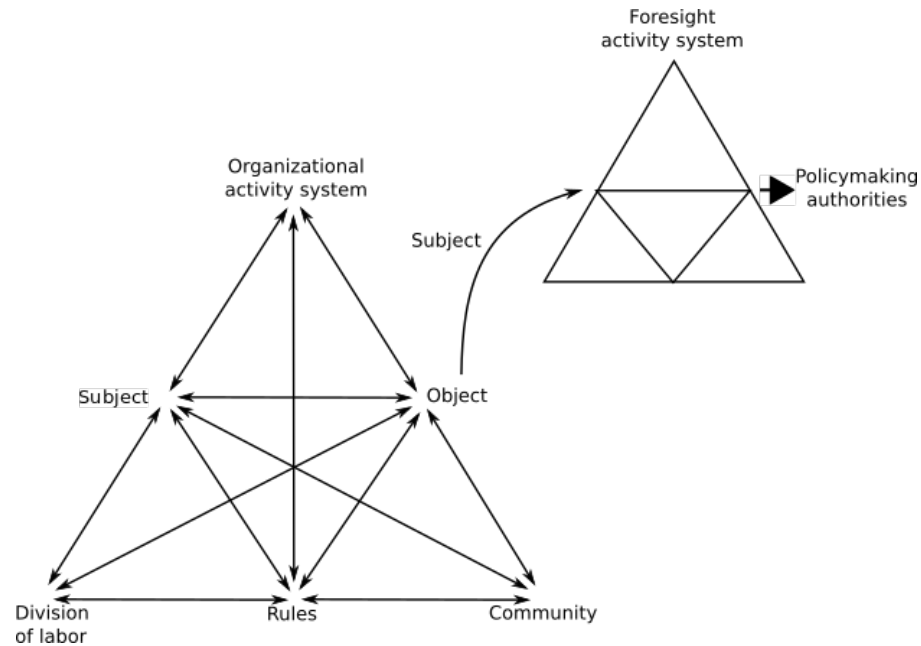


Figure 15. The Advisers' theory-in-use regarding systemic information and knowledge flows between program and organizational contexts.

The theory espoused by the program coordinators is demonstrated by the original CHAT diagrams in Chapter Four, in which information, knowledge, and experience flow from a neighboring activity system, i.e. the foresight programs, to organizational activity systems. Figure 16 shows how program participants who were categorized as Advisers regarded themselves as filtering conduits that facilitated transfers of information and knowledge, not from the program context to their organizational contexts, but from their organizational contexts to the foresight program contexts. Their expectation was that that information and knowledge provided by them regarding practices and experiences in

their organizations would be processed within the foresight activity system, thus producing outputs that flow to the relevant program coordinators, i.e. the OPM and MOE. As providers of information and knowledge, rather than co-constructors of new information and knowledge, the Advisers saw it as the responsibility of the policymaking authorities to facilitate the construction of immediate outcomes, and to disseminate them in a useful and actionable manner back to the relevant organizations. Consequently, the Advisers expected immediate outcomes that were not consistent with what the programs actually produced, or even aimed to produce. Since the immediate outcomes that the Advisers expected never materialized, they concluded that there were no outcomes, and therefore, nothing for their organizations to act on following the initial foresight activities.

Sharing immediate foresight outcomes: The Believers. The Believers were better informed about the general purpose and aims of the foresight programs that they participated in than the Advisers. This affected how they shared immediate foresight outcomes with others in their organizations. For the Believers, their roles as program participants were twofold. First, they expected that they would share their own experiences and knowledge from their organizational contexts with other foresight program participants. Secondly, and more importantly, they expected to gain new knowledge and experiences during their involvement in the programs that would potentially benefit their organizations. As program participants, the Believers were looking for things that they would be able to transfer from the programs' activity systems to their own organizational activity systems. To share outcomes, they made use of the

channels of communication that were available to them and used them to the best of their ability. However, because they were relatively inexperienced with foresight methods, they had difficulty engaging others within their organizations with the outcomes. Despite the best of intentions, what they shared, for the most part, languished in their organizations' document repositories and as topics of vague discussions, as one of many things that the organization would address when there was time. Figure 16. shows a CHAT model of how the Believers generally transferred immediate outcomes from the programs' activity systems to their organizational activity systems.

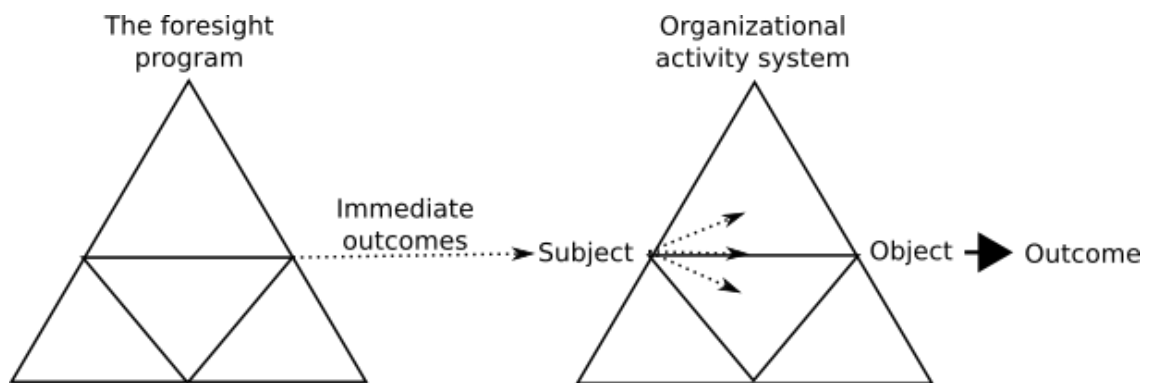


Figure 16. The Believers' transfer of immediate foresight outcomes to organizational activity systems.

