

## Abstract

Despite the availability of educational technology with the potential to improve today's education, schools still struggle to adopt new solutions. Through several decades, innovation champions have been considered as crucial participants in organizational implementation processes. However, small amounts of research have been conducted in the field of teacher championship.

The purpose of this study is to investigate how teacher championship contribute to the institutionalization of educational technology. The results will provide important insights for both ventures providing educational technology and educational leaders, as well as contribute to the research fields of championship, organizational change, and school development. The research question for this thesis is: *How does teacher championship contribute to the institutionalization of educational technology?*

To seek answers to the research question, a literature review in combination with a qualitative study based on focus groups and semi-structured individual interviews with respondents on the faculty of two Norwegian high schools have been conducted. The data was analyzed using content analysis and sorted according to the activity system from activity theory.

Findings show that a stereotypical image of the individual champion, "fighting at the barricades", do not seem to fit the teacher champions included in the study. Rather, nuances of championship as practice are highlighted. The current research implies that teacher championship has the ability to contribute to the institutionalization of innovations by changing the pedagogical beliefs of their peers through patient promoting. Also, findings show that teacher champions to a larger extent exert *collaborative championship*, hence creating an important coalition for change within their community. Lastly, the lack of formal technology leadership is highlighted, contributing to the debate of formalization of the champion's role and the balance between formal and informal technology leadership within the school context.

Further research should study the emergence and effectiveness of collaborative championship, both within and outside the school context. Also, the balance between formal and informal technology leadership to achieve institutionalization of innovations within the school context should be investigated.

## Sammendrag

Til tross for tilgjengeligheten av utdanningsteknologi med potensial for å forbedre dagens utdanning, sliter skoler fortsatt med å implementere nye løsninger. Gjennom flere tiår har ildsjeler (champions) for innovasjoner blitt ansett som essensielle deltakere i organisatoriske utviklingsprosesser. Det er imidlertid foretatt små mengder forskning på lærere som ildsjeler.

Formålet med dette studiet er å undersøke hvordan lærer-ildsjeler sin praksis bidrar til institusjonalisering av utdanningsteknologi. Resultatene vil gi viktig innsikt for både bedrifter som leverer utdanningsteknologi og utdanningsledere, samt bidra til forskningsfeltet på ildsjeler, organisasjonsendring og skoleutvikling. Forskningsspørsmålet for denne oppgaven er: *Hvordan bidrar lærer-ildsjeler sin praksis til institusjonalisering av utdanningsteknologi?*

For å finne svar på forskningsspørsmålet har en litteraturstudie, i kombinasjon med en kvalitativ studie basert på fokusgrupper og halvstrukturerte, individuelle intervjuer med respondenter fra fakultetet ved to norske ungdomsskoler blitt gjennomført. Dataene ble analysert ved hjelp av innholdsanalyse og sortert i henhold til aktivitetssystemet fra aktivitetsteori.

Resultatene viser at et stereotyp bilde av den enkelte ildsjel, som "slåss ved barrikadene", ikke synes å passe til lærer-ildsjelene som er inkludert i studiet. Snarere er nyanser av deres praksis fremhevet. Forskningen indikerer at lærer-ildsjelene sine aktiviteter har evne til å bidra til institusjonalisering av innovasjoner ved å endre det pedagogiske synet til sine likemenn gjennom tålmodig promotering. Funnene viser også at lærer-ildsjeler i større grad utøver sine aktiviteter i samarbeid, og dermed skape en viktig koalisjon for forandring i fellesskapet de tilhører. Til slutt er mangelen på formell teknologiledelse fremhevet, noe som bidrar til debatten om formalisering av lærer-ildsjelenes rolle og balansen mellom formell og uformell teknologiledelse innenfor skolen.

Videre forskning bør studere fremveksten og effektiviteten av samarbeid mellom lærer-ildsjeler, både innenfor og utenfor skolen. Også balansen mellom formell og uformell teknologiledelse for å oppnå institusjonalisering av innovasjoner innenfor skolen bør undersøkes.

## **Preface**

This master thesis is written by Karianne Hartviksen as the final part of her master's degree at The NTNU School of Entrepreneurship at the Department of Industrial Economics and Technology Management. The goal of this thesis has been to investigate how teacher championship contributes to the institutionalization of educational technology. The research has been exciting, educational and challenging.

I want to thank my supervisor, Erlend Dehlin, for his guidance and encouragement throughout the fall of 2018 and spring of 2019. His enthusiasm and interest in this thesis has served as important motivation and contributed to fruitful discussions that have developed the thesis further. Also, I want to thank Ph.D. Jørgen Veisdal and professor Lise Aaboen for additional feedback along the way. In addition, I want to thank all my respondents and their respective schools for providing me with their valuable time. Without their honest and reflected answers, this thesis would not have happened. My colleagues at Inkrement AS, who provide schools with excellent educational technology, as well as being patient with me through the work with this thesis, also deserve thanks.

Lastly, I want to thank all the inspiring students and talented faculty members who have made these two years at NTNU educational and unforgettable.

Karianne Hartviksen

June 2019

Trondheim, Norway

## Table of content

<b>1. INTRODUCTION.....</b>	<b>6</b>
1.1. BACKGROUND.....	7
1.2. PURPOSE AND RESEARCH QUESTION.....	7
1.3. CONTRIBUTIONS.....	8
1.4. STRUCTURE.....	8
<b>2. LITERATURE REVIEW.....</b>	<b>9</b>
2.1. CHAMPIONS IN CHANGE PROCESSES.....	9
2.2. COLLABORATIVE CHAMPIONSHIP.....	12
2.3. CHAMPIONS OF TECHNOLOGY INTEGRATION IN SCHOOLS.....	13
2.3.1. <i>The teacher</i> .....	13
2.3.1.1. Perceptions of (the) technology.....	14
2.3.1.2. Perceptions of themselves.....	15
2.3.2. <i>The context</i> .....	16
2.3.2.1. Technological infrastructure.....	16
2.3.2.2. Social infrastructure.....	18
2.3.2.3. Culture.....	19
2.3.3. <i>The innovation</i> .....	21
2.4. THEORETICAL FRAMEWORK.....	22
2.4.1. <i>Activity theory</i> .....	23
2.4.2. <i>The activity system</i> .....	24
2.4.3. <i>The modified activity system</i> .....	25
2.5. IMPLICATIONS FOR THEORY BUILDING.....	26
2.6. LIMITATIONS OF THE FRAMEWORK.....	28
<b>3. METHODOLOGY.....</b>	<b>29</b>
3.1. LITERATURE REVIEW.....	29
3.2. RESEARCH DESIGN.....	31
3.3. SELECTION AND PRESENTATION OF CASES.....	32
3.4. DATA ACQUISITION.....	34
3.4.1. <i>The focus groups</i> .....	34
3.4.2. <i>Semi-structured individual interviews</i> .....	35
3.5. DATA ANALYSIS.....	36
3.6. METHODOLOGICAL REFLECTIONS.....	36
3.6.1. <i>Validity and Reliability</i> .....	37
<b>4. FINDINGS, DISCUSSION, AND ANALYSIS.....</b>	<b>39</b>
4.1. THE TEACHER AS THE PARTICIPANT.....	39
4.1.1. <i>Champions at School A</i> .....	39
4.1.2. <i>Champions at School B</i> .....	41
4.1.3. <i>Champions in plural</i> .....	42
4.2. TECHNOLOGY AND CHAMPIONSHIP AS TOOLS.....	43
4.2.1. <i>The exemplified technology</i> .....	43
4.2.2. <i>Variations of championship</i> .....	43
4.3. RULES.....	45
4.3.1. <i>Economy</i> .....	45
4.3.2. <i>Pedagogical beliefs</i> .....	47
4.3.3. <i>Management expectations</i> .....	49
4.4. COMMUNITY.....	50
4.4.1. <i>The students</i> .....	51
4.4.2. <i>The teacher teams</i> .....	52
4.4.2.1. Culture of innovativeness.....	52
4.4.2.2. Culture of collaboration.....	53
4.5. DIVISION OF LABOR.....	56
4.5.1. <i>The discovery and evaluation of learning materials</i> .....	56

4.5.2. Training and support .....	57
4.6. THE GOAL OF INSTITUTIONALIZATION .....	59
<b>5. CONCLUSION.....</b>	<b>63</b>
5.1. RESEARCH CONTRIBUTION .....	64
5.2. RECOMMENDATIONS FOR FURTHER RESEARCH.....	64
5.3. IMPLICATIONS FOR PRACTICE.....	65
<b>6. REFERENCES.....</b>	<b>66</b>
<b>7. APPENDIX.....</b>	<b>72</b>
APPENDIX 1: EXAMPLES OF SEARCH STRINGS .....	72
APPENDIX 2: EXAMPLES OF SEARCH RESULTS .....	73
APPENDIX 3: EXAMPLES OF SNOWBALLING.....	73
APPENDIX 4: INFORMATION PROVIDED TO THE RESPONDENTS.....	74
APPENDIX 5: INTERVIEW GUIDE FOR FOCUS GROUPS.....	75
APPENDIX 6: INTERVIEW GUIDE FOR INDIVIDUAL INTERVIEWS.....	77

**List of figures and tables:**

<i>FIGURE 1: VISUAL PRESENTATION OF THE STRUCTURE OF THE THESIS.....</i>	<i>8</i>
<i>FIGURE 2: THE ACTIVITY SYSTEM AS PRESENTED BY ENGSTRÖM ET AL. (1999).....</i>	<i>24</i>
<i>FIGURE 3: THE MODIFIED ACTIVITY SYSTEM AS PRESENTED BY POSTHOLM ET AL. (2004).....</i>	<i>26</i>
<i>FIGURE 4: THE MODIFIED ACTIVITY SYSTEM WITH THE RELEVANT ELEMENTS FOR THIS THESIS. ....</i>	<i>27</i>
<i>FIGURE 5: THE STEPS CONDUCTED THROUGHOUT THE LITERATURE REVIEW. ....</i>	<i>30</i>
<i>TABLE 1: THE CRITERIA FOR INCLUSION OR EXCLUSION IN THE SCREENING PROCESS. ....</i>	<i>31</i>
<i>TABLE 2: OVERVIEW OF THE RESPONDENTS. ....</i>	<i>34</i>

## 1. Introduction

Several studies have highlighted the significant challenges of technology integration within the public-school system (Cuban et al., 2001, Zhao et al., 2002, Ertmer and Ottenbreit-Leftwich, 2010). In spite of availability, due to major investment in information and communications technology (ICT) in schools worldwide, technology often remains unused by teachers (Zhao et al., 2002, Machin et al., 2007, Hew and Brush, 2007). Even though champions have been indicated to be valuable within technology integration processes both within (Swan and Dixon, 2006, Lowther et al., 2008) and outside the school context (Schon, 1963, Howell and Higgins, 1990b), limited amounts of research has emphasized the role of championship among teachers (Masullo, 2017, Ng' Ambi and Bozalek, 2013). There has been little research on how leaders demonstrate the extent technology can be used to support instructional innovation and improve teaching strategies (Dexter, 2011). What role informal leaders play in the implementation of educational technology needs to be studied (Ng' Ambi and Bozalek, 2013). Hence, the need for a greater understanding of how teacher champions can contribute to the institutionalization of educational technology is present.

Organizational champions have through prior research been linked strongly to the successful implementation of technological innovations (Howell and Higgins, 1990b, Curley and Gremillion, 1983, Schon, 1963). The reason for the champion's importance in the change process lays in their ability to reduce resistance, promote innovations enthusiastically, and support and guide their peers through successful change (Jenssen and Jørgensen, 2004, Buono and Subbiah, 2014, Westover, 2010).

Technology integration in the school system has been shown to be a complex task, faced with barriers such as teachers' contradicting beliefs (Ertmer, 2005), lack of technology leadership (Masullo, 2017), limited amount of time (Cuban et al., 2001), lack of training and support (Hennessy et al., 2005), resource restraints (Lim et al., 2003), and the absence of a supportive culture (Carney, 1998). Educational technology is innovations that challenge the universal and well-established school system (Collins and Halverson, 2010), thus introducing new practices and forcing a complex change process.

## 1.1. Background

The motivation behind the choice of topic lays in the fact that the researcher herself is affiliated with a venture providing educational technology to Norwegian schools. In the role as the chief marketing officer for Inkrement AS, it is of personal interest to conduct the present academic work to investigate the institutionalization process of educational technology. Inkrement AS is a Norwegian start-up company delivering educational technology based on the pedagogical method of the flipped classroom. The author's experiences confirm the difficulty of integrating new educational technology from a supplier perspective, and that the vital asset often is the teacher champion that will create and secure usage at their school.

## 1.2. Purpose and research question

The purpose of this thesis is to establish a greater understanding of how teacher championship contributes to the institutionalization of new educational innovations in their workplace. This knowledge will serve as insight for new ventures on a mission to integrate educational technology and gain loyal customers of their products and/or services. It will, in addition, serve educational leaders with guidelines to achieve successful change processes in their organizations. The research question for this thesis is:

**RQ:** *How does teacher championship contribute to the institutionalization of educational technology?*

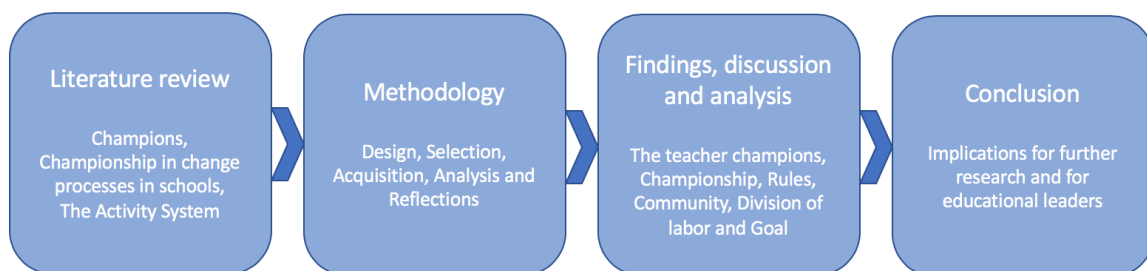
Teacher championship is activities conducted by educators who put in the extra effort to promote innovation and facilitate for change. This will further be defined and discussed thoroughly through the following sections. Institutionalization can be defined as the act of establishing something as a convention or norm in an organization or culture (Berger, 1966). Within Scandinavian institutionalism in organizational theory, both change and stability exist simultaneously as an organizational norm (Eriksson-Zetterquist et al., 2014). The term is chosen as it emphasizes the duration of use and stability in addition to the introduction of new technology and methods. Lastly, educational technology can be defined as innovations that challenge the universal and well-established school system (Collins and Halverson, 2010), often by combining both software, hardware and pedagogical methods (Luppicini, 2005).

### 1.3. Contributions

The findings from this master thesis will create a greater understanding of what factors hinder and facilitate teacher champions' ability to institutionalize educational technology in their workplace. It will also provide useful insight for new ventures providing educational technology, as well as guidelines for educational leaders. The thesis will hence contribute to the research field of champions, organizational change, and school development. Hopefully, the findings will be useful for both providers of educational technology and educational leaders in relation to technology institutionalization and development processes.

### 1.4. Structure

The thesis is structured in the following way; first, a literature review is presented. This section consists of prior studies on champions, championship in change processes in schools, and the presentation of activity theory and the activity system as the thesis' theoretical framework. Further, the design, selection, generation, and analysis of data is presented. Then follows the findings combined with the discussion and analysis of the generated data, structured according to the theoretical framework. Lastly, the conclusion, limitations, and implications for further research and educational leaders are showcased.



*Figure 1: Visual presentation of the structure of the thesis*



## 2. Literature review

### 2.1. Champions in change processes

The champion is seen as a crucial factor for the survival of new ideas within the organization (Schon, 1963). Prior research holds a widespread agreement that champions enhance the probability for success in the process of organizational change (Buono and Subbiah, 2014, Curley and Gremillion, 1983, Hartley et al., 1997, Jenssen and Jørgensen, 2004, Westover, 2010). These findings are coinciding with the view of the integration process heavily related to communication from the innovators to the non-innovators in an organization, as described in the theory of diffusion of innovations (Rogers, 2003). The reason for classifying the champion as a key factor is their ability to prepare their peers for change, reduce resistance (Westover, 2010), understand the complex environment of the change process, create collaborative relationships (Buono and Subbiah, 2014), and eagerly promote and facilitate for change (Curley and Gremillion, 1983).

So, who are these crucial key actors of change? Jenssen and Jørgensen (2004) define the champions as *an individual that is willing to take risks by enthusiastically promoting the development and/or implementation of an innovation inside a corporation through a resource acquisition process without regard to the resources currently controlled*. This definition is supported by Howell and Higgins (1990a) who describes the champion as an individual that take creative ideas and bring them to life through enthusiastically promoting the innovation, building support and overcoming resistance. The image of the organizational champion as an eager individual “fighting at the barricades” is a regular in the research field of championship (Howell and Higgins, 1990a, Jenssen and Jørgensen, 2004, Howell and Boies, 2004, Schon, 1963, Maidique, 1980, Lawless and Price, 1992).

However, several types of the eager champions have been identified and classified through previous research (Howell and Higgins, 1990b). Among them, “the project champion” is the one who makes creative ideas understandable and promotes them enthusiastically within their organization, while “the user champion” is the one who implements the innovation by providing training and assistance to the users (Curley and Gremillion, 1983). This makes us understand that different processes and contexts might experience the need for different types of

champions, and in different combinations. The champions that initiate change and those who promote stability might not be mutually exclusive in person or behavior, but they may be more drawn to one of these roles (Westover, 2010), making them more suitable at different steps in the change process.

Jenssen and Jørgensen (2004) have summarized how prior research has pointed out the champions' human and social capital, resource acquisition strategies, and leadership characteristics as important for the success of innovations. This is coinciding with the study from Curley and Gremillion (1983) stating that the champion must understand the implementation process as a social and political action to be able to succeed. Most focus in prior research has been put on investigating the champions' characteristics (personal characteristics, experience, and position in a network) and their resource acquisition strategies (rational strategies, participating process and bootlegging). However, the literature does not say much about the relative importance and effectiveness of the different acquisition strategies within different environments (Jenssen and Jørgensen, 2004). This limitation is further emphasized, 10 years later, by Buono and Subbiah (2014) that suggests that future research should look into what types of change processes would benefit the most from the use of champions as their internal consultants, rather than external consultants.

A model of champion development shows that personality characteristics as innovativeness, risk-taking and persuasiveness, transformational leadership skills as being charismatic, inspirational and intellectually stimulated, as well as using influence tactics frequently and with variety, influence the emergence of champions (Howell and Higgins, 1990b). Hence, an organization cannot simply choose someone to be their champion, as appointing someone to the role might lead to a reduction of their motivation, felt responsibility and commitment to the innovation, and therefore jeopardize the ultimate success (Howell and Higgins, 1990b). That being said, organizations can facilitate for the rise of their internal change agents. Champions are more likely to emerge when technological and organizational constraints are weak than within strong constraints that provide cues and guidelines for individual behavior (Howell and Higgins, 1990b). Hence, there is expected to be a greater likelihood of champion emergence in organic organizations than mechanistic ones (Howell and Higgins, 1990b), indicating the significance of organizational structure related to the emergence of champions.

Champions have the opportunity to prepare their co-workers for change and reduce the possibility for major resistance than if the same message is being introduced from the top-management or external consultants (Westover, 2010). Users of a new system are not rationale, creating the challenge of abandonment even though the innovation creates value (Curley and Gremillion, 1983). This supports the view of the importance of the champion as a mediator, potentially safe and well-known to the resistant adaptor of change. The strongest resistance to change will come from those who feel that their areas of control are being violated (Pondy, 1967). Hence, it is of great advantage if the change initiator is someone within the same area of control, rather than an “ignorant” external.

A study by Hartley et al. (1997) presents the learning needs of champions to make them able to effectively manage cultural and organizational change. Their findings show that the internal change agents gained greatly from having an understanding of the complex process of change, the network effects, and especially understanding the people within their organization and their roles. This is consistent with the 8 step model for leading change by Kotter (1995), where main areas of focus are to engage and include the whole organization in the change process. Kotter’s model can though be criticized for simplifying the complex change process too much, indicating that it is possible to pursue an organizational change in such a neat way, one defined step at the time (Kotter, 1995). The model does substantiate that if the champion should be best equipped to engage for, and lead change within their workplace, then their circumstances must make this possible. An apparent dilemma is the champion as a leader for change, but not necessarily a formal leader within the organization. The champions take on the role as informal transformational leaders (Howell and Higgins, 1990b), but this does not necessarily mean that they have control of the information or resources needed to perform their task as effectively as possible. Hence, leaders of champions should facilitate for them to secure the outcome of innovation success. A complete understanding of the organization, its environment and needs should be communicated throughout the whole organization. When every member is aware of what opportunities and threats the organization is facing, it is easier for the champion to succeed (Buono and Subbiah, 2014).

Several studies describe the champion as an informal leader, but few emphasize the challenge of information and resource restraint as a hinder for both the champion and the organization as a whole. Reward systems within organizations tend to favor bureaucratic rather than innovative skills (Jenssen and Jørgensen, 2004), which highlights an obvious challenge as the importance

of innovation is needless to argue for. In most companies, one will get rewarded for following the rules, minimizing risk and by performing their formal role (Thornberry, 2001), which does not exactly promote championship. Incentives in organizations are usually either behavior-based or outcome-based (Jenssen and Jørgensen, 2004). Lawless and Price (1992) argue that organizations have to evaluate the champion through reputation and second opinion, because of the great level of uncertainty related to the innovation. Thornberry (2001) states that people with entrepreneurial minds (like champions) often are nowhere to be found in large and highly bureaucratic organizations because they either get pushed out or are learned to stop pushing for change.

## **2.2. Collaborative championship**

The champion is defined as an individual fighting the masses, while less research has been conducted on collective championship (Jenssen and Jørgensen, 2004). Still, some studies focus on the phenomenon of several promoters to secure implementation of innovations (Hauschildt and Kirchmann, 2001, Witte, 1973, Rese et al., 2013). Witte (1973) created the promoters' model which argue that a dyad of two different promoters, co-operating closely, is needed to secure the success of innovations. Later research has added on to this view, arguing that an additional third promoter of the process is the ideal to secure the implementation of complex innovations (Hauschildt and Kirchmann, 2001).

Within the theory of collective championship several different roles, with different abilities and strengths, are identified. "The power promoter" tackles the psychological barriers and unwillingness among her peers, while "the technology promoter" provides specific technical knowledge. In addition, "the process promoter" handles challenges related to the complexity of organizational barriers and systems (Hauschildt and Kirchmann, 2001). Other studies have presented additional roles related to innovation processes between organizations. More or less overlapping with the roles presented above, some examples are "the broker" (Rosenfeld, 1996), "the network champion" (Woodside, 1994) and "the alliance champion" (Forrest and Martin, 1992).

Hamadi et al. (2018) found that the presence of multiple innovation champions at any time through an R&D collaboration was unnecessary, but their contribution at the right time was

needed to bring partners together and synchronize activities. On the other hand, too many champions involved in the same project has been found to be a potential starting point for chaos (Rese et al., 2013).

Prior studies have, to some extent, highlighted the potential for the advantage of complementary abilities through collective championship (Witte, 1973, Hauschildt and Kirchmann, 2001, Hamadi et al., 2018). Meanwhile, it seems that less research has been conducted on how championship can emerge and be strengthened through collaboration.

## **2.3. Champions of technology integration in schools**

The change process of technology integration in schools is a widely studied topic given increased focus over the last two decades. The practical challenges are clearly present as many teachers still struggle to integrate new technology into their teaching in spite of significant investment in ICT in schools worldwide (Zhao et al., 2002, Ertmer, 2005, Kopcha, 2012, Masullo, 2017). Hence, the need and basis for facilitating change through championship is certainly present. Zhao et al. (2002) present eleven factors, placed within three interactive domains, that affects the integration of classroom technology innovations; (1) the teacher, (2) the context and (3) the innovation itself. Even though the knowledge of educational leadership is significant through prior research, not much is known about the potential for using teachers as champions in technology institutionalization processes (Masullo, 2017). The three domains presented by Zhao et al. (2002) will further be used as categories to explore what findings from prior research imply about the potential of using champions in technology institutionalization processes in schools.

### **2.3.1. The teacher**

Even though prior research has indicated both institutional and school factors, like technical resources and supportive administration to be important, the factors related to the teacher, like feelings, skills, and attitudes towards IT in general, is far more important when it comes to actually integrate technology in the classroom (Mumtaz, 2000). The topics of teacher beliefs and teacher perceptions are regulars in the field of technology integration in schools (Cullen and Greene, 2011, Haydn and Barton, 2008, Kim et al., 2013, Mueller et al., 2008, Mumtaz, 2000, Wozney et al., 2006, Swan and Dixon, 2006), and highlighted as significant barriers that

hence have to be overcome by the champion. The current chapter is divided into two subchapters; (1) how the teachers perceive the technology, and (2) how the teachers see themselves as the adaptor of the technology.

#### *2.3.1.1. Perceptions of (the) technology*

Teachers attitudes towards technology in general, and their beliefs of its usefulness, effectiveness and fit with their pedagogical views are deemed to be important factors affecting their level of, and success in technology integration. Ertmer (2005) argues that the most significant barrier is the alignment of technology with the teachers' pedagogical beliefs. Several studies have supported and contributed to this view (Zhao et al., 2002, Clavert et al., 2015, Mumtaz, 2000). Few would argue that teachers' beliefs do not affect their behavior in the classroom (Ertmer, 2005), hence the importance of alignment between the educational technology and the teacher's pedagogical beliefs is possibly the most crucial criteria to fulfill. Not contradictory, Kim et al. (2013) studied how teachers' beliefs were related to the integration of technology and found that teachers' beliefs about the nature of knowledge and about effective teaching methods were related to their actual technology integration practices. This is coinciding with the results of Wozney et al. (2006) which, among other findings, revealed that teachers' attitudes towards value achieved through integration are of great importance.

Teachers general attitude towards technology is also proven to be a significant factor affecting their level and success of integration (Mueller et al., 2008, Swan and Dixon, 2006, Hew and Brush, 2007). Explained simply, the teacher will be resistant to taking a specific technology into use if their attitudes towards technology, in general, are anything other than positive.

Champions in technology integration processes in schools also need to be convinced by the technology to be able to influence and be compelled to tell others (Larson and Meyer, 2006). If convinced, the champion seems equipped to overcome the barriers of both general and specific technology skepticism, on the basis of the personality characteristics and skills highlighted through previous findings. Prior research shows that champions have the ability to affect and change the beliefs of their peers (Ertmer, 2005, Larson and Meyer, 2006), as well as serve as user examples, showcasing the value of the technology (Glazer et al., 2005). A review on the field of organizational champions by Jenssen and Jørgensen (2004) shows that common traits and abilities found for champions include charisma, the ability to inspire others, and the ability to create a network consisting of both weak and strong ties around them.

### *2.3.1.2. Perceptions of themselves*

Teachers do not only have attitudes towards the technology, as they also carry a lot of conscious and unconscious attitudes about themselves, that may or may not be accurate. How teachers perceive themselves, as well as perceived skills and knowledge, actual skills, knowledge, experience, and motivation greatly affect the technology integration process. The importance of building teachers' confidence through successful experiences with technology is highlighted (Ertmer, 2005). The teacher's belief that the usage will be successful (Wozney et al., 2006) is closely related with their self-efficacy related to technology use, which is recurrently given focus through prior research (Kopcha, 2012, Hennessy et al., 2005, Swan and Dixon, 2006, Glazer et al., 2009). This is, of course, related to both their perceived and actual technical knowledge and skills (Zhao et al., 2002), technology-supported pedagogical knowledge and skills, and technology-related-classroom management knowledge and skills, which may serve as major barriers for integration (Hew and Brush, 2007). The findings of Glazer et al. (2009) show that teachers that can be defined as champions was a source of motivation to their peers by assuring them of their abilities throughout the integration process.

Teachers motivation to use technology is also a recurring factor deemed important in technology integration (Wozney et al., 2006, Cullen and Greene, 2011, Mueller et al., 2008). Mueller et al. (2008) found that perceived usefulness was an important component of motivation for computer use while teaching efficacy was not found to be the same.

Prior research has also shown that teachers that are mentees integrate technology more often over time than teachers who do not have the support and guidance from a mentor (Swan and Dixon, 2006, Lowther et al., 2008). This is coinciding with the findings from Glazer et al. (2009) which emphasize the importance of both technical and motivational support to the adopting teacher exploring unfamiliar grounds. Teachers are also more likely to change their beliefs about the value of technology if their peers socialized them to think differently (Ertmer, 2005), rather than if an external supplier aims to do the same. These findings support the importance of champions in technology integration in schools, as champions can fill the description of both mentors, support providers, motivators and promoters through workplace socialization with their peers (Buono and Subbiah, 2014, Jenssen and Jørgensen, 2004).

The model presented by Zhao et al. (2002) do not consist of any factors concerned with teacher's self-confidence in relation to technology usage, and should thus be criticized. Even though the teacher as the innovator is one of three interactive domains, the model only place focus on the teachers' knowledge of the technology, and knowledge of the social culture, which excludes the aspect of teachers' confidence as a significant factor affecting if they integrate technology or not. Teachers' beliefs of their own abilities are found to be of significant importance in later research (Swan and Dixon, 2006, Lowther et al., 2008, Haydn and Barton, 2008, Mueller et al., 2008)

### 2.3.2. The context

The context of the integration process will vary from organization to organization, and from school to school, hence making the challenges to overcome of varied difficulty. This chapter is divided into subchapters inspired by the model of Zhao et al. (2002) and is comprised of (1) the technological infrastructure, (2) the social infrastructure, and (3) the culture.

#### 2.3.2.1. *Technological infrastructure*

The technological infrastructure in the school system is comprised of factors like facilities, network, and equipment, according to the model presented by Zhao et al. (2002). The absence of factors like time and organizational structure creates room for criticism of the model's lack of a holistic view on the integration process. Time and organizational structure are found to be significant barriers by prior research (Cuban et al., 2001, Swan and Dixon, 2006, Kopcha, 2012), and will thus be included by the author and discussed throughout this section.

The lack of time for technology integration has been highlighted as a barrier by several previous studies (Swan and Dixon, 2006, Glazer et al., 2005, Kopcha, 2012, Cuban et al., 2001). Some studies emphasize the lack of time between tasks inside and outside the classroom (Rosen and Weil, 1995) which makes it difficult for the teacher to prepare the use of technology during their individual instructional time. Other focus on the lack of collaborative time to explore the possibilities of educational technology and set the course collectively to achieve successful integration (Haydn and Barton, 2008, Swan and Dixon, 2006). Teachers who were able to work collaboratively with other teachers of the same subject, and who was in addition given the time to explore ICT and the possibilities for their subjects, had a cost-effective way of enabling ICT in subject teaching according to Haydn and Barton (2008). Giving the teachers time, freedom



and an arena to discuss ICT rather than general training courses was shown to be a path towards success.