The primary challenge confronted by the Believers was how to transfer immediate foresight outcomes to their organizational activity systems in such a way that others related to their meaning and significance for the organization. But, because the Believers had only a rudimentary understanding of foresight and futuring, rather than strategically engaging relevant components of the organization with the outcomes, they essentially cast a wide net, such that the outcomes, while being available, were seldom,

if ever, a focal point for discourse or action. They were simply among the many resources that were available when, and if, relevant issues arose. Consequently, any significance that the Believers, themselves, saw in the immediate outcomes was diluted and time-sensitive information became outdated. Thus, the immediate outcomes, while being made available to the organizational activity system, did not rise to the status of mediating artifacts that required action on the part of the organization, and, therefore, had little influence on how the organization developed in the ensuing period.

Despite the challenges faced by the Believers, they are likely to casually inject what they learn from foresight programs into their professional surroundings through their daily interactions with coworkers. This can result in gradual change for their organizations as discourse in their general operating environments evolves to create tensions that prompt appropriate responses from organizations. This applies in particular to Believers within hot organizations, whose daily routine is more directed toward external networks than internal organizational contexts. The same can occur in warm organizations and is then likely to involve both external networks and other members within the organization.

Although the Believers seldom prompted immediate action within their organizations, their method of widely dispersing foresight outcomes sometimes influenced their environments in subtle ways. Over the long term this method of disseminating foresight outcomes may produce tensions within their organizations, or in their organizations' general operating environment, and can, thus, play a role in facilitating the realization of intermediate foresight outcomes. However, because of the

subtlety of the changes that occur, and that they mostly occur over long periods through casual interactions, individuals and organizations involved do not necessarily associate them with the relevant foresight programs. This makes it difficult to gauge to what extent changes in discourse or in organizations are the result of foresight programs or general shifts in organizations' operating environments.

Sharing immediate foresight outcomes: The Preachers. What primarily separated the Preachers from the other participant categories was that they were both knowledgeable about foresight and futuring and occupied senior leadership positions within their organizations. Thus, out of the three participant categories that emerged from the study, the Preachers made for the most ideal participants in foresight programs. Their prior experience allowed them to recognize, and make effective use of, the full range of immediate foresight outcomes, including the substantive, communicative, and subjective outcomes. They brought to the foresight programs a solid understanding of what the programs were intended to accomplish, and how they were to do it. Their senior positions within their organizations made it possible for them to dedicate the organizational resources needed to disseminate immediate foresight outcomes and initiate follow-up activities intended to produce changes within the organization in accordance with the outcomes.

The Preachers were further distinguished from other categories in that they generally entered into foresight programs with their own ideas about what they wanted the programs to achieve. They had also set goals for their participation that related to how they expected their organizations to benefit from the programs' immediate

outcomes. They had laid the groundwork for maximizing the transfer potential for all types of immediate foresight outcomes to their organizations by creating an environment of anticipation that was mobilized for action. Figure 17. indicates how the Preachers fed relevant foresight outcomes to their organizations as they emerged and ensured that outcomes were exposed to their organizational contexts as mediating artifacts, prompting new dialogue and follow-up activities. In a CHAT sense, the Preachers' cases essentially epitomized assumptions regarding how neighboring activity systems interact. Nevertheless, tensions did arise between the Preachers and program organizers, but they were of a very different nature than those experienced by program participants in other categories.

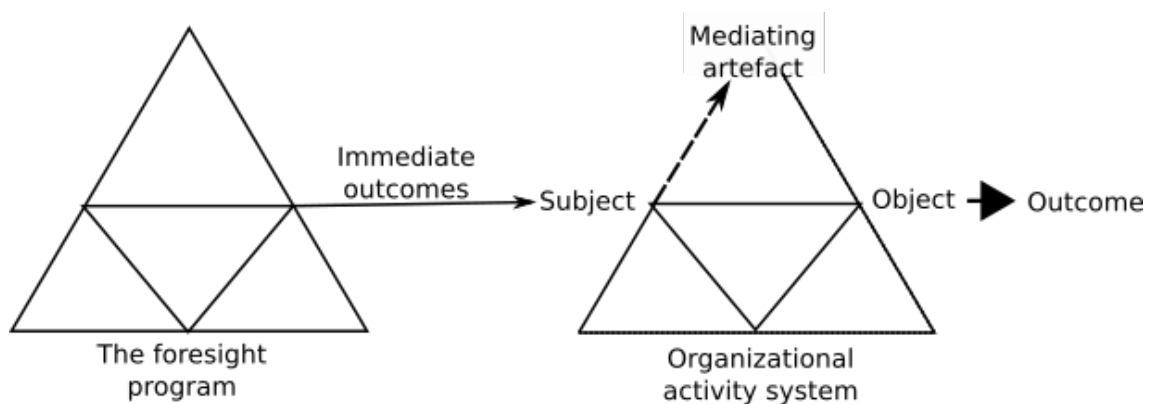


Figure 17. The Preachers' transfer of immediate foresight outcomes to organizational activity systems.

Whereas tensions and frustration between program coordinators and participants in other categories risked leading to abandonment of the foresight processes within participants' organizations, this was not the case with the Preachers. Tensions

experienced by the Preachers' primarily concerned foresight methodology and the ultimate goals of the programs. Their prior experience and knowledge of foresight and futuring had instilled in them expectations regarding how foresight is conducted. When processes in the programs that they participated in diverged from those expectations, the Preachers were frustrated. This was evident in Gunnar's case, when he felt that the program was being subsumed by political forces and no longer following what he regarded as proper foresight practices. However, the Preachers, using their own prior experience and knowledge of foresight and futuring methods, re-aligned the immediate foresight outcomes with their personal expectations by continuing on their preferred path within their organizations, thereby increasing the likelihood that the goals that they had set would be reached.