Looking at findings from the research field of champions, we can see that champions are likely to act differently than their non-champion peers under time constrained conditions. Some findings on champion behavior emphasize distinctive features as rule-breaking and the willingness to take on personal risk to promote their beliefs (Jenssen and Jørgensen, 2004), for example by using their spare time to explore and prepare technology for both individual usage and for the display to their colleagues. Another example may be that the champion dares to use their given time differently, both within the grey area of what is allowed or as a rule-breaker, moving beyond. An example of this outside the educational environment is the champion at Sony who used his working hours creating the PlayStation (Mohedano-Suanes and Benítez, 2018), even though this was not his job description at all. Larson and Meyer (2006) suggest that administrative leaders should provide incentives in the form of extra time or reduction of workload to a strategically chosen champion. This seems like a reasonable action, but is contradictory with the findings of Howell and Higgins (1990b), stating that the champion can experience lack of motivation if held responsible to the activities they themselves have taken the initiative to perform.

The organizational structure is indicated to be of importance for champion emergence. As mentioned in section 2.1, Howell and Higgins (1990b) state that champions are more likely to occur in organic organizations than in mechanistic ones. This line of reasoning is done on the basis of social learning theory (Mischel and Mandler, 1973), which states that individual differences are more visible through behavior when environmental conditions are unstructured or weak. Further, in circumstances of significant technological or organizational change, personality characteristics will be expressed more strongly and give a clearer outcome in behavior. Therefore, when the organizational structure does not provide guidance for individual behavior, champions seem more likely to occur (Howell and Higgins, 1990b). This argumentation may be linked to the nature of the reward system and level of bureaucracy as discussed earlier by Jenssen and Jørgensen (2004). These thoughts are complemented by Thornberry (2001) stating that people with entrepreneurial minds (like champions) often are nowhere to be found in the organization because they either get pushed out or are learned to stop pushing for change.

The above-mentioned view on structure and champion emergence seem contrary to several prior findings of championship. Firstly, some of the characteristics highlighted by Jenssen and Jørgensen (2004) include that champions are persistent, have long and varied experience within the same company, and bypasses the bureaucracy. These findings propose in favor of championship in mechanistic organizations, as they communicate champions overcoming factors that are not usually to be found in organic organizations. Also, the characteristic of persistence argues against the view of Thornberry (2001), describing that the champion will give up or leave the organization. One can argue that it is in fact in mechanistic organizations one will find champions, as that is where they are needed and will stand out from the crowd.

Zhao et al. (2002) mainly discuss the factors of facilities and equipment through their section on the topic of technological infrastructure. The lack of resources is found to be a barrier by several studies (Mumtaz, 2000, Swan and Dixon, 2006, Lim et al., 2003), but there is not a complete consensus of the importance of this factor. Cuban et al. (2001) found that even though teachers had high access to technology, the usage still remained low, indicating the irrelevance of technology access as a highly significant hinder for technology integration compared to other discussed barriers. The author has to take into consideration that the availability of technology in public schools has improved drastically since the above-mentioned research was conducted. The increasing technology availability might make the study of Cuban et al. (2001) even more relevant, highlighting that barriers such as time for exploration and training are more significant to address.

#### *2.3.2.2. Social infrastructure*

Social infrastructure is concerned with the organization of human activities to help support technology integration. Technological innovations exceed other innovations in requirements for institutional support as resources and knowledge because they are more demanding for the individual to understand and take into use (Zhao et al., 2002). Prior research has highlighted the need for technical support (Lim et al., 2003, Hennessy et al., 2005, Haydn and Barton, 2008), someone who can help the teacher understand and take the technology into use (Haydn and Barton, 2008, Mueller et al., 2008), and an administrative staff that is supportive and makes information available (Zhao et al., 2002). Social infrastructure was found to be a hygiene factor by Zhao et al. (2002); meaning that when it is working it is largely unnoticed, but that the lack of social infrastructure will create discontent.

In the UK, some of the investments and policies for teacher training in ICT integration has not been viewed as helpful by the teachers. The training programs have been both criticized for being unwieldy and insufficiently geared to meet the needs of different subject specialism (Preston, 2005, Ofsted, 2002), and many of the competence specifications and testing mechanisms for new teachers were found to be both unhelpful and overly bureaucratic (Barton and Haydn, 2006). The need for the development of communities of practice (hereby referred to as CoP) and a collegial culture sharing best-practice experience from both ICT-resources and training has been acknowledged (Younie, 2006). Prior research has shown that long-term changes in teachers' practices and views on the use of technology in the classroom is more likely to be successful through a social infrastructure made of personalized training and support by colleagues within the actual classroom (Ertmer, 2005, Becker, 2000). This is coinciding with the findings of Stager (1995), stating that assistance from someone who had managed technology integration and could work alongside the teacher to observe, evaluate and support can affect the integration positively. These findings support the use of champions in technology integration processes in schools accurately.

Glazer et al. (2009) talk about teachers that are skilled, has knowledge and experience of the technology, that can provide situated, ongoing, just-in-time support to their peers as they develop their skills, knowledge and resources to be used in the classroom. This description is coinciding to the one earlier discussed by Curley and Gremillion (1983), describing the user champion. Research has shown that teachers that are mentees integrate technology more often over time than teachers who do not have the support and guidance from a mentor (Swan and Dixon, 2006, Lowther et al., 2008). The role of the champion as the internal consultant of change, providing support and guidance through close physical proximity and knowledge of the adopter's challenges and opportunities, lays heavily within the field of social infrastructure, and also culture, which will be discussed in the next section.

#### *2.3.2.3. Culture*

To which degree the teacher as the innovator is discouraged or enthusiastically rooted for is of great significance to the success or failure of technology integration (Zhao et al., 2002). Hence, the culture of the organization needs to be taken into consideration when studying champions' contribution to technology integration processes (Kopcha, 2010). Findings by Rosen and Weil (1995) show that the lack of available networks for technology-positive teachers is a significant barrier for integrating new technology in the classroom. This is supported by the findings of

Carney (1998), stating that a positive culture for change and development is needed and that this further demands the creation of new opportunities for teachers to learn both technological and pedagogical skills. Hew and Brush (2007) complement these findings, stating that different subcultures of subject groups often is the norm of schools, making the challenge even more complex to handle.

A culture that supports the needs of technology for learning is needed (Kopcha, 2010). How a teacher's peers react and accept the usage of new technology (Ertmer, 2005, Zhao and Frank, 2003), and their own beliefs about the usage of the technology (as discussed in section 2.3.1.1.) is of great importance. A supportive and promoting culture of technology integration and usage is the kind that encourages risk-taking, provides continuous support and allows the teachers to immerse themselves in technology (Ertmer, 2005). A study by Clark (2006) conducted on 58 high schools, showed that a culture of support and assistance was more important than the improvement of curriculum or professional development received to secure technology integration at the schools.

Prior research states that teachers are more likely to change their beliefs about the value of technology if their peers socialized them to think differently (Zhao and Frank, 2003), rather than if an external supplier aims to do the same. Zhao and Frank (2003) also explain that leveraging change through the social context is a double-edged sword. Some teachers will not have a champion colleague to inspire them, while others can experience social pressure that rather works against the technology adaption than in favor of it. Champions need to be aware of the culture they are operating within and be knowledgeable about the current stress the adopter may be influenced of at the current time (Zhao and Frank, 2003). Later research also indicates that such changes must be done bottom-up, through collaborative engagement aimed at changing shared practices (Clavert et al., 2015), rather than through top-down initiatives.

Findings of the importance of CoPs to support technology integration are numerous (Kopcha, 2010, Clavert et al., 2015, Glazer et al., 2009, Carney, 1998, Larson and Meyer, 2006, Glazer et al., 2005). The concept explains how learning is situated in informal communities, typically discipline-specific, within which the teachers conduct their daily activities of teaching (Clavert et al., 2015). The shared engagement in a common workplace lays the foundation for, and sustain the CoP (Glazer et al., 2009). Fullan (2009) has characterized a collaborative culture as crucial for a successful school, including the need for risk-taking and idea sharing to be able to

improve the quality of their education. Collaborative learning combined with the socializing with peers that share experiences and ideas, as well as offer their support seems unavoidable for the modern school.

### 2.3.3. The innovation

The innovation itself is, of course, important in the institutionalization process as it may be more or less challenging to integrate. Zhao et al. (2002) describe the ease of integrating the innovation related to its distance from school culture, existing practice, and available technology, as well as its dependency to human and technological resources. This section will discuss findings related to the innovation's compatibility and thus the ease of integrating it.

Educational technology is innovations that challenge the universal and well-established school system according to Collins and Halverson (2010), thus introducing new practices and forcing change processes. Educational technology can be defined as the field concerned with the design, development, utilization, management, and evaluation of processes and resources for learning (Luppicini, 2005). Used for instructional purposes, educational technology can be defined as the technology used during instructional time, but also as the technology used to instruct the student, as opposed to a tool for communication or administrative work (Gray et al., 2010).

The previous section described how culture is concerned with the values, pedagogical beliefs, and practices by a teacher, a subject group, or at a school as a whole. An overview and alignment between the given technology and the teacher's (and potentially the subject group's and/or school's) pedagogical beliefs are, as mentioned and not surprisingly, seen as a crucial first step to integration (Ertmer, 2005). Hew and Brush (2007) explain how technology can be seen as a mean to either replace, amplify or transform the pedagogy, where the latter is, without doubt, the most demanding of the three. Teachers are reluctant to adopt any technology that does not seem to fit with the established norms of their subject culture (Hennessy et al., 2005). Hence, if educational technology requires changes in pedagogical beliefs and practices, efforts to promote and influence the status quo is needed. Shedding light on factors that can reduce uncertainty and risk associated with trying a new practice is a step in the right direction concludes Larson and Meyer (2006). They further recommend the use of champions as a mean to accelerate the adoption of new practices.

The innovation's dependency on human and technological resources has been indicated to be of importance (Zhao et al., 2002). Research showed that innovations that were more dependent on other people (which the teacher did not control) and additional resources were harder to integrate than those who were less dependent (Zhao et al., 2002). This is especially applicable when the technology requires additional resources that the school does not have at the time, thus requiring additional investments. The presence of CoPs and a technology- and change-positive culture may be assumed to reduce, but not eliminate, this challenge.

The theory of Rogers (2003) on the diffusion of innovations also support the view of compatibility as a significant factor affecting the pace of adoption. The theory explains how complex ideas or systems are harder to adopt than simple ones, making the ease of both understanding and use critical. Educational technology can often fall into the category of complex innovations, as the technology may consist of a combination of software, hardware and pedagogical methods (Luppicini, 2005), thus making it challenging to integrate. The visibility of the innovation once integrated by someone may, according to Rogers (2003), encourage the ones that are considering to adopt. In such situations, the champion is deemed useful, as they tend to promote and showcase new innovations to their peers (Glazer et al., 2005).

Previous research has shown it more effective to let teachers focus on smaller amounts of technology at first, perceive the mastery, and further feel confident to explore more (Barton and Haydn, 2006). A study by Barton and Haydn (2006) concludes that teachers who choose not to engage in technology integration may have “shut off” their interest due to overwhelming amounts of information at once. Hence, to achieve successful technology integration among teachers, the champion has to take into consideration that the changes and information should be kept to a limited and manageable amount. In such issues, the champions have their clear strength, as they are internals that are known with the context and situation of their peers (Buono and Subbiah, 2014).

## **2.4. Theoretical framework**

The current section presents the framework suitable for identifying and explaining the context and interactions in the process of technology integration in schools. A framework shall serve

as a tool for analysis and hence place focus in the research (Postholm, 2010). Activity theory is chosen due to its focus on mediation and tools, which is transferable to considerable interest in the human relationship with technology (Kaptelinin and Nardi, 2018). The activity system has been used as a framework for the primary data generated in the master thesis. The rationale behind this choice is the framework's ability to describe and analyze human activities, such as the championship performed by a champion, within a given context, for example, a teacher team or a school while being conscious about how the different elements affect each other (Postholm, 2010). This makes the framework suitable for describing and analyzing championship as a mean to accomplish the institutionalization of educational technology, while observed in context with the teacher team, their workplace and the boundaries and opportunities they include. Hence, the framework includes analysis at both the organizational and individual level.

Activity theory is also able to analyze how contradictions within a social system can lead to development, innovation, and change, as the different components go through continuous transitions and transformations (Engeström et al., 1999). As explained throughout the next chapters, the framework accommodates both the actions conducted by the champion teachers in relation to the technology integration and the context they are operating in, in the form of their working environment, with given rules and specific tasks. Both actions, context, and people will affect each other, and must all be included in the analysis to ensure a holistic view of the process of institutionalization.

#### 2.4.1. Activity theory

Activity theory has strong historical roots from the work of Russian psychologists, mainly Vygotskiĭ (Vygotskiĭ and Cole, 1978), Luria (Cole, 2017) and Leont'ev (1974) (Gall and Alabdullaziz, 2015). It is suitable for studying different forms of human actions as development processes, including both individual and social levels (Kaptelinin and Nardi, 2018). The behavioral and social sciences have appreciated disunity between the studies on socioeconomic structures from the studies on individual behavior and human agency. In this view, the individuals' actions do not seem to have any impact on its surroundings (Engeström et al., 1999). According to Engeström et al. (1999), this dualistic framework is unsuitable to create an understanding of the deep social transformations we experience. Precisely the champion's impact on his or her collegial environment is of great interest in the current research.

Activity theory sees the activity as a collective phenomenon which involves several actors (Mursu et al., 2007). Within the integration process, we cannot isolate the actions performed by one teacher from his or her surroundings. In the same way, we must recognize that the teachers also will be affected by each other and the community and context they belong to. The interaction in a social context, as well as the idea of development and dynamics from a work activity, is regarded as the strengths of activity theory (Mursu et al., 2007), making it suitable to identify and analyze the different factors in the integration process. Unlike in the 1920s and 1930s, when activity theory was developed within the psychology of play, development, cognition and learning for children (Vygotskiï and Cole, 1978), it now comprises such topics as the development of work activities and the implementation of new technology (Engeström et al., 1999). These areas of application make the framework of activity theory highly relevant to fulfill the purpose of this master thesis.

2.4.2. The activity system

Activity theory is the origin of the activity system presented by Engeström et al. (1999). The model is presented beneath, in figure 1.