How participants' personal experiences and attitudes affect transfer. One of the main findings of this study is that how immediate foresight outcomes are transferred from program contexts to organizational contexts is significantly affected by participants' experiences and attitudes, most of which are not directly related to the foresight programs. In terms of program participants' experiences and attitudes that affected how they transferred immediate foresight outcomes to their organizational activity systems, four factors stood out in the data analyzed in this study:

1. Participants' prior knowledge of foresight and futuring.
2. Participants' prior experiences with program coordinators.
3. Participants' roles within their organizations.
4. Participants' perceived capacity to facilitate change in their organizations.

Of these categories, the first and second influence what immediate outcomes are recognized and transferred. The third and fourth categories influence how immediate outcomes are transferred.

There is a clear dependency between the first two categories, on the one hand, and the latter two, on the other hand. Individuals who would rate highly on the latter two categories, i.e. numbers three and four, would include those who are in leadership positions within their organizations and who are able to make resources available for follow-up activities. Individuals matching these characteristics are found in all three categories of participants. Thus, these characteristics, on their own, are not sufficient to explain what immediate outcomes were transferred to organizational activity systems, nor how. Participants who would rate highly in the first category are also found in more than one participant category. None were categorized among the Advisers but individuals with various levels of knowledge of foresight and futuring are found in both the Believers and Preachers categories.

Specific combinations of the categories of experiences are useful for identifying what participant categories particular individuals are likely to fall into. For example, all Preachers had considerable knowledge of foresight and futuring and were in senior leadership positions within their organizations. Organizational leaders who were categorized as Believers tended to have less knowledge and experience of foresight and futuring than those who were categorized as Preachers. Thus, individual participants who display combinations that include high ratings in at least one of the first two categories, and at least one of the latter two, are likely to result in the transfer of some

immediate outcomes. However, combinations that include high ratings in more of these categories, with all four categories being optimal, are more likely to result in transfers of immediate outcomes, and effective follow-up activities in the organizational activity system.

Question 2: How are immediate foresight outcomes used to effect change in organizations?

How immediate foresight outcomes were used within organizations varied significantly. Like with the transfer of immediate foresight outcomes, how outcomes were used proved to be highly dependent on program participants' knowledge of foresight and futuring processes. Those who had considerable knowledge and experience with foresight and futuring were able to engage others in their organizations in ways that essentially extended the aims of the foresight programs into the organizations' activity systems. Those who were less knowledgeable about foresight and futuring were more likely to make information available within their organizations in the hopes that it would prompt others to action, rather than attempting to initiate activities themselves. Thus, it was the transfer of immediate foresight outcomes from the program activity systems to participants' organizational activity systems that set the stage for how they were used within the organizations. Not surprisingly, the Preachers dominated the former group while the Believers fell into the latter. The Advisers had little to base organizational initiatives on because they did not attempt to transfer immediate foresight outcomes.

The primary difference between program participants who successfully continued foresight processes, and those who did not, was that the former were able to inject outcomes into the organizational activity system in a way that made them meaningfully relevant to the organization and gave them a sense of urgency. The latter, at best, shared outcomes but, lacking adequate knowledge about foresight processes, were not successful in creating an appropriate context within the organization to make use of them. The meaningful relevance of the immediate foresight outcomes constructed by the program participants was key to engaging others within the organizations involved.

There were two primary components to the meaningful relevance of the immediate foresight outcomes, both of which are demonstrated in the ways that the Preachers followed-up on foresight activities. The first was that immediate foresight outcomes were communicated in ways that related to the organizations' overall missions. In Innova's case, this meant that immediate outcomes were presented as tools to explore product and service innovations that could emerge over the long-term. For trade unions, immediate outcomes were presented as tools to explore long-term labor market developments and skills needs. Second, the immediate foresight outcomes were used to lend a sense of urgency to the overall task of proactively addressing issues and possible developments over the long-term. Because the Preachers in the study were all participants in the Iceland 2020 program, they benefited from the general sense of urgency attached to that program as a proactively preventative response to the financial crisis of 2008. Yet, even the Preachers had to convey that sense of urgency to their

organizational contexts and relate it to their organizations' missions. This they did by establishing structures in their organizations early on that they could feed immediate foresight outcomes into, as they emerged within the foresight programs.

The Believers lacked the knowledge and experience that the Preachers had of foresight and futuring and were less confident about how they should share immediate foresight outcomes. The Believers, themselves, struggled to see the relevance and urgency of the immediate foresight outcomes and were, therefore, ill equipped to communicate them effectively to others in their organizations. Instead, they sought ways to make immediate foresight outcomes available to others in their organizations in the hopes that that would suffice to prompt others to act. Without any sense of urgency to act on the immediate foresight outcomes, they tended to be treated within the organizations resources for possible projects, to initiate if and when opportunities presented themselves. This was even the case where Believers attempted to initiate specific actions using the foresight outcomes. The outcomes were regarded as interesting, potentially useful, but not demanding prompt action. In relation to CHAT theory, the differences in how immediate foresight outcomes were acted on within organizational activity systems can be described in terms of the perceived urgency to resolve contradictions that were highlighted by the outcomes. Essentially, it is the difference between seeing contradictions as indicating that something that can, or should, be done, or something that must be done. In simpler terms, we can say that this is a question of how the future is problematized.

The future is often perceived as a distant period that, while interesting to engage with, is mostly inaccessible from the present, and does not noticeably impinge on the present. This perspective fails to take into account a key aspect of foresight and futuring, i.e. the systemic nature of change over long periods, that the future is shaped and reshaped by various decisions and actions that occur in the present, some of which may, on the surface, seem unrelated. For example, few regard the development of self-driving cars as a potentially significant change for education. Yet, the technologies being developed to make self-driving cars a reality, including artificial intelligence, spatial awareness for technology, and many others, can be expected to affect, not only transportation, but all nooks and crannies of contemporary societies, including education. Thus, although seemingly unrelated to education, the development of self-driving cars is arguably one of the more significant forces that will drive change in education in the future. Understanding and engaging with this systemic nature of foresight and futuring is a key skill for interacting with possible futures. It is through explorations of possible systemic connections that significant changes are identified and addressed in a relevant manner. The Preachers used their understanding of the systemic nature of long-term change to effectively problematize the future by strategically highlighting the urgent aspects of potential forces driving change according to the relevance for their specific organizations. Thus, potential contradictions arising from the immediate foresight outcomes that were shared, most of which were as yet not necessarily observable, were perceived by others in the organizations, not as something that *could* be done, but as something that *had to* be done.

The CHAT diagrams in Figure 18 and Figure 19 illustrate how the ways that the Preachers and the Believers presented immediate foresight outcomes to their organizations affected what was done with them in the organizational activity systems.

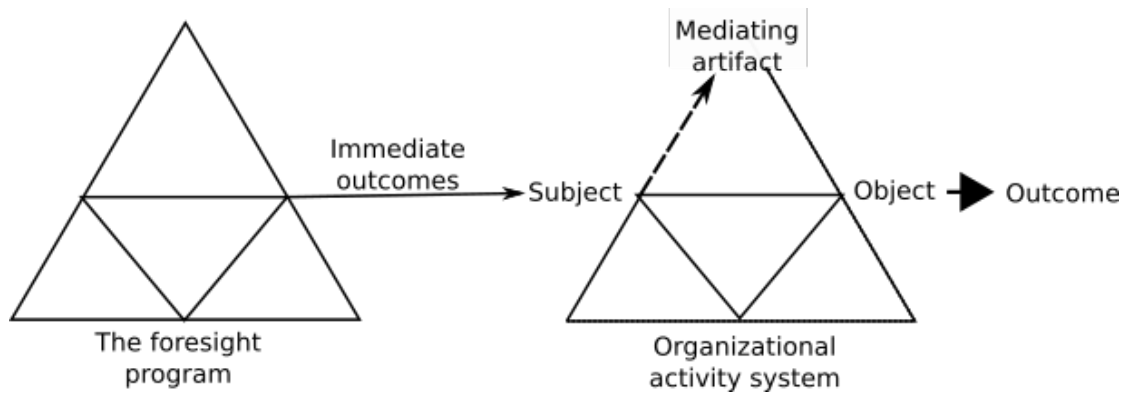


Figure 18. Preachers strategic sharing of immediate foresight outcomes.

The Preachers presented well-defined mediating artifacts to the organizational activity system in a meaningful and urgent manner and targeted relevant parts of the organization. The resulting mediating artifact is obvious and accessible to all concerned.

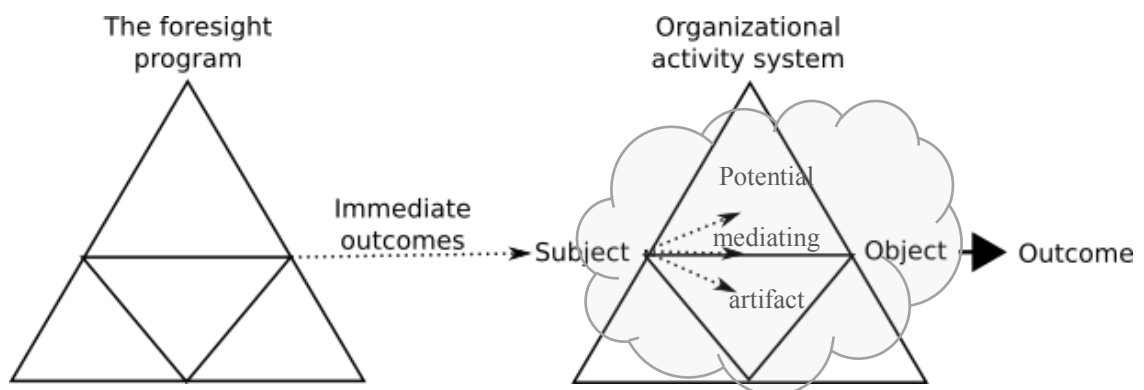


Figure 19. Believers dispersed immediate foresight outcomes.

The Believers shared immediate foresight outcomes but did so in a manner that left it up to others in the organization to define, or discover, their relevance and urgency. There is no clearly defined mediating artifact. Rather, there exists a potential for a mediating artifact in the organization's environment, but it is not necessarily perceived as being currently relevant to the organizational activity system. A mediating artifact may emerge either from pressures within the organization, or from outside of the organizations.

Because foresight outcomes generally address possible changes that have yet to be observed, they tend to present themselves as distant from present contexts. The Preachers were aware of this, due to their previous experiences and knowledge of foresight and futuring. Therefore, they proactively addressed these concerns in two ways. First, they contextualized immediate foresight outcomes in ways that were relevant to their organizations' overall missions. Second, they created pockets within their organizational structures that would be receptive to the immediate foresight outcomes early on in the process.