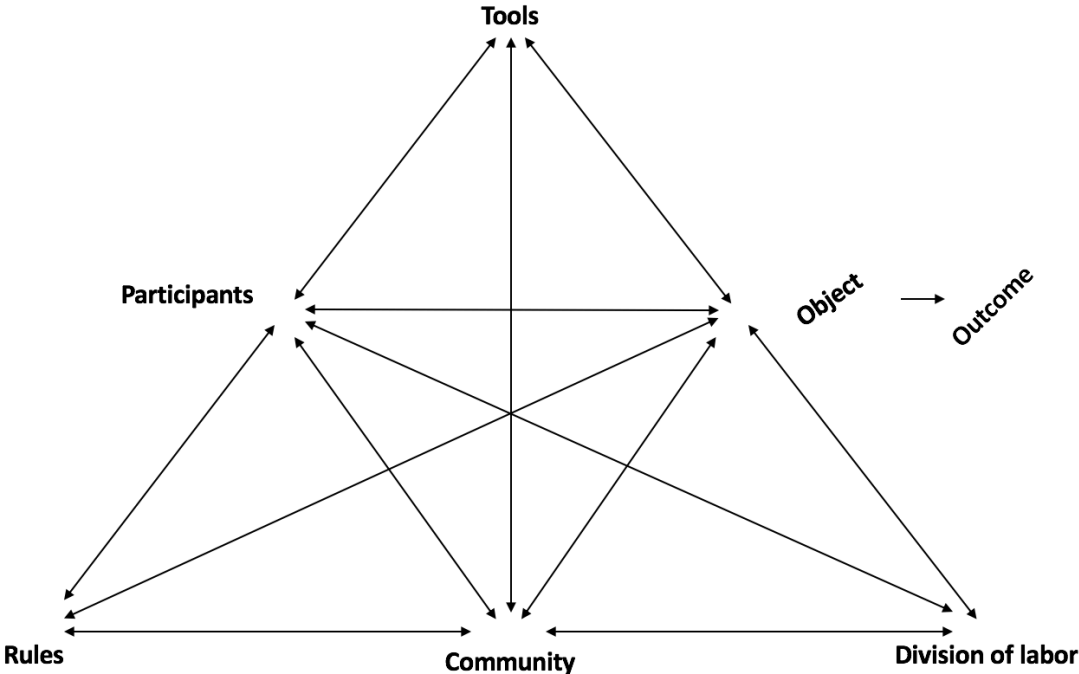


Figure 2: The activity system as presented by Engeström et al. (1999).



The factors in the model; “participants”, “tools”, “object”, “outcome”, “rules”, “community” and “division of labor”, all affect each other mutually (Engeström et al., 1999). These factors are unstable as the development of activities is rather discontinuous. This creates imbalances between them that are called contradictions (Gedera, 2016). A contradiction is defined as a misfit within elements, between them, between different activities or between different developmental phases of a single activity (Kuutti, 1996). Engeström (2014) describes four types of contradictions; the primary within an element, the secondary between the elements, the tertiary when participants have to use advanced methods to achieve an objective (e.g. the use of new technology), and the quaternary between the central activity system and outside activity systems. Innovation can be defined as “the process of bringing new problem-solving ideas into use” (Glynn, 1996). Hence, the tensions can be the motive force of change and development, as new ways of doing things will force its way through when parts of the context are changed (Engeström et al., 1999).

As an example, we can imagine nurses at a hospital that suddenly must handle changes within the factor of “rules”. The introduction of a new legislation regarding personal data creates contradictions at the secondary level, between “rules” and “tools”, as the hospital’s established routines and tools for data handling no longer are in line with the regulation. Such tension drives innovation and change, as new solutions and methods must be developed to resolve this unwanted situation.

The factors of the activity system are transferable to the institutionalization process initiated by the teacher champion, with championship as a tool within the school context, which will be presented in section 2.5. The first three factors can be explained in the following way: as a participant a human use tools to reach their objects. The context of the activity is represented by rules, community, and division of labor. The rules may be regulations, established plans or laws. Community represents all the people who share the same object, while the division of labor entails the object-oriented activities divided between the members of the community (Postholm, 2010). Hence, these three factors comprise the limitations and premises in which the activity unfolds (Postholm et al., 2004).

### 2.4.3. The modified activity system

As explained, the activity system is used to describe and analyze human activities. While the system might present a good visualization of activities on an organizational level, the different

goal-oriented activities on an individual level might not be highlighted in the original system. Postholm et al. (2004) therefore suggest a modified version, including "goal" and "result" as shown in figure 3 beneath. The modified version creates room for goal-oriented actions en route to the overall goal or object, as well as showing concrete products from the accomplished action as a result. The outcome is in the modified version understood to be a process that is durable and a never-ending activity (Postholm et al., 2004), such as a continuous development process, or learning cycle.

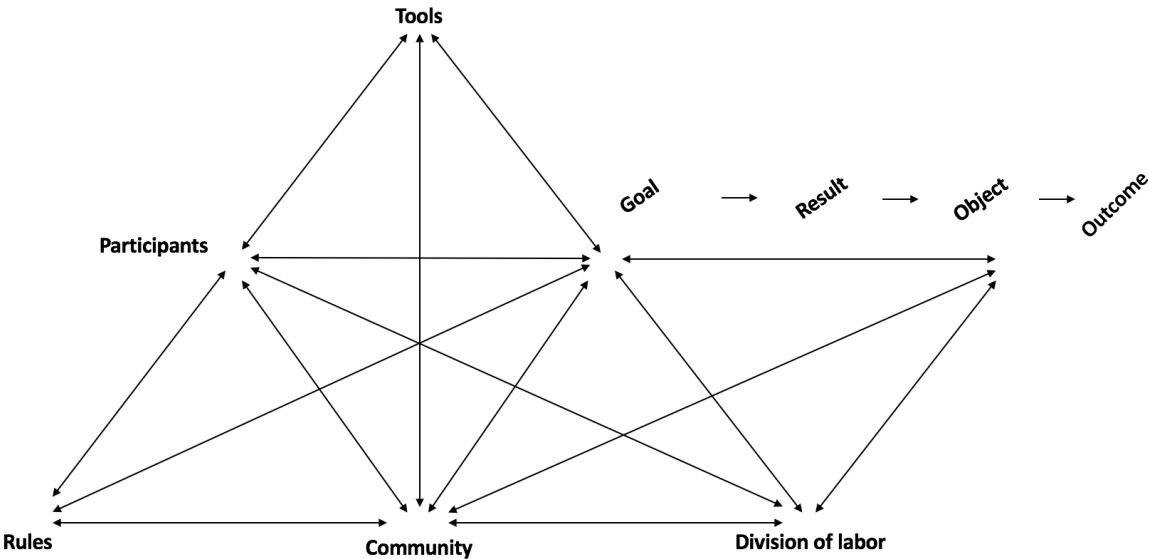


Figure 3: The modified activity system as presented by Postholm et al. (2004).

## 2.5. Implications for theory building

The following section presents the activity system adjusted to a framework suitable for the research in the current master thesis. A modified version of the activity system is used to explain and analyze the different factors in the institutionalization process of educational technology through championship, and how the elements affect each other.

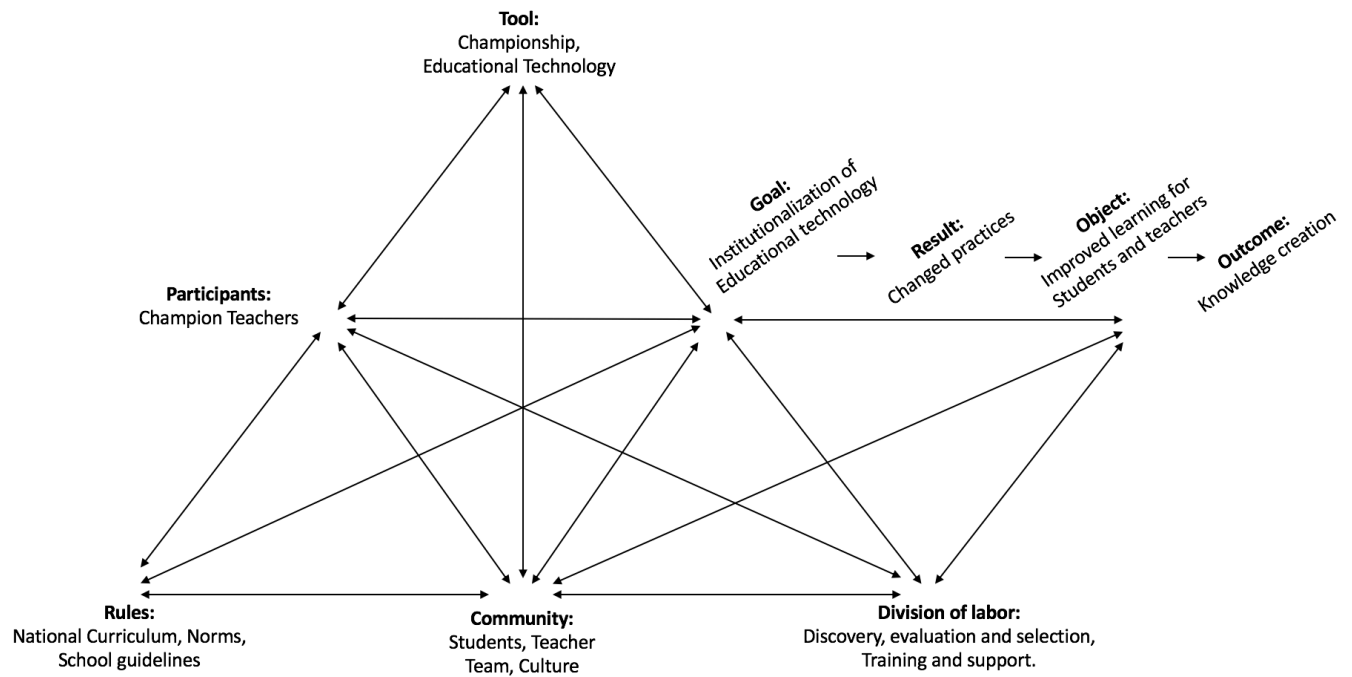


Figure 4: The modified activity system with the relevant elements for this thesis.

In the current research, the teacher champion is placed as the participant with the goal being to institutionalize the educational technology. The tools to achieve this (besides the actual technology) is championship as these activities are seen as crucial for successful integration by prior research (Jenssen and Jørgensen, 2004, Coakes and Smith, 2007, Buono and Subbiah, 2014, Westover, 2010). The context of the activity is shaped of the national curriculum and school guidelines (rules), the students, teacher team, and culture (community), and the roles of the teachers (the division of labor). Collegial interactions have been proven to affect the integration of new innovations (Lowther et al., 2008), which hence makes the relationships between both the teacher champion and his or her co-workers, and the community in general, of great interest. The factors of community, rules, and division of labor may also consist of relevant information regarding barriers such as the lack of time, access to needed technology and training offered (Kopcha, 2012). This is of interest to include and investigate to understand the environment the teacher champion performs his or her championship within. The goal for the champion as the participant is to achieve institutionalization of the technology, with the desired result of changed teaching practices from the champion's co-workers. The overall object is further to improve learning for both students and teachers, hence placing knowledge creation as the outcome.

## **2.6. Limitations of the framework**

The third generation of the activity theory describes the combination of two or more interacting activity systems (Engeström, 2001), as activities are not isolated units but rather nodes in crossing hierarchies and networks that influence each other (Kuutti, 1996). Thus, the second generation of the activity theory with a single activity system, as presented above, can be criticized for delimiting the studied activity from a realistic, holistic context. Still, the researcher argues that such a broad reach for a master thesis with a limited time scope would harm the depth of the research.

Activity theory's strength is its holistic view (Mursu et al., 2007), which may make the shortcoming of depth within specific factors to its most apparent weakness. Unlike the theory of resource-based view (Alvarez and Busenitz, 2001), activity theory does not go in depth of what resources must be present to secure successful integration. Effectuation theory is an example of a framework that better describe how thoughts really become actions (Sarasvathy, 2001) than the activity theory does. Another example is while agency theory investigates challenges between two or more parts in transactions (Eisenhardt, 1989), activity theory acknowledges the mutual affecting relationship between the object and his or her community without a specific focus. One can criticize activity theory for not including all factors that might be relevant, such as personality traits, characteristics of lifestyle and socioeconomic background of the participants. This might mean that the importance of teachers' personal beliefs may not be investigated thoroughly enough through this framework, something the researcher must be aware of.

### **3. Methodology**

This chapter outlines the selected method of research and the rationale behind it. First, the process of the literature review is presented, and its limitations discussed. Then, the research design is showcased, followed by the selection and presentation of the cases. The conduction of data generation, as well as the structuring and analysis of data, is presented. Lastly, reflections and limitations related to the method are discussed.

#### **3.1. Literature review**

As a foundation for the master thesis, a pre-study in the form of a literature review was conducted the fall of 2018. The objective of the review was to gain a holistic overview of the field of champions' role in technology integration processes in schools. This section will shortly present and explain the research design used to obtain the relevant literature.

The design of the literature review is illustrated in figure 5, which is inspired by, but not equal to, the systematic mapping process by Petersen et al. (2015). The model visualizes the different steps conducted throughout the process, from defining a topic, to actually extracting the data from the relevant papers. Different methods should be used on how to construct a literature review, dependent on the research question being qualitative or quantitative. With a qualitative research question, a literature review needs to show why the question needs to be addressed, and it will be necessary to include the general theme as well as specific findings from prior studies (Denney and Tewksbury, 2013).

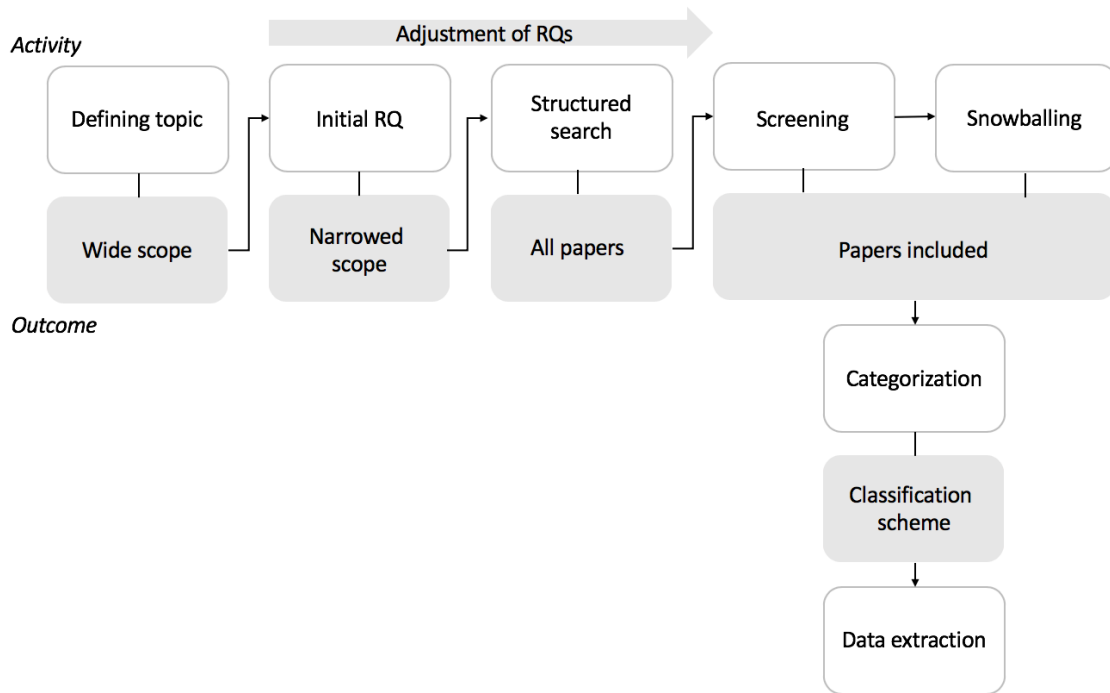


Figure 5: The steps conducted throughout the literature review.

As Denney and Tewksbury (2013) explain it is natural to modify, revise or refocus the initial topic. The research question was refocused several times throughout the process, as new knowledge was acquired by the author. This structure is coinciding with the recommendations of Denney and Tewksbury (2013), including the general theme of champions in change processes, before narrowing it down to more the more specific and narrowed topic of champions in technology integration processes in schools.

The process of the structured search was mainly conducted through the use of the scientific databases Oria and ProQuest. Search strings including relevant keywords related to championship, organizational change and the context of schools were developed (Appendix 1). Based on the theory from Petersen et al. (2015) criteria for inclusion and exclusion was made to select the relevant papers for the literature review. This became especially important when searching with several synonyms for “champion”, resulting in papers within several irrelevant fields, such as champions and championships within sports. The criteria for selection are presented in table 1 below.