The Believers used their understanding of foresight and futuring processes and their influence in the organization to extend the foresight program into the organizational activity system. They not only made immediate foresight outcomes available to others in their organizations, but also involved them in foresight and futuring activities in their organizations using the methods that they were most familiar with. In the cases studied, the primary methods used by the Believers were environmental scanning, scenario construction and analyses, and analyses of systemic change (ex. futures wheel). By

engaging others in their organizations in these ways, the Preachers helped to problematize the future and make it relevant for the organization's mission, while highlighting ways that possible future issues could be addressed in the present. The Believers, on the other hand, anticipated that sharing immediate foresight outcomes would spur others within their organizations to act. Thus, they distributed the outcomes in a broad and vague manner to reach the most individuals possible. When no one acted on the available immediate outcomes, the most advanced of them attempted to initiate activities themselves but were hindered by their limited knowledge and experience of foresight and futuring processes.

Toward a Universal Model of Intermediate Foresight Outcomes in Organizations

A primary motivation for this study was to explore the claim, that has been made by several foresight scholars, that intermediate foresight outcomes occur as immediate outcomes are transferred from program contexts to organizational contexts (Schartinger et al., 2012; Havas, Schartinger & Weber, 2010). A significant finding, relating to that claim, has to do with the ambiguity of immediate foresight outcomes, as regarded from the perspectives of program participants, and how this ambiguity affects the realization of intermediate outcomes within organizations. CHAT analyses conducted with the collected data resulted in a range of varied models because of differences in participants' backgrounds and circumstances. The CHAT models that were generated helped to highlight important differences in how immediate foresight outcomes were brought to bear on the organizational activity systems involved. However, they do not adequately inform foresight practitioners of what they can do to encourage more robust knowledge

transfer between the neighboring activity systems, i.e. foresight programs' activity systems and organizations' activity systems, because they rely on intimate knowledge of program participants' attitudes and experiences that will not always be readily available. A universal CHAT model of foresight involving neighboring activity systems would provide a more proactively usable tool for foresight practitioners and program planners.

CHAT is primarily a diagnostic tool intended to focus attention on key characteristics within given activity systems. CHAT provides tools to model what occurs within the activity systems involved and to identify sources of tension in them. However, a limitation of the theory encountered in this study is that, where interactions between neighboring activity systems are involved, the theory does not adequately address what occurs in the conceptual and temporal space separating the systems. CHAT focuses primarily on mediating artifacts that are present within an activity system, but less on how they become apparent to actors within an activity system. In the analyses conducted for this study, it proved to be challenging to use CHAT to identify why, in some cases, the full range of substantive, communicative, and subjective foresight outcomes found their way into organizational activity systems, and why, in others, they did not. The evidence suggests that this was because much of the decisive action that determines what becomes a mediating artifact in organizations' activity systems occurs neither in the foresight programs' activity system, nor the organizations' activity systems, but in the space between them.

The results of this study suggest that, as foresight programs produce immediate outcomes, participants negotiate outcomes' meanings and how they should be presented

to others in their organizations. This occurs mostly on an individual basis and is based on program participants' personal knowledge and experiences. Factors that affect these negotiations include, participants' prior experience with foresight and futuring, participants' prior experiences with program coordinators, participants' roles and influence within their organizations, and participants' perceived capacity to use foresight outcomes to facilitate change within their organizations. A universal CHAT model of interactions between foresight activity systems and organizational activity systems needs to reflect the way that these elements influence program participants' perceptions of outcomes and affect transfer between the two systems. Thus, we propose an extended CHAT model of interactions between neighboring foresight and organizational activity systems that accounts for these influential factors, and, in particular, illustrates how outcomes from foresight activity systems become inputs into organizational activity systems.

In our expanded CHAT model of the interaction between an organizational activity system and a neighboring foresight activity system, we use the space between the two to indicate the different ways that program participants shared immediate outcomes and what influenced how those outcomes were shared. This study showed that foresight program participants filter, or moderate, immediate foresight outcomes on the basis of their prior experiences, their prior knowledge of foresight and futuring methods, their perceived role in the organization, and their ability influence others in their organizational activity systems to follow up on foresight activities initiated in the programs. The model in Figure 20 shows the proposed universal CHAT model for

interactions between neighboring foresight and organizational activity systems with the *negotiation space* situated between the two.

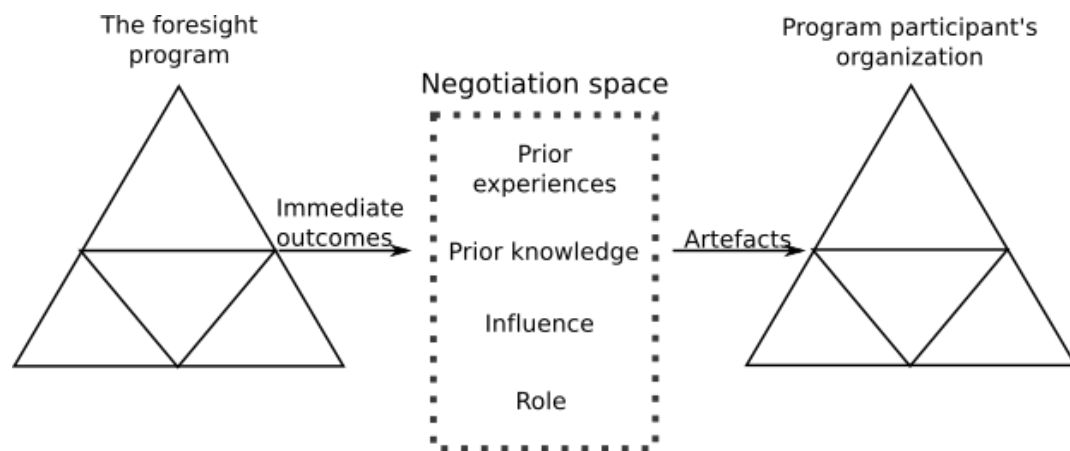


Figure 20. Universal CHAT model of interactions between foresight program activity systems and organizational activity systems.

Immediate foresight outcomes are the products of the programs' activity systems and their meaning is dependent on an understanding of how they were generated. Although anyone can potentially derive significance from particular immediate outcomes, a keen understanding of the processes involved in their generation is needed to appreciate the complete breadth of outcomes, including the subjective, communicative, and substantive outcomes, and how they can be used to influence the organizational activity system. This was demonstrated in the study both by the Advisers' failure to identify significant outcomes and the Believers' difficulty in transferring outcomes in a meaningful manner to their organizational contexts. In this extended CHAT model, immediate outcomes are not treated as artifacts capable of mediating

action in the organizational activity systems. Rather, they are raw materials that can potentially be translated into meaningful artifacts that organizational activity systems will respond to. It is the program participants who transfer outcomes from one activity system to another that use the tools at their disposal, i.e. their experiences, knowledge and others available in the negotiation space, to imbue them with meaning that is relevant to the organization. Thus, it is only after immediate outcomes have passed through the negotiation space that they become meaningful artifacts.

To demonstrate further how the extended CHAT model for foresight functions we can model how the three categories of foresight participants that emerged from the study transferred immediate outcomes from the foresight programs' activity systems to their organizational activity systems. In Figure 21 we represent the negotiation space as metaphorical lenses, through which program participants filtered immediate foresight outcomes. There are three types of lenses depicted, which correspond to the three categories of program participants:

1. the Advisers - a mirrored lens that reflects light back to source (indicated by two parallel lines)
2. the Believers - a concave lens that scatters what is directed at it.
3. the Preachers - convex lens that focuses what is directed at it.

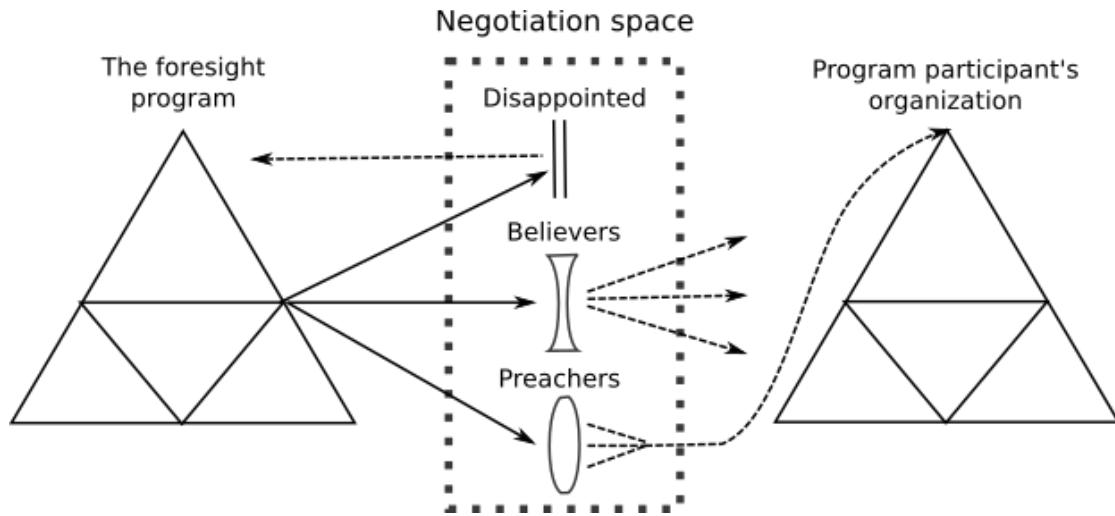


Figure 21. Program participants' negotiation space in between the program and organizational activity systems.

Because the Advisers had expectations that did not align with what they experienced during the programs, they were not able to, or chose not to, make use of any of the tools available in the negotiation space. Therefore, they did not transfer any immediate foresight outcomes to their organizational activity systems. Not only did they not transfer outcomes to their organizations, they essentially deflected the foresight outcomes back toward the foresight activity system and assumed that the parties responsible for the program would communicate outcomes to intended recipients. In the extended CHAT model, the negotiation space is represented by a mirrored lens that reflects what is exposed to it back to the source. Because immediate foresight outcomes were not shared with others in the Advisers' organizations, the organization was not confronted by any meaningful artifacts resulting from the foresight programs, neither in

the organization nor in the vicinity of their organizational activity system. Thus, individuals had nothing to act on, whether there was a will to change or not.

The Believers were, for the most part, inexperienced in foresight and futuring methods and this limited their access to some of the tools in the negotiation space. However, they were willing learners and eager to explore how the immediate foresight outcomes could be used in their organizations and used the tools that they could to transfer relevant outcomes to their organizational activity systems. Because of their limited access to the tools available in the negotiation space, they filtered immediate outcomes through a biconcave lens. A biconcave lens scatters what is directed through it, and this is a fair depiction of what occurred in the Believers' cases. They attempted to share what immediate outcomes that they could but were unable to focus their delivery in a strategic manner to prompt action within the organization. Thus, some immediate outcomes were directed toward the organizations activity system, some toward the community component of the activity system, and some were even directed beyond the organizations activity system, such as toward individuals' external networks. Because the outcomes are scattered, their impact on the organizational activity system was widely distributed, and, therefore, unlikely to elicit prompt responses. Immediate outcomes that are shared in this manner can lead to change over the long-term as they travel through the various channels of communication and concentrate within the organizational activity system. However, since many of the immediate outcomes of foresight programs have a relatively brief shelf-life, in particular the substantive outcomes, which are the

most readily shared, gradual change over extended periods of time require updated inputs to be able to address issues in a relevant manner.