	<b>Criteria</b>
<b>Inclusion</b>	Books, scholarly journals that are peer-reviewed and in English or Norwegian, that include relevant research related to the research questions.
<b>Exclusion</b>	Sources that do not meet the criteria for inclusion. Especially where full text is not available, the paper is in an unknown language, or within a different context than organizational change.

TABLE 1: THE CRITERIA FOR INCLUSION OR EXCLUSION IN THE SCREENING PROCESS.

An example of some of the structured searches and the screening process is illustrated in Appendix 2.

On the basis of the articles selected through the screening process presented in the previous subchapter, additional papers were found through the method of snowball sampling. Snowball sampling is conducted by finding new relevant sources through linkage in citations. According to Wohlin (2014), the method is particularly useful for extending a systematic literature review. This both include backward snowball sampling, where the primary source has cited the new source, but also forward sampling, where for example the scientific database suggests new articles that have cited your initial source (Wohlin, 2014). Some examples of papers retrieved through snowball sampling are listed in Appendix 3.

The sources used in the literature review is limited to the databases accessible through The Norwegian University of Science and Technology (NTNU). The research fields of champions in change processes and technology integration processes in schools are widely studied topics. The author has had to set clear criteria for her inclusion and exclusion of papers, and thus cannot be certain that some studies of high relevance have been excluded through the process. Backward and forward snowballing has been used actively to include relevant findings cited in the literature, which was not found through the initial search strings.

## 3.2. Research design

This thesis seeks to explain how teacher championship contributes to the institutionalization of educational technology. As the research question aims to explain “*how*,” rather than “*how many*” a qualitative method is suitable. The method is preferred above quantitative studies when the researcher aims to gather and analyze experiences that are difficult to quantify or measure (Dalland, 2012). Individual interviews and focus groups are the most commonly used

techniques within exploratory research design (Gripsrud et al., 2016), and is therefore considered appropriate for the current thesis.

A case study design, as described by Yin (2014), is chosen for this thesis. The case study method aims to make us able to understand a real-world case assuming that its context will be of importance to include (Yin, 2014). The research has been conducted through a comparative multiple-case study of respondents from two teacher teams within mathematics at different public high-schools in Norway. When the theory is straightforward, and the research question does not demand a superfluous degree of certainty, the researcher can limit his or her cases to two or three (Yin, 2014). Despite the restricted time scope, the researcher has still managed to include a total of 12 respondents from two case schools. A comparative structure compares alternative descriptions or explanations when repeating the same case study two or more times. When analyzing the implementation process of the same educational technology from two different teacher teams, the researcher is able to compare the findings. The case study design helps us understand a complex social phenomenon by focusing on the particular case in its realistic context (Yin, 2014). Yin (2014) refers to a multiple-case design as research that contains more than a single case, and that a typical example is the study of school innovations, such as the use of new educational technology. The method of the case study is suitable as the research question is explanatory: The focus is both on the present situation as well as on historical events and the researcher has no control over actual behavioral happenings (Yin, 2014).

### **3.3. Selection and presentation of cases**

When studying how teacher championship can contribute to the institutionalization of educational technology respondents belonging to different teacher teams at different schools have been selected. The selection of these cases has been done based on replication, not sampling logic. The reason comes from the logic in experimental designs, where the aim is to either uncover that a significant finding from one case can be replicated in more cases, or that one or two conditions considered unimportant can be changed to see if the results could still be duplicated (Yin, 2014). Within the multiple-case study design, cases should be selected so that they either predict similar results (a literal replication) or that they predict contrasting results



but for anticipatable reasons (a theoretical replication) (Yin, 2014). Due to the limited scope of the master thesis, the research is conducted with two cases, making it a literal replication.

To select the appropriate cases to study, some boundaries have been established to guide the selection of cases. According to Yin (2014), the researcher must establish who is within the immediate topic of the case study, and who is outside, belonging to the context. The teacher teams are selected on the basis of the following criteria:

- Belonging to a Norwegian public high school
- Available to the researcher
- Consisting of at least 6 mathematics teachers and 300 students
- Mathematics teachers have some experience with the exemplified educational technology
- The number of teachers using the exemplified educational technology has increased with at least 50% at the school over the last three years

The criteria of belonging to a Norwegian public high school is set to secure similarity in relation to rules and context for the cases, as well as availability to the researcher. The requirement of teacher and student mass is set to obtain a quantity that makes the researcher able to investigate championship towards several peer teachers and student groups. The criteria of experience with the educational technology is deemed necessary to study the implementation, and the increased usage assures the interest for institutionalizing the technology. Based on these criteria, two cases, from here referred to as School A and School B, were selected. The respondents are provided with aliases to secure their anonymity. Names and gender are hidden through randomly chosen respondent aliases which are listed in table 2 below.

Respondent alias	School	Identified as a champion	Interview duration (minutes)	Years as a teacher
Claire	School A	-	51	6
Paul	School A	-	51	10
Catherine	School A	-	51	40
James	School A	-	51	3
Nora	School A	Yes	51 + 21	12
Susan	School A	-	51	40
Robert	School B	-	47	11
Andy	School B	-	47	25
Christian	School B	Yes	47 + 18	18
Lizzie	School B	Yes	47 + 23	36
George	School B	-	47	24
Caroline	School A	Yes	5 + 22	16

TABLE 2: OVERVIEW OF THE RESPONDENTS.

### 3.4. Data acquisition

The primary data have been generated through two focus groups with respondents from each school presented in section 3.3. Further, semi-structured individual interviews have been conducted with respondents identified as champions based on the data generated from the focus groups. The respondents were identified as champions by their colleagues and themselves by confirming championship, such as the promotion, resource acquisition, training and/or support related to the educational technology. The reason for conducting two methods was to use the focus groups to capture both the dynamics within the teacher team, but also between the respondents, in relation to championship activities and their context. The individual semi-structured interviews further served to gather individual experiences and more in-depth reflections on championship from the identified champions, including their personal beliefs and self-efficacy on the subject of institutionalizing the technology (Tjora, 2017). In this way, the researcher has aimed to acquire data that is of relevance for analysis both at an organizational and individual level.

#### 3.4.1. The focus groups

A focus group is, simply explained, a form of group interview where several respondents are gathered to discuss one or several topics (Wilkinson, 2004). According to Tjora (2017), the

spontaneous answers that might evolve in the interpersonal dynamics within the focus groups can reveal interesting information regarding the topic of study. As the current study of championship is interested in the activities and influence between peers, the focus group is a suitable choice to capture the different perceptions from champions and non-champions within the same context, and not least; how they react to each other's opinions and perceptions. The focus groups have been conducted as a joint conversation with five to six participants. An interview guide (Appendix 5), as suggested by Flick (2015) among others, was designed in advance to secure that relevant topics were touched upon. The guide was developed based on the theoretical framework of the activity system, ensuring the inclusion of its contextual factors; rules, community, division of labor, tools, participants and the goal. The researcher used an audio recorder to record the interviews and the respondents were in advance informed of the protection of their data and their rights to withdraw their information from the research at any given time (Appendix 4).

The focus group method can both be effective as data from several respondents are generated at once, but also seem less threatening when respondents are to express their opinions, meanings, and ideas regarding the topic (Krueger, 1994). The location for the focus groups have been at the respondents' workplace, both due to the ease for the respondents, but also to facilitate an environment where the respondents feel safe and comfortable to answer freely.

#### 3.4.2. Semi-structured individual interviews

The purpose of qualitative research interviews is to get the respondents own description of the situation (Dalland, 2012). To ensure more in-depth answers after the completion of the focus groups, semi-structured individual interviews, as discussed by Tjora (2017), was conducted with the identified champions. It has become normal to devote an hour or more to conduct an individual interview, but Tjora (2017) argues that short, focused interviews might be just as good when the discussed topics are not sensitive, nor difficult to address. Providing a good time estimate for the respondents situated in their normal workplace may be an important factor to secure a relaxed conversation and hence quality in the data generated, as exemplified in the study by Iversen (2008) as mentioned by Tjora (2017). Since the researcher has gained some knowledge of the respondents' situation in advance, and because the interview will evolve around the respondents' personal experiences, the focused interview is deemed appropriate for the purpose (Tjora, 2017).

The semi-structured interview is not completely rigid. The researcher has in advance developed an interview guide (Appendix 6) in line with the activity system but also asked follow-up questions to pursue new, relevant information (Flick, 2011). The interviews were conducted by phone to make it easy for both the respondent and researcher to find the time and avoid unnecessary travels.

### **3.5. Data analysis**

To analyze means to divide something into pieces or elements (Kvale and Brinkmann, 2015), and the purpose of qualitative analysis is to understand, interpret and theorize from the collected data (Flick, 2011). Hence, The purpose of the data analysis is to connect the generated data to the current research question and tell us what the interviews have to tell us that is of relevance (Dalland, 2012).

Before analyzing the data, the oral interviews had to be transformed into text through transcription (Kvale and Brinkmann, 2015). The interviews comprised of words filling approximately 43 pages. Further, the data has been analyzed through content analysis, where the factors from the activity system have been used to sort the findings. The context analysis is a classical way of analyzing text and is an empirical method for the transparent disclosure of significant and formal functions in messages, in a systematic and inter-subjective manner (Flick, 2011). This method has been used to sort the data into categories based on the activity system and to select the material most relevant for answering the research question (Flick, 2011).

### **3.6. Methodological Reflections**

Due to the limited time frame (January 2019 to June 2019) only two cases were examined. Hence, the thesis can be criticized for its limited number of respondents. Still, Dalland (2012) explains that the qualitative interview aims to go in depth, thus cannot the number of respondents be too big. Also, follow-up interviews were conducted with the respondents identified as teacher champions by their peers to secure this depth.

In addition, it is important to mention that several schools declined the request to participate in the research. Even though they all apologized and reasoned their refusals due to time constraints, one must not deny that the participating schools may be the exception and above average interested in the theme of technology integration, and thus do not reflect the average school. Hence, the findings of this thesis cannot be generalized based on this research alone.

The literature review revealed that considerable amounts of research have been conducted in the fields of respectively, championship and technology integration and development processes in schools. Thus, the author cannot be certain that she has been able to cover all relevant literature for this thesis. However, through well-developed search strings and snowball-sampling (Wohlin, 2014), a systematic search has been conducted to avoid this pitfall.

The researcher's role must also be addressed. My affiliation with the company providing the educational technology exemplified through this thesis provides me with prior knowledge of the topic of study. It is important that the researcher is conscious of her pre-understandings to ensure objectivity (Dalland, 2012). However, being completely unconnected with the research also has its pitfalls, as it may not assure objectivity, but rather just distance (Patton, 1980). Still, my role may have affected the respondents' answers due to some of the respondents' awareness of this. To avoid any uncertainty the respondents was informed of my role as a researcher, that there were no right or wrong answers, that evaluation of them was not the purpose of the study, and that my intention and wish was to learn about how they work with technology implementation, as suggested by Dalland (2012).

### 3.6.1. Validity and Reliability

When evaluating empirical studies, it is necessary to assess whether the methods used are reliable and whether the results obtained to meet the requirements for validity (Flick, 2011). The terms validity, reliability, and generalizability can differ in meaning within different research traditions and people can, therefore, use different criteria when evaluating a study (Easterby-Smith et al., 2012). In a case study, Yin (2014) describes reliability as “the consistency and repeatability of the research procedures”, which refers to how reliable the results are. The reliability is interrelated with the credibility of the results (Dalland, 2012), and is hence connected to the credibility of the respondents. Due to the respondents' employment and experience in their positions as mathematics teachers, the researcher considers the reliability to be fairly solid.

Validity is “the extent to which measures and research findings provide an accurate representation of the things they are supposed to be describing” (Easterby-Smith et al., 2012). Internal validity refers to the validity of the research design, where the focus is on the research results (Flick, 2011). The choices of methods have been carefully considered to provide answers to the research question. The interview guides have been followed to ensure the quality of the data collected. The interview guide was developed supported by knowledge from the literature review and in accordance with guidelines established within the methodology. The researcher considers the questions in the interview guide to be appropriate, based on the overall similarity in understanding by the respondents, and because they gave answers to what the researcher wanted to examine. Based on this, the researcher considers the validity to be good.

External validity is about the extent to which the results of a study can be transferred to similar situations (Grønmo, 2004). External validity is thus a matter of generalization (Gripsrud et al., 2016). If the results of a study are considered to be reasonably reliable and have satisfactory internal validity, then often the question follows whether the results can be generalized. Generalization concerns with whether the results are primarily of local interest, or if they can be transferred to other interviewees, contexts or situations (Flick, 2011, Kvale and Brinkmann, 2015). It can therefore be conflicting that it is often precisely the connection to a specific context that provides value to qualitative research (Flick, 2011). The findings of this thesis cannot be generalized based on this research alone, but they can be of interest to similar organizations and can contribute to the diversity of knowledge.

## 4. Findings, discussion, and analysis

The following sections present, analyses and discuss findings from the generated data and is sorted in sub-sections based on the activity system as presented by Engeström et al. (1999). The framework highlights tensions and contradictions between the different elements, which will further be discussed along the way. Each respondent is referred to in accordance with their alias, as presented above in table 2. The discussion and analysis aim to reveal answers to the thesis' research question:

**RQ:** *How does teacher championship contribute to the institutionalization of educational technology?*

### 4.1. The teacher as the participant

The presence of an apparent champion seems to vary between the studied cases, or at least that the role is filled in quite different ways. To establish an overview of the identified teacher champions, a presentation of them is given in section 4.1.1 and 4.1.2. These findings are further discussed in section 4.1.3.

#### 4.1.1. Champions at School A

At School A, Nora and Caroline are identified as champions by their peers. They are frequently referred to by their colleagues when asked about championship activities. Nora is immediately described as the go-to-person when her colleagues need advice. Even though the respondents also state that they can ask each other, Nora is the one who stands out as a champion, more concerned with the implementation of the educational technology than the rest (Howell and Higgins, 1990b). This is visible through her actions to constantly and eagerly support her peers. Her knowledge of and experience with the technology, combined with her ability to provide on-going, situated support makes her an important contribution to the institutionalization process according to prior studies (Glazer et al., 2009). Her motivation, according to herself, lies in the ability to make a positive change in the school system, so that every student will benefit from their education. She has also immersed herself in the theme of students with

extraordinary learning abilities through her own education. Her experience with talented students who do not fit the system, and thus have a potential risk of dropping out, is of great importance to her. According to Howell and Higgins (1990a), champions are often driven by doing good for others and their organization. Nora explains that she takes on a champion role: *I really think it's okay that people ask me. And I want people to be able to do that, so I rather have to fight the management about that resource.* Nora is, unlike her non-champion peers, willing to obtain resources and fight for the management's approval (Roure, 2001). Previously, a close collaboration with Caroline sparked the implementation of the exemplified educational technology. As Nora puts it: *"Quite a lot happened when I and [Caroline] was placed in the same classroom together"*.

*(...) and you have been working hard to secure that things get used?*

- James, School A

*Yes, I do of course want to achieve things.*

- Nora, School A

In addition, Caroline is also frequently mentioned by the respondents at School A when asked about preformed championship such as the promotion, training, and support of the educational technology. She possesses the role as a department manager at the school but has also filled the role as a mathematics teacher within the studied teacher team until last year. Together with a former colleague, she introduced the flipped classroom methodology and the educational technology to the mathematics teachers, working as early idea adaptors (Maidique, 1980). She describes her prior colleague as *"very eager"* and explains that they collaborated well and ran the implementation together. Caroline strongly believes that the use of the educational technology leads to better resource exploitation, and she is motivated by creating the best possible outcome for the students, as prior research suggests about champion motivation (Howell and Higgins, 1990a). Previously, Caroline has held several courses and local training with the educational technology for several of the teachers at School A, even though this is a task outside her work description, which is described as typical champion behavior (Markham, 1998).



#### 4.1.2. Champions at School B

At School B, Christian and Lizzie are referred to as inventors by their peers, though there is also an equal focus on the innovativeness of the teacher team as a whole. One of the teachers reflects in the following way: *Everyone contributes (...) we have a lot of common meetings (...), and the fact that we work a lot together, makes us go further (...) We are good in different areas, and we also think that everything is fun, so then we try, again and again* (Andy, School B). The focus on the teachers' different qualities and their culture of collaboration is highly discussed within the teacher team at School B, comparable to the literature on CoPs (Kopcha, 2010). An example is their regular meetings, where they *discuss individual challenges and solve them together* (Robert, School B). Such practice is completely in line with the widely accepted definition from Wenger et al. (2002) stating that CoPs are *groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis*. Through collaboration put into a system, the teachers at School B solve challenges together on a regular basis. Looking at the activity system, the resolving of tensions is crucial development work (Engeström, 2014). Hence, the collective reflection and problem-solving may actually be the first step towards collective innovation, keeping in mind that new solutions need to be implemented as well (Glynn, 1996).

Even though the respondents describe the whole teacher team as innovative, Christian is one out of two that are given additional referrals in relation to the championship of the educational technology by his peers. He holds the role as the subject contact in the group and was together with Lizzie, the first to use the exemplified educational technology at School B, hence being the early idea adaptors (Maidique, 1980). His experience with students "falling off the wagon" motivated him to try new methods and solutions. He familiarizes himself with the champion-like description given by his colleagues, explaining that he and Lizzie have been initiators and promoters for the educational technology at their school, coinciding with the findings of Roure (2001).

*(...) you have to talk positively about things. Of course, it is time-consuming, so you have to work on it and be patient.*

- Christian, School B

Lizzie has worked alongside Christian for several years. Even though she was initially skeptical of the flipped classroom methodology, she is now seen as a promoter by her peers (Schon, 1963). She has also held the role as the subject contact of the teacher team previously and describe herself and Christian as similar in their desire for continuous professional development. Self-actualization is through prior research found to be one of the most common factors for champion motivation (Renken, 2019). Lizzie also states that her motivation is attached to her previous experiences with trying to help struggling students. This finding is in line with prior findings, stating that champions were motivated by implementing an innovation because “it was the right thing to do” for their organization (Howell and Higgins, 1990a).

#### 4.1.3. Champions in plural

The majority of prior literature defines the champion as an individual, conducting his or her championship alone (Jenssen and Jørgensen, 2004). Still, the current study indicates that championship is conducted through collaboration between internal enthusiasts. Previous research has studied the individual champion and such matters as their abilities (Buono and Subbiah, 2014), their learning needs (Hartley et al., 1997), and their personality characteristics (Howell and Higgins, 1990b). However, less focus has been put on collaboration between champions to create and achieve collaborative championship (Jenssen and Jørgensen, 2004). Prior research has shown that teachers who were able to work collaboratively with other teachers of the same subject, and who was in addition given the time to explore ICT and the possibilities for their subjects, had a cost-effective way of enabling ICT in subject teaching (Haydn and Barton, 2008). Even though prior studies also highlight the importance of the champion’s ability to collaborate with their peers and key stakeholders (Buono and Subbiah, 2014, Jenssen and Jørgensen, 2004), the existence of peer champions and their ability to achieve collaborative championship seem to be a rare exception in the literature. Hauschildt and Kirchmann (2001) have presented how complex innovations need several different types of champions to achieve successful implementation. Hence, the process of implementing educational technology may benefit from collaborative championship since the innovation is complex, often consisting of both software, hardware and pedagogical methods (Luppicini, 2005). These findings are of importance to further research as well as practitioners, as the rapid pace of change and the emergence of complex innovations is unavoidable, also for the modern school.

## 4.2. Technology and championship as tools

Tools are what the participants use to reach their objects in the activity system (Postholm, 2010). In this thesis, the exemplified educational technology and championship in relation to it, are seen as the tools used by the teacher champions to reach the goal of institutionalization, and further, improved learning. This section will shortly present the exemplified technology, but not discuss it further as it is not the main area of interest for this thesis. Further, the different variations of championship conducted by the respondents to obtain the goal of institutionalization are presented, discussed and analyzed.

### 4.2.1. The exemplified technology

The exemplified educational technology belongs as a tool in the activity system for this thesis, as it is a given mean to obtain the institutionalization. Zhao et al. (2002) describe that complex innovations can be hard to integrate, a statement supported somewhat by findings from the current study. James from School A explains: *But it has been a bit scary (...) It was completely new to me.* Implying that he needed some time to adjust to the new technology and pedagogical methods. The exemplified educational technology is used to transform the pedagogy, the most challenging type to integrate according to Hew and Brush (2007). Respondents from both cases confirm the changed practices they have adopted linked to the use of the technology (Collins and Halverson, 2010), and its inclusion of hardware, software and pedagogical methods as described by Luppini (2005).

### 4.2.2. Variations of championship

Findings from the current study imply that the identified champions of the exemplified educational technology exert their championship in different ways. The teacher champions at School A has provided on-going, situated support, and hence fit the definitions of “the user champion” by Curley and Gremillion (1983), as well as “the technology promoter” by Hauschildt and Kirchmann (2001). These supporting activities are deemed highly important to secure successful implementation by prior research (Glazer et al., 2009, Swan and Dixon, 2006, Lowther et al., 2008). However, the champions from School B do not seem to fit this definition. Rather, the teacher team experience support activities as a collective responsibility shared somewhat equally.

Even so, Christian and Lizzie at School B are nevertheless seen as pioneers by their peers within the teacher team. Still, findings indicate the lack of some prominent champion behavior, such as taking on personal risk to promote their beliefs, which is described as typical championship by Jenssen and Jørgensen (2004). In contrast, Nora at School A states that she has “*fought the management*”, representing a more stereotypical image of championship according to previous literature and definitions (Jenssen and Jørgensen, 2004). Hence, the champions at School B seem to fit the established image of the eager and fighting champion to a lesser extent than the champions at School A. However, Christian and Lizzie have conducted several other activities defined as championship through prior research. One example is showcasing the technology to their peers through their own teaching, a champion-like activity according to Glazer et al. (2005). Such activities tend to encourage peers to adopt the technological innovation themselves (Rogers, 2003).

Also, Christian and Lizzie introduced their colleagues to the educational technology, engaging in what they describe as “*patient promotion*”. They describe how some of their peers tend to sit on the fence, hence requiring a lot of conviction over time. This finding implies that Christian and Lizzie understand the implementation process as more than providing their peers with access to the technology, and rather see it as a social and political action, in line with research on successful championship (Curley and Gremillion, 1983). According to prior research, the promoter role is one of the most proverbial (Hauschildt and Kirchmann, 2001, Jenssen and Jørgensen, 2004, Howell and Higgins, 1990b). In addition, the teacher champions’ use of the technology has been stable and has thus potentially decreased the perceived risk of implementation held by their colleagues (Ertmer, 2005). The visibility of an innovation once integrated may have encouraged their peers as suggested by Rogers (2003). Also, prior studies imply that the promotion over time and stability is the most effective tool champions can use to convince their peers (Beatty and Gordon, 1991).

Findings from both cases show the continuous referral to the collaborative championship from one identified champion to the other. Experiencing support through change within the workplace have been found to be crucial (Zhao et al., 2002, Mueller et al., 2008, Ertmer, 2005, Becker, 2000), thus it is understandable that also teacher champions benefit from the encouragement from a champion peer. Once introducing an innovation, acting as an early idea adaptor (Maidique, 1980) or a technology promoter (Hauschildt and Kirchmann, 2001), the

teacher champions create contradictions in the established activity system by changing an element (Engeström, 2014). An example is the skepticism (which will further be discussed in section 4.3.2) that is likely to arise among change-averse members of their community, possibly creating tensions between both the community and the tool, the community and the teacher champions, and within the community. Thus, teacher champions can experience considerable resistance. Current findings imply that this challenge can be handled through the formation of a powerful coalition of collaborative championship, in line with prior research on creating a climate for change (Kotter, 1995). In fact, also prior research on CoPs highlights the importance of an internal support team as the core of a knowledge initiative, which facilitates the development and learning for the whole group (Wenger et al., 2002). As teacher champions find and support each other, the driving force for change may be stronger.

### 4.3. Rules

In the activity system, rules are related to the regulations, laws or plans the participants have to follow within the context of the technology implementation (Postholm, 2010). This section presents the found rules given and perceived by the respondents and further discuss the tensions attached to this element, as well as how championship relate to these given guidelines.

#### 4.3.1. Economy

One of the first mentioned barriers of implementation was in both cases economy and the fact that the respondents themselves did not have access to the financial resources at their workplace. Nora at School A stated this clearly by saying: *I have to go to my boss and ask if I want (to buy) something*. This statement was complemented by another finding from School B, adding on to the teachers' view of their school's economic situation: *After all, we are dependent on the management saying it is okay that we buy the licenses. It costs a lot for the school (...) it's not that much money in the bank, I think. So, they must have faith in it, so we had to sell it in* (Andy, School B). The teachers express that they perceive their school's financial scope as limited, and as a hinder to get access to and implement new educational technology. Limited availability of technology has been found to be a barrier for implementation (Mumtaz, 2000, Swan and Dixon, 2006, Lim et al., 2003). However, prior studies have also stated the irrelevance of this factor, showing that high access did not necessarily lead to high usage (Cuban

et al., 2001). Still, it is needless to argue that the educational technology cannot be implemented if it is not available to the teachers at their school.

*It is the economy who create the boundaries, besides that, we can choose quite freely.*

– Nora, School A

The current study implies that the respondents' awareness of resource availability is present, especially within the field of financial constraints. This finding highlights a contradiction at the secondary level (Engeström, 2014), between the elements of rules and tools, as the economic limitations may restrict the availability of tools needed to achieve the goal of institutionalization of the educational technology and the overall object of improved learning for both students and teachers. Hence, these findings highlight the importance of teacher championship, as champions have the ability to perform resource acquisition processes inside their organizations (Jenssen and Jørgensen, 2004, Buono and Subbiah, 2014), thus addressing and possibly resolving this tension. Nora, one of the champions at School A, exemplified this clearly by saying that she did not mind "*fighting the management*" when it was for something she believed in, such as acquiring the resources for the procurement of the exemplified educational technology. At School B, Andy, one of the non-champions, stated that "*they had to sell it in*". In this case, the championship activity of convincing the management is seen as a collective task. Regardless of the individual or collective method, the championship conducted contributes to innovation by solving the challenge of lack of technology availability within the activity system, so the goal of institutionalization of the educational technology can be reached (Engeström et al., 1999).

The perceived economic barrier is discussed both by non-champions and the identified champions. Literature on CoPs describes the boundary broker; a member who takes on the role as a broker, create necessary connections, and who are essential to the development of the CoP. Also, good brokers are often undervalued (Wenger et al., 2002), comparable to the situation of champions with no formal role or incentives. These findings highlight the prior discussed dilemma of the effectiveness of the champion as an informal leader, not in control of the information or resources that are possibly necessary to perform successful leadership (Buono and Subbiah, 2014). Even though the teacher champions have the abilities to lead change for improved learning at their school, they are still concerned and have to fight for the resources to

do so. The usefulness of collaborative championship is present in such situations, as the one who fills the role of “the user champion”, might not fit the role as “the broker” (Westover, 2010), thus perceiving economic constraints as a higher barrier than her or his champion peer. Hence, collaborating champions have the ability to complement each other in the resource acquisition process.

#### 4.3.2. Pedagogical beliefs

Another expected finding was the teachers’ awareness of the educational technology’s fit with the national curriculum. This topic was quickly introduced, almost as a matter of course by both groups, and not further emphasized. However, each schools’ adjustment on how to undergo the learning objectives, and thus the respondents’ shared pedagogical beliefs, is of importance. Teachers’ pedagogical beliefs can be defined as their suppositions, commitments, and ideologies related to how they teach. These beliefs include their view of themselves, pedagogical methods, their students, the educational technology, technology in general, their own abilities, etc., and is thus a complex matter to address (Ertmer, 2005).

Nora from School A explains her view of the teacher team’s shared beliefs in the following way: *It must, after all, teach students the way we want them to be taught. We do not necessarily follow a textbook, but we think more about "what do we want to teach the students? And how do we want to teach it?" Then we find a teaching aid that works the way we want to do it.* Statements like this imply that shared pedagogical beliefs create norms affecting the choice of educational technology at School A. Robert from School B complements this finding when he states: *We have a number of norms here that we follow (...) It is a goal for us at the high school level that one shall use Campus or flipped classroom teaching.*

The importance of alignment between teachers’ pedagogical beliefs’ and the educational technology is greatly emphasized through previous research (Ertmer, 2005, Clavert et al., 2015, Zhao et al., 2002). It is impossible to conclude to what extent the respondents are aligned in their pedagogical beliefs, but the existence of some common expectations and attitudes related to how to teach seems present. This finding indicates no apparent tension between the elements of community and tools in the activity system. One respondent puts it into words in the following way: *(...) it is because we have great belief in it as well, just the way we are doing it*

now, combined with the flipped classroom at home (George, School B). A respondent at School A contributes to this finding by addressing the matter in the following way: (...) *we have become a bit found of the flipped classroom that [the exemplified educational technology] has* (Susan, School A). Hence, a teacher with no faith in the pedagogical method of the flipped classroom would be reluctant to use educational technology which facilitates a contradictory pedagogical belief to one's own.

Still, the current study indicates that tensions have previously been present, and that pedagogical beliefs can be challenged and changed through championship. Lizzie from School B was initially skeptical of the flipped classroom methodology based on her daughter's previous experiences. She explained it by saying: *I was very skeptical towards the flipped classroom a long time ago because my daughter had been exposed to it*. However, this tension had disappeared, and the situation changed considerably, as the same respondent has been championing the educational technology to her colleagues, explaining that her beliefs about the pedagogical method and technology have changed completely. Prior studies show that teachers are more likely to change their beliefs about the value of technology if their peers challenged them to think differently (Ertmer, 2005). In the same way, it seems like teachers' beliefs about pedagogical methods have the potential to be changed through the influence of peers, as showcased in the situation from School B. This is in line with the theory of the champion in the role as a "power promoter", tackling unwillingness and psychological barriers among his or her peers (Hauschildt and Kirchmann, 2001). Also, this highlights how championship can resolve crucial tensions within the activity system they are a part of.

*I get a bad taste in my mouth whenever I hear of something new and fancy.*

– Susan, School A

Findings from School A are not contradictory, as one of the teachers make it clear that she was not immediately positive about the educational technology. This created tension at the secondary level between the community and the tools, but also at the tertiary level as the respondent had to use new technology to achieve the joint objective (Engeström, 2014). She explains: *I get a bad taste in my mouth whenever I hear of something new and fancy. I've been involved in so many things that I don't think have worked at all, so I am unfortunately a little...*



*My husband would say pessimist, but I think it is correct to call me a realist* (Susan, School A). The respondent's view of the new technology's usefulness has been highlighted as an important component of motivation by prior studies (Mueller et al., 2008). Still, her beliefs about the educational technology have changed through the promotion from her champion colleagues. Findings also imply that change has not been forced upon Susan, but that her champion peers rather have promoted the educational technology and pedagogical method in a slow and steady manner. This is completely in line with findings from Barton and Haydn (2006) stating that teachers who are reluctant to new technology should be exposed to small amounts and experience mastery before moving further.