The Preachers were able to make the best use of the tools available to them in the negotiation space. The additional tools used by the Preacher expanded the curvature of their lens outward, resulting in a biconvex lens, which focuses what is directed toward it. Therefore, they, were able to direct immediate outcomes, in a meaningful and strategic manner, to those parts within, and around, their organizational activity systems where they could expect maximum engagement involving other members of their organizations.

The expanded CHAT model, in combination with the lens metaphor, allows for more effective modeling of what occurred in the cases included in this study than the traditional CHAT model. It depicts how immediate foresight outcomes were transferred between the neighboring activity systems involved and suggests why organizational activity systems reacted in the ways that they did. Further research is likely to reveal additional lens types, including, for example, flat lenses that allow outcomes to pass through unfiltered, or combinations of lens types that better illustrate more complex transfers between activity systems.

Implications for Foresight Theory and Practice

Foresight scholars have suggested that as immediate foresight outcomes flow to organizations, intermediate foresight outcomes are produced (Schartinger et al., 2012; Havas, Schartinger & Weber, 2010). These intermediate foresight outcomes are reflected by the changes made within organizations as they internalize foresight and futuring

processes to proactively address possible future issues. This study shows that the critical step from immediate outcomes, realized during foresight program activities, to intermediate outcomes, resulting from ensuing organizational activities, is significantly more complex than has been suggested. The ambiguity of the immediate foresight outcomes, that was observed in the study, shows that foresight and futuring involve learned skills that are critical to the realization of intermediate outcomes. Furthermore, organizational activity systems cannot be expected to be receptive to immediate foresight outcomes unless the issues to be addressed are problematized in a manner that is relevant to, and has a sense of urgency for, others in the organization.

Havas, et al. and Schartinger, et al.'s prior work assumes that immediate foresight outcomes flow somewhat seamlessly to organizations' whose representatives participate in the programs. This is illustrated in Figure 22.

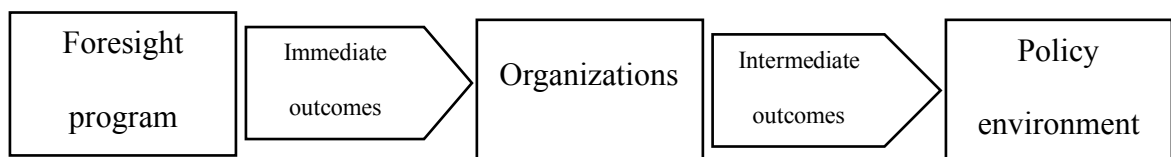


Figure 22. Process of realization of intermediate foresight outcomes according to existing theoretical proposals.

This study suggests, however, that an additional component is needed to illustrate how program participants negotiate the meaning and relevance of immediate foresight outcomes as they are transferred to organizational contexts, as shown in Figure 23.



Figure 23. Process of realization of intermediate foresight outcomes suggested by the study.

Within the negotiation space, program participants draw on their past experiences, their knowledge of foresight processes, and their perceptions of what they can reasonably expect to accomplish in their organizations, to determine what of the immediate foresight outcomes they can present to their organizational contexts in a meaningfully relevant manner. Thus, there are practical implications that concern program participants' foresight skills needs, program participant selection, and the involvement of organizations in foresight activities.

The added negotiation component in the theoretical model of how immediate foresight outcomes are transferred to organizational contexts has implications for both program planners and coordinators, and program participants. Firstly, program planners and coordinators should, ideally, aim for all program participants to at least be at the level of those who were classified in this study as Believers at the start of foresight program activities. They may even consider rooting out those who might be classified as Advisers as early as possible. Secondly, program planners and coordinators should ensure that program participants are able to make organizational resources available for

continued foresight activities either through the participants' own roles in the organizations, or through dedicated support of organizational leadership.

Program planners and coordinators need to consider how they will ensure that program participants will have the skills needed to recognize significant foresight outcomes and effectively transfer them to their organizational contexts. Immediate foresight outcomes should be highlighted within program contexts and documentation to ensure that they are recognized as such. This should extend to all types of outcomes, including, substantive, subjective, and communicative outcomes. All outcomes should be documented, as much as is possible, and included in substantive outcomes. Documenting specific subjective and communicative outcomes is likely to be a challenge, since they may differ from one participant to another. Indicating in documented program results that such outcomes are among the anticipated outcomes would, however, bring needed attention to them, both for project participants and others in their organizations.

Program planners and coordinators also need to consider how program participants will engage others in their organizations with immediate foresight outcomes. In particular, foresight programs should include training in foresight and futuring methods that participants can use within their organizations to engage other organization members in foresight and futuring activities. Such training should include relatively easily applied methods that help to address both the systemic aspects of change and constructing well reasoned long-term projections for anticipated and possible futures. Specific methods could include, for example, environmental scanning for intelligence

gathering, futures wheels for exploring possible systemic change, and scenario construction and analysis for visualizing anticipated and possible futures. Although all of these methods can be applied in highly sophisticated ways, but they can also be used to inform and guide relatively simple, but effective, exercises.

Program participants need to be aware early on in foresight programs that they are expected to engage their organizations in continued foresight activities after program implementation. They should ensure that the organization will be receptive to foresight outcomes and that necessary resources will be available. In some cases, it may be beneficial to specifically select participants for foresight program involvement from among organizational leadership. However, it is generally considered beneficial for the foresight process that participants include individuals from various levels within the relevant organizations to ensure a broad range of perspectives to work from. In these cases, program participants should have the full support of organizational leadership to ensure that immediate foresight outcomes will be transferred to a receptive organizational context.