The findings above somewhat challenge the view that contradictory pedagogical beliefs between the educational technology and the teacher are almost impossible to overcome (Ertmer, 2005). Hence, this also highlights the importance of championship to resolve contradictions and tension, as both Susan from School A and Lizzie from School B changed their attitudes considerable on the basis of influence from their peers. The positive effect of peer influence on technology integration is found in several prior studies (Westover, 2010, Curley and Gremillion, 1983) and is a powerful tool to overcome major resistance to change.

#### 4.3.3. Management expectations

Rules were also connected to expectations and demands from the management for some of the respondents. Zhao et al. (2002) have highlighted the importance of an administrative staff that is supportive and makes information available throughout an organization to secure successful implementation. The respondents from both cases reveal the presence of a supportive administration: *We have support from the management, "try the things you want"* (Robert, School B). And also, at School A: *We usually pick the things we want* (Nora, School A).

The study indicates that respondents from both schools feel that they have major influence on the choice of teaching materials in their subject. One respondent goes as far as describing the teacher team as "*supreme*" in the process, while her colleagues approvingly burst out in laughter by her statement. At the other school, one respondent states that they "*have to be really lost*" before the management interferes with their choices. The respondents describe high levels of autonomy and co-determination, which has been shown to create a feeling of organizational commitment that is crucial to secure innovation (Rogers, 2003). Their culture (which is discussed more thoroughly in section 4.4.2) includes room for trial and error which the

respondents emphasize. A teacher from School A describes it like this: *We have quite a lot of freedom I feel, and it is good that there is a culture where we are allowed to try and fail. You shall rather try often and fail several times, then you have at least tried* (James, School A). Mumford et al. (2002) suggest providing champions with sufficient autonomy to create and explore new ideas. However, Howell and Boies (2004) argue the difficulty of this, as champions are not formally appointed to their roles. Hence, providing autonomy for the teacher team as a whole might positively influence champion emergence and collaborative championship.

*We are given high levels of trust from the management.*

- Robert, School B

Hulpia et al. (2012) found that teachers experience a higher degree of organizational commitment if at least one member of the management provides their support. In addition, being in the belief that your voice is being heard in the school's decision making also increase the feeling of commitment (Hulpia et al., 2012). Prior research has shown that teachers' contribution to development processes are crucial to secure a sense of ownership in the process (Knowles et al., 2005), which supports the current findings. Studies show that champions are defined by a strong willingness to participate (Jenssen and Jørgensen, 2004, Howell and Higgins, 1990b), making the opportunity to do so of great importance. Still, one can question if championship emerges on the basis of a supportive administration, or if a trustful administration will adjust on the basis of championship? Pointing at the first of the two, prior studies show that organic organizations, that do provide freedom to operate for their employees, are more likely to experience champion emergence than mechanistic ones (Howell and Higgins, 1990b). Still, it is impossible to conclude, as limited amounts of research have been conducted on the field of organizational factors and champion emergence (Jenssen and Jørgensen, 2004).

#### **4.4. Community**

The community, according to Gall and Alabdullaziz (2015), consist of the social relationships that influence individual activity. In this thesis, the goal is defined as the institutionalization of the exemplified educational technology, where the further object overall is improved learning for both students and teachers. Therefore, both students, the teacher team and the school culture

are further considered and discussed. Due to the limited scope of this thesis, other relevant groups like parents, school owners and government have consciously been omitted.

#### 4.4.1. The students

The student group was considered both crucial and insignificant to influence the choice of implementation of the given technology by the respondents. A respondent from School A stated: *I would have thought that all classes can use [the exemplified educational technology] ...* (Claire, School A), while no one seemed to disagree, and the conversation continued. Hence, teachers at School A did not feel that their students affected the choice of the exemplified educational technology. However, respondents from School B had a different view of the matter: *It was actually a bit of a conscious choice at the school when we picked it. It fell on [textbook related to the exemplified educational technology] because it suited our student group in a better way, even though it is a bit boring, and, what is it called? Deductive built up* (Lizzie, School B). The teachers at School B had actively searched for what they believed was the right pedagogical solution for their student groups' specific needs.

The respondents at School B thus express some of their shared pedagogical beliefs, including the wish for deductively structured learning aids for their students. Their answers are in line with prior studies stating that the technology's alignment with teachers pedagogical beliefs is a significant barrier to tackle (Ertmer, 2005). However, the respondents' pedagogical beliefs seemed to have evolved, creating tension at the secondary level between the elements of community and tools over time. According to Engeström et al. (1999), the transformation and development of the different elements in an activity system are unavoidable and will lead to contradictions and possibly innovation if acknowledged and resolved. In recent times, the teachers have experienced an increasing misalignment between their perception of the educational technology and their pedagogical beliefs. One respondent states his concern by saying: *[We are] a bit worried about the further direction of [the exemplified educational technology], detaching itself from textbooks. [The students] have enough screen time as it is* (Robert, School B). While the respondents from School A believe that all student groups can take advantage of the educational technology, respondents from School B are concerned that their student group carries different needs that are contradictory with the solution. Thus, findings from the current study indicate the challenge of generalization related to the student groups' impact on the choice of educational technology as the results vary greatly between the cases, and also evolve through time, in line with activity theory (Engeström et al., 1999).

#### 4.4.2. The teacher teams

##### 4.4.2.1. *Culture of innovativeness*

Respondents from both schools express to be a part of a culture focused on innovativeness and learning. Norms can be defined as the type of behavior that is expected within a given culture (Jacobsen, 2012). Several of the respondents referred to the “does and don’ts” within their workplace, which hence affect how they perform their work. An example is the following statement from School A: *You hear the word “no” very, very rarely. It’s always: “Oh, cool idea! How can we make this work?” I feel we are concerned with solutions and how we will get one of the ideas we have to work in a classroom rather than saying: “Oh no, this sounds difficult. That sounds like a lot of work.” (...) I don’t think I’ve ever experienced that* (James, School A). The respondents describe a culture where the norm is that one should be open-minded to new ideas and solutions. These findings support the implementation process, as the lack of technology positive teachers have been found to be a significant barrier for classroom technology integration (Rosen and Weil, 1995). Findings from School B were comparable. One of the respondents states: *We are quite outward directed, innovative. We are constantly looking for new impulses* (Lizzie, School B). The majority of the respondents seem to have less acceptance for skepticism towards new solutions, as the norm is to be positive towards new ideas and development.

*I feel [School A] is very... Wants to be a step ahead.*

- Claire, School A

Prior research shows that a positive culture for change and development is needed to achieve successful implementation (Carney, 1998) and that reactions and acceptance from peers are of great importance (Zhao and Frank, 2003). On the other hand, and as described in section 4.3.2., not all of the respondents were initially positive to the implementation of new solutions and technology. This highlights a tension on the primary level in the activity system, within the factor of community, and at the secondary level, between the teacher champions as participants and the community (Engeström, 2014). A major challenge for champions is to convince those who are skeptical and dismissive towards an innovation (Jenssen and Jørgensen, 2004). Zhao and Frank (2003) explain that reluctant teachers can experience social pressure that rather works against the implementation of the technology than in favor of it. In these situations,

championship may be the solution to obtain change, as the champion is familiar with the current situation and pressure that the reluctant adopter is under (Westover, 2010). This knowledge makes the champion able to limit the amount of change and information to smaller, manageable portions to avoid major resistance (Barton and Haydn, 2006), as current findings have implied. Even though such leadership skills are commonly defined traits among champions (Jenssen and Jørgensen, 2004), one must not forget that while some champions take on the role as the informal leader and “power promoter”, other champions find the mentor and “technology promoter” role more suitable (Hauschildt and Kirchmann, 2001). Also, the resource and information constraints the champion as an informal leader will experience (Jenssen and Jørgensen, 2004) may create barriers for successful championship aimed at tackling resistance towards change.

The respondents, especially at School A, is encouraged, by both the management and each other, to work in the method of trial and error. According to Ertmer (2005), a supportive and promoting culture of technology integration and usage is the kind that encourages risk-taking, provides continuous support, and allows the teachers to immerse themselves in technology. Both teacher teams felt the encouragement and freedom to try new technology in their teaching, which is a crucial factor for technology integration success (Zhao et al., 2002, Vanblaere and Devos, 2016). Personality traits as innovativeness and risk-taking are usually found in champions (Howell and Higgins, 1990b). Hence, the culture described seems suitable to facilitate championship. On the other hand, if management expectations include cues and guidelines in the form of performance management for individual behavior, this might create tension and decrease champion emergence (Howell and Higgins, 1990b).

#### 4.4.2.2. *Culture of collaboration*

Respondents from both cases also highly emphasize a culture of collaboration at their schools, where they point at systematic efforts to nurture and retain such a culture. Robert at School B puts it into words in the following way: *It is to constantly help each other out. Work in such a way that it is natural. That you work in teams, not just that you have some collaborative tasks (...)Working in teams for us means that we are planning everything together. We plan the classes together, we give each other support in things we don't manage, we are open with each other about things we need help with. So, that is the way we retain that culture.*

At School A the focus on collaboration in their daily work tasks is also present. They work in something called a two-teacher system, which means that two teachers share the responsibility for a student group, including the collaboration in planning, teaching, and evaluation. The collaboration throughout most activities seems to reduce the teachers' perceived risk of failure when trying something new. As one of the respondents explain: *It makes me feel safe (...) Because of the two-teacher system, we have a lot of time to discuss and collaborate* (James, School A). Several studies have found that teachers carry a lot of conscious and unconscious attitudes about themselves (Kopcha, 2012, Hennessy et al., 2005, Glazer et al., 2009, Swan and Dixon, 2006) which can make them doubt their own abilities to put new ideas to life, such as the use of new educational technology. This creates a contradiction at the tertiary level, where the participants are exposed to advanced methods in the form of technology to reach the goal of institutionalization (Engeström, 2014). In line with findings from prior research, the two-teacher system creates a sense of safety through personalized support, also within the actual classroom (Becker, 2000, Ertmer, 2005), thus facing this tension in the activity system. This type of close collaboration has been the arena for collaborative championship at both schools. The teachers who are defined as champions have co-operated closely and seem to have inspired each other. This is not unlikely, as prior research has found that teachers who worked collaboratively with other teachers and was in addition given the time to explore technology, also had a cost-effective way of enabling it in their teaching (Haydn and Barton, 2008). Aligned with prior findings, the current study indicates that several champions and their championship has had a positive impact on the implementation process (Hauschildt and Kirchmann, 2001).

*One does not stand alone when trying something new.*

- Nora, School A

Current findings support prior research related to the importance of collaboration and CoPs in technology integration processes in schools (Kopcha, 2010, Clavert et al., 2015, Glazer et al., 2009, Carney, 1998, Larson and Meyer, 2006, Glazer et al., 2005). In line with the findings of Fullan (2009), collaboration, idea sharing, and risk-taking are incorporated ways to work at both schools. The similarities between CoP activities and championship are numerous. As an example, definitions of CoP activities include sharing of best practice experiences (Younie, 2006), while championship activities include showcasing the use of innovations (Glazer et al., 2005). However, a clear distinction in the literature is the focus on collective learning through

CoPs (Wenger et al., 2002), while literature on championship tends to focus on the activities performed by an individual (Jenssen and Jørgensen, 2004). One can argue that the individuals engaging in collaborative championship might participate within their own CoP, but that they also function as a subgroup of a larger CoP, with the aim to promote, support and influence their non-champion peers. Also, collaborating champions seem to learn from each other. As Nora stated, “*a lot happened*” when she and Caroline (who is also identified as a teacher champion) worked in the same classroom. Not only did they learn from each other, Nora and Caroline also started promoting and training other teachers in their teacher team.

These findings are in line with the literature of promoter teams by Wenger et al. (2002), stating that a sub-group of the CoP is essential to drive the development of the whole CoP. However, the distinction between the theory of promoter teams and collaborative championship lays in the question of formalization, where champions emerge on their own, while promoter teams are formally chosen (Wenger et al., 2002). Prior studies have shown that too many champions in the same group may create chaos (Rese et al., 2013). Hence, the goal is not to convert every member of the CoP into champions, but perhaps rather create a subgroup of collaborative championship within the CoP. This is exemplified in the findings, where both cases reveal collaborating champions within their respective teacher team.

Another interesting finding was that respondents from both schools referred to an organizational change that had affected their school’s culture of collaboration. School A had been merged with another school in 2016, while respondents from School B mentioned how the management recruited teachers based on similarity in their student view back in 2002. A teacher from School A explains the impact of the merger: *It must have had an impact on the culture of collaboration once you had, that is, there were quite a few new teachers coming at that time. Then you had to meet each other and get to know each other...* (James, School A). The respondents further explain how there was a need for a lot of collaboration to align the new teacher team. Looking at activity theory (Engeström et al., 1999), we can understand how contradictions might have evolved as several elements changed and different activity systems met at the times of organizational change. The recruitment at School B, based on the applicants’ student view, tried to secure similar values within the teacher group, which thus facilitates a shared culture and vision (Jacobsen, 2012). At School B, one of the respondents explains the establishment of the school in the following way: *When the school started, it was not just a new building and the old school that was moved, but it was completely new from here and from*

*there, both teachers and students* (George, School B). Both cases have in common the formation of new teacher teams within the time span of most of the respondents' careers. Findings indicate that the respondents feel a sense of ownership to their culture and workplace, as several of them have played a part in the organizational change. Their sense of commitment to their schools increases when their voices have been heard (Hulpia et al., 2012). Coinciding findings argue that such changes must be done bottom-up through collaborative engagement to change shared practices (Clavert et al., 2015).

## **4.5. Division of labor**

The division of labor entails the object-oriented activities divided between the members of the community (Postholm, 2010). This section is divided into section 4.5.1. about the discovery and evaluation of new educational technology, and in section 4.5.2. about the training and support related to the stable use of it.

### **4.5.1. The discovery and evaluation of learning materials**

Findings from the current study show that a formal responsibility for the discovery and evaluation of educational technology was absent at both schools. At School B, Christian, one of the teacher champions, currently held the role as the subject contact and was therefore seen as the one most likely to possess this responsibility within the group. Still, he made it clear that he would never decide by himself. School A had no one with a formal appointed role, but Nora, one of the teacher champions was unanimously referred to by the group. This was not that surprising, as champions tend to take on the role of informal leaders, especially where a formal responsibility is absent (Jenssen and Jørgensen, 2004).

As mentioned earlier, in section 4.3.3., the respondents report high levels of trust, autonomy, and co-determination within their workplace, factors that are crucial to support the implementation of new learning methods (Vanblaere and Devos, 2016). Combined with the lack of a formal position, this enables all of the teachers to bring new ideas to the table, thus supporting the emergence of an innovative culture. These loose boundaries also facilitate for champion emergence as no guidelines for individual behavior is given and innovativeness is welcomed (Howell and Higgins, 1990b). However, the lack of a formally appointed responsibility might jeopardize the optimization of the discovery and selection of educational



technology, as lack of time for such activities is found present both in the current and previous studies (Kopcha, 2012, Clark, 2006). One of the champions states: *It's something I miss, a bit more delegation so that someone would have had a main responsibility among the teachers. Maybe someone you could get advice from and ask, who actually spent some time and familiarized themselves with things. It is too random as it is now* (Nora, School A). Adding on to this statement, prior studies have highlighted the lack of time for discovery and preparation of educational technology as crucial barriers in the implementation process (Rosen and Weil, 1995).