Engeström (1999) and other scholars have developed CHAT to serve as a diagnostic tool to analyze organizational activity systems. There is a strong theoretical foundation that supports the CHAT framework, Vygotsky's activity theory, that suggests that it can be expanded on to be used for other purposes, including studying policymaking processes. In particular, because of the organizational focus, CHAT lends itself to examining how policymaking affects organizations internally during, and after, policy implementation. However, because CHAT is primarily focused on what occurs

internally within organizations, it has weaknesses that come to light when applied to contexts that involve interactions between organizational activity systems, such as occurs in the early stages of policymaking processes. These weaknesses may be addressed in the manner that has been suggested here, i.e. by extending the systemic perspective beyond the boundaries of the organizational activity systems involved. Yet, in doing so, there is a risk that the spaces between the relevant organizational activity systems will come to be viewed as independent activity systems themselves. Because this is an undefined and unbounded space, populating it with independent activity systems to explain what occurs in organizational activity systems is a slippery slope that can easily spin out of control, resulting in numerous activity systems, which is neither theoretically efficient, nor does it increase the explanatory power of the theory. Indeed, in my own attempts to connect the foresight programs' activity systems and participants' organizational activity systems while concluding this research, I became keenly aware of this potential and had to be cautious not to fall into this trap.

Guidance for future research

The findings of this study suggest several areas for future research:

1. *Longitudinal impact studies of foresight programs.* This study focused on perceived impacts of foresight programs within the timeframes that outcomes are expected to be realized, according to theoretical models put forth in prior scholarship. A limitation of the study is that it is not based on any earlier research or evaluations of the included foresight programs, as these were

unavailable. Ideally, impact studies of foresight programs would include data collected prior to, during, and following program implementation.

2. *Effects of increasingly rapid technological and social change on educational policy.* This study suggests that intelligence gleaned from foresight outcomes is not generally perceived as being indicative of problems requiring urgent attention. Further investigation into how technological and social changes have affected education, and how policymakers address changes, would help foresight planners and coordinators to frame emergent issues in ways that lend them a greater sense of urgency.
3. *Comparative futures across cultural, social and national contexts.* This study focused on national foresight programs implemented in one small country. The changes that led to the implementation of the programs are global in nature, but the challenges that emerge from those changes may be perceived differently in other countries. For example, as regards technological change, there is a considerable difference in the diffusion of many technologies depending on the countries or societies concerned. A recent, and ongoing example, is the shift toward speech-based computer interfaces, as demonstrated by, for example, Google's and Amazon's popular intelligent agents. Currently, these devices and technologies only function with very limited selections of spoken languages. It may be expected that the experiences of language areas that have early access to the technologies can greatly benefit those that follow. Thus, foresight outcomes from other

countries or societies may provide valuable insights for foresight activities in areas that are, by necessity, later adopters.

4. *Borrowing effective policy development tools.* Comparative education researchers have primarily focused on policy borrowing across cultural and national contexts, i.e. the transfer of effective educational policies and practices. In this study I have examined how a policy development tool, that has proven effective for policy formulation, was transferred to Iceland to promote the development of innovative policy approaches that are uniquely adapted to Iceland's anticipations for its future. Much like with policy borrowing, it is reasonable to expect that there is a process involved with borrowing policy development tools that needs to be better understood.
5. *CHAT and organizational environments.* The results of this study suggest that, in cases where foresight and futuring are being used to shape policymaking activities, environments surrounding individual organizational activity systems can be influential. This was particularly evident in cases that involved Believers in hot organizations, who were more likely to engage their external networks with foresight outcomes, rather than colleagues in their organizations. Consequently, there was little pressure to change within the organization. Yet, because of the nature of the hot organizations, there was a potential for significant pressure from these organizations' immediate surroundings as external network members looked to them to support their own attempts to build on foresight outcomes. A better understanding of how

organizations' environments affect activity systems, and in particular the role of external networks in transferring immediate foresight outcomes to organizational activity systems, would be helpful.

Conclusion

This study examined how foresight program participants contribute to the realization of intermediate outcomes of foresight programs that previous foresight research suggests occurs several years follow program implementation. Participants in two foresight programs that were implemented in Iceland to address issues relating to education were involved to explore their perceptions of the long-term impacts of the programs. The study revealed that foresight program planners and coordinators need to better prepare program participants to sustain initiatives launched with programs if long-term outcomes are to be realized. The research will help to organize foresight activities in ways that are likely to increase their impact and effectiveness for policy planning.

Educators and others involved in educational policymaking need to adopt a proactive approach to addressing technological and social change. There exists a wealth of intelligence on anticipated future trajectories of technological and social development produced by futurists that has proven, if not entirely reliable, certainly useful for policy planning purposes. Educational policymakers have all too seldom made effective use of this intelligence as is evident from the tendency to implement reactive policies that are quickly outdated by ongoing, and increasingly rapid, change. Foresight can be a useful tool for producing policy alternatives that build on, and encourage, positive changes, and positive attitudes toward change. However, to deliver on such a promise, foresight needs

to be conducted in ways that are meaningful and relevant to the key players in the educational environment.

As interest and appreciation of forward-looking and long-term policy development for education increases, as it demonstrably has, comparative education researchers need to increase their awareness of how tools like foresight programs influence educational development from an international perspective. Foresight programs are unique in that they direct policymakers' attention inwards to the needs, ambitions, and values of the immediate social context. As such, they may influence subsequent policy borrowing practices by refining the factors that affect cross-national attraction. Because they are inward-looking, they may also foster increased policy innovation. These are issues that are likely to be relevant to the field of comparative education as use of foresight and other future-oriented policy development tools spreads and increases.

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