The lack of technology leadership in the school system has been emphasized through later research (Masullo, 2017, Dexter, 2011, Ng' Ambi and Bozalek, 2013). Technology coordinators are suggested for the evaluation, purchasing and information spreading to teachers (Twomey et al., 2006), similar to the role wished for by Nora at School A. Hence, tensions at the primary level, within the factor of division of labor, is present (Engeström, 2014). Lai et al. (2002) state that technology coordinators play a major role in the implementation of new technology, as they serve as change agents and provide professional development to the teachers. These technology coordinators should at the same time be teachers at their schools and have been a part of the faculty for several years (Masullo, 2017), which make them comparable to the current study on teacher champions. Still, this formalization of the role is in conflict with championship literature (Howell and Higgins, 1990b). Further, Rogers (2003) distinguishes between change agents, such as the formally appointed technology coordinator, and the opinion leaders, such as the champion as an informal leader, stating that the change agent should identify and mobilize opinion leaders to secure the adoption of innovations. This theory calls for both formal and informal leaders of technology integration, showcasing the need for teacher championship in combination with formalized technology leaders in the institutionalization process. Hence, the need for a form of collaboration involving teacher champions is highlighted.

#### 4.5.2. Training and support

A formal responsibility for training and support for educational technology was not present at any of the schools. The perception of this as a challenge, however, varied between the respondents. Respondents at School B saw the strong culture of collaboration as the main solution needed. *We help each other*, explains Robert, while Christian follows up: *Well, that's a bit of that culture. That's how it is, that I can ask*. The teachers seem to be a part of a

functioning CoP (Wenger et al., 2002). On the other side, some respondents at School A felt the need for more delegated resources for training and mentoring, especially Nora, one of the champions, who took on this responsibility on a regular basis.

Prior research has shown that teachers who are mentees integrate technology more often than teachers who do not have the support and guidance from a mentor (Lowther et al., 2008, Swan and Dixon, 2006). The two-teacher system at School A seems to contribute to personalized, situated, on-going support for the teachers, as they express a feeling of security when trying new things collectively. Prior research has shown that long-term changes in teachers' practices and views of the use of technology in the classroom is more likely to be successful through a social infrastructure made of personalized training and support by colleagues within the actual classroom (Ertmer, 2005, Becker, 2000). Also at School B, the close collaboration between the teachers lead to sharing of experience and support. This is coinciding with the findings of Stager (1995), stating that assistance from someone who had managed technology integration and could work alongside the teacher to observe, evaluate and support can affect the integration positively. The stable promotion over time is found to be the most effective tool a champion can use to convince their peers (Beatty and Gordon, 1991), thus working alongside a "technology promoter" gives a higher probability for success than participation at stand-alone courses. These findings support the use of champions in technology integration processes in schools accurately, as the lack of a formal position makes the informal role available for the champion to eagerly claim.

Findings from School A reveal that Nora, one of the identified champions, wished for some delegated resources and incentives. This finding is somewhat contradictory to the theory of champions stating that an appointed responsibility might lead to a reduction of their motivation (Howell and Higgins, 1990b). Also, her wish for formalization is unaligned with prior studies of champion motivation (Renken, 2019). Still, the current and prior studies imply that providing incentives after the champion has been identified and carried out their championship for some time, may be successful. Larson and Meyer (2006) suggest that administrative leaders should provide incentives in the form of extra time or reduction of workload to a strategically chosen champion. We already know that champions take on different roles and carry different abilities (Witte, 1973, Jenssen and Jørgensen, 2004, Hauschildt and Kirchmann, 2001). On that note, it might also be reasonable to suggest that incentives may affect their motivation in different ways.

*It is something I miss. That someone had the main responsibility among the teachers.*

– Nora, School A

Respondents from both schools report a fair amount of time set for collaboration, but the resources allocated for the leadership and management of the implementation seems to be omitted. Not contradictory, previous studies have highlighted the challenges related to the lack of leadership to set the course collectively to achieve successful technology integration (Haydn and Barton, 2008, Swan and Dixon, 2006, Masullo, 2017). Championship quickly becomes visible when the leadership role is not present, as champions tend to take on the role of informal leaders (Jenssen and Jørgensen, 2004, Howell and Higgins, 1990a). Hence, championship is deemed important in such contexts, but maybe such contexts are important to create room for champion emergence as well? There is an inter-relationship between the elements of division of labor and championship as the tool, as the lack of formal responsibility leads to the potential for championship to emerge. An example is Nora at School A, who fill the role at the promotor and mentor of the educational technology, even though she holds no formal responsibility to do so. She expresses her ambivalence by stating that it is important for her to support her colleagues, but that she wishes for a formalization of the role. We cannot know if Nora would have claimed this role if it originally was formally appointed to someone else. As Engeström et al. (1999) explain, the factors in the activity system evolve over time, creating new tensions and contradictions that require new solutions. The tension that has occurred between Nora as “the participant”, and the degree of formalization within the element of “division of labor”, might not always have been present. It may be that Nora was fine with the informal leader role previously, but that her view of it has changed through time. However, the current tension should be taken into consideration, and the introduction of some degrees of formal technology leadership may be discussed (Masullo, 2017).

#### **4.6. The goal of institutionalization**

The goal of the institutionalization can be defined as the situation where educational technology has changed and become a natural part of the teachers’ mathematics teaching. The overall

objective is further to achieve improved learning for both students and teachers, as students are believed to benefit from the new teaching methods and educational technology, while the teachers establish a context for collective learning and institutionalization of new solutions. Hence, both the goal and overall objective are impossible for the teacher champions to reach without engaging their peers. Thus, championship is crucial as it has the ability to challenge and change their peers' beliefs (Ertmer, 2005), serve as mentors (Swan and Dixon, 2006), conquer organizational barriers (Jenssen and Jørgensen, 2004) and engage for change (Buono and Subbiah, 2014). As Schon (1963) so accurately puts it; *the innovation either finds a champion or dies*.

Findings from this study show that the teacher champions' goal and motivation for conducting their championship were focused around improved learning for their students, which is in line with prior research on champion characteristics by Howell and Higgins (1990a). This is not only an idealistic goal, as their improved teaching also indicate the motivational factor of professional development for the teacher champions (Renken, 2019). Their goal en route this objective was to achieve institutionalization of the educational technology, resulting in the change practices of adopting the pedagogical method of the flipped classroom, which they strongly believed in. Knowledge workers, such as (champion) teachers, tend to be deeply vested in their trade (Hislop et al., 2018), and often perceive their work as their identity. Hence, it is often of great importance for these actors to experience a higher meaning than monetary incentives through their work (Howell and Higgins, 1990a). This is coincident with prior research on champion behavior, stating that champions take on tasks without formal incentives given (Jenssen and Jørgensen, 2004), which hence help us understand their motivation and goals at an individual level.

Further, the institutionalization of new educational technology and practices seem to be supported by collective learning activities where championship is of importance. The current findings show that both teacher teams studied have allocated time for sharing of knowledge and experiences, as suggested to achieve successful implementation by prior research (Younie, 2006, Kopcha, 2010, Clavert et al., 2015). The planned meetings happen at different levels, and hence provide the teacher champions with an arena to promote and inspire their peers (Howell and Boies, 2004). At School A there are regular meetings between the teachers at the same grade. The respondents also participate in the sharing of experiences across the high schools in the same geographical area. One of the respondents also highlights their on-going knowledge

sharing based on how their work is organized: *I think there is an enormous amount of experience sharing just in the time we spend collaborating in the two-teacher system* (James, School A). James is one of the teachers who have been paired up with Nora, one of the identified teacher champions. He has adopted the educational technology and refers to Nora's support and guidance along the way.

At school B, the formal knowledge-sharing and development seem to happen to a greater extent across the entire school. The respondents refer to regular experience-exchange meetings where one can be asked to share something. Christian explains: *The grade or subject group can be appointed a mission in relation to sharing their experiences. (...) It can be focused on reading, math, or different focus areas. Then, one share experiences with the rest of the staff* (Christian, School B). These activities facilitate for a CoP across the school (Younie, 2006), contributing to collective problem-solving and thus, potentially innovation if these solutions also get implemented (Glynn, 1996). Prior research has highlighted the importance of allocating time for collective reflection to achieve successful change (King and Stevenson, 2017). Christian, one of the teacher champions, has used the joint meetings to promote the educational technology to the rest of the school. Even though the teachers may be appointed missions from the management, Christian has acted in line with champion literature (Jenssen and Jørgensen, 2004, Howell and Higgins, 1990b), promoting the educational technology at his own initiative.

Prior research has shown that the establishment of a collective goal has been perceived as challenging to achieve by teachers (Salleh, 2016). According to the modified activity system by Postholm et al. (2004) the factor "goal" is a sub-goal on the road to the overall objective. In this thesis, the goal of the teacher champions is to institutionalize the educational technology, with the aim of improving both student and teacher learning as the overall objective. All members of the community might not share this sub-goal, thus creating contradictions between the elements of the goal, community and participants (teacher champions) (Wenger et al., 2002). While all members of the community might reach towards the overall objective of improved learning, the perceptions of the right sub goals and methods along the way might differ.

To achieve successful change support and agreement is needed (Jacobsen, 2012), hence highlighting the importance of communication and collaboration in the organization. The current findings highlight how collective learning through problem-solving contribute to the

goal of innovation and change at the schools. Both within CoPs (Wenger et al., 2002), but also through collaborative championship, do the teachers facilitate for change that persists.

## 5. Conclusion

This master thesis has aimed to answer the following research question:

**RQ:** *How does teacher championship contribute to the institutionalization of educational technology?*

First, it is clear that champions come in different variations, and that their championship is, in some regards, exerted and contribute to the institutionalization of new technological innovations in different ways. While some champions may fit the stereotypical image, promoting eagerly and fighting for resources on their own, other aspects and nuances are highlighted through this thesis. Findings reveal teacher champions who differ from the definitions of previous research, and hence propose an unexpected continuation of current definitions and research on the field of organizational champions.

Results imply that teacher champions have the ability to contribute to institutionalization by changing the pedagogical beliefs of their peers through patiently promoting, supporting and showcasing technology within their own classroom. Their persistence seems to be of great importance as it reduces uncertainty among their skeptical colleagues, both by reducing the risk through the delivery of satisfying student results, but also by providing them with stable support so that reluctant teachers can adopt the innovation at their own pace.

While previous research mainly describes championship as activities conducted by one “fighting individual”, the current study reveals the important and under-communicated presence of collaborative championship within the studied teacher teams, and as a subgroup in their CoP. The study indicates that pairs of teacher champions have the potential to inspire each other and serve as an important coalition within their community to achieve institutionalization. Hence, the current research suggests the establishment of the term *collaborative championship*. This term describes the championship of innovation as a joint project between internal enthusiasts.

Lastly, the lack of formal technology leadership is highlighted, contributing to the debate of formalization of the champion’s role. Findings show that some champions wish for their role

to be formalized, thus challenging prior research. Hence, the current study discusses the combination of formal and informal leadership to achieve institutionalization of technological innovations through teacher championship.

## **5.1. Research contribution**

The current research contributes to the literature on championship, organizational change, and school development. Current findings have revealed a gap in the literature on championship, as the collaboration among champions seems to be a topic rarely touched upon by prior research. The thesis shed light on variations of championship, contributing to a more nuanced image of champions. It also points out the importance of collective learning and management support provided for knowledge workers to facilitate innovation and institutionalization.

## **5.2. Recommendations for further research**

Prior and current research fail to explain how collaborating champions affect each other. Therefore, more research should be conducted on the theme of collaborative championship, both within and outside the school context, to contribute to existing champion literature. Could it be that a latent champion can emerge through the collaboration with another (latent) champion? And will even more institutionalization processes of innovations succeed through the championship from collaborating enthusiasts?

In addition, the current study discusses the results of formalization and incentives for identified champions. Further research should study how the accountability of an appointed champion impacts the institutionalization process and the champion's motivation. The balance between formal and informal technology leadership to achieve institutionalization of innovations within the school context should be investigated. Research should also address how an effective combination of self-driven enthusiasm and formalized technology leadership can be found.



### **5.3. Implications for practice**

Based on the current research, the following recommendations and guidelines are provided for participants in school development processes and educational leaders. When contributing to change and development one should: 1) Allocate time for the collective reflection and sharing of knowledge between teachers. Collective problem-solving creates a sense of security for risk-averse staff and facilitates innovation. 2) Provide explicit support combined with the freedom to work in the method of trial and error. Communicating trust and providing knowledge workers with autonomy is deemed highly important to secure successful institutionalization of innovations. 3) Aspire to facilitate collaboration between enthusiastic teachers to spark collaborative championship. 4) Be aware of the balance between informal and formal technology leadership, aiming towards a combination of self-driven enthusiasm and incentivized responsibility within their organization.

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## 7. Appendix

### Appendix 1: Examples of search strings

Search strings and their results in the scientific databases of Oria and ProQuest:

Search string	Results in Oria	Results in ProQuest
<i>“integration process*” AND school*</i>	726 415	10 644
<i>“technology integration” AND school*</i>	419 792	5 597
<i>“Integration of technology” AND school*</i>	7 419	2 127

Examples of improved search strings developed through the process of the literature review:

Search string	Results in ProQuest
<i>(ti(champion* OR “change agent*” OR “innovation champion*” OR “opinion leader*”) AND (“development process*” OR “Organizational change*” OR “change process*”) AND school*) AND stype.exact(“Scholarly Journals”) AND PEER(yes)</i>	78
<i>(ti(champion* OR change agent*) AND organizational (development* OR change)) AND ab((implementation OR integration) OR innovation)</i>	63
<i>(ti(champion* OR change agent*) AND organizational (development* OR change)) AND ab((implementation OR integration) OR innovation) AND ab(school*) AND stype.exact(“Scholarly Journals”) AND PEER(yes)</i>	5



## Appendix 2: Examples of search results

Examples of search strings and the process of screening and inclusion or exclusion:

DB	Search string	Results	Abs. read	Art. read	Art. used	Articles
PQ	ti((champion* OR "change agent*") AND organi*ational (development* OR change))	73	73	5	2	(Westover, 2010), (Buono and Subbiah, 2014)
O	“ti((champion* OR “change agent*”) AND organi*ational change*	10 591	50	7	3	(Jenssen and Jørgensen, 2004), (Glynn, 1996), (Howell and Higgins, 1990b)
O	"Communities of practice" AND "educational technology"	403	100	11	4	(Kopcha, 2012, Glazer et al., 2009, Kopcha, 2010, Hennessy et al., 2005)

## Appendix 3: Examples of snowballing

New sources acquired through backward and forward snowballing:

Initial source	New source(s)
(Mumtaz, 2000)	(Stager, 1995), (Carney, 1998), (Rosen and Weil, 1995)
(Haydn and Barton, 2008)	(Zhao et al., 2002), (Ofsted, 2002), (Younie, 2006)
(Glazer et al. 2005)	(Glazer et al. 2009)
(Kopcha, 2012)	(Cuban et al., 2001), (Clark, 2006), (Hew and Brush, 2007), (Gray et al., 2010)

## Appendix 4: Information provided to the respondents

### Mail i forkant av fokusgruppe:

*Emne:* Fokusgruppe [dato] [tid] ved [sted]

Hei [navn],

Tusen takk for at du har takket ja til å delta i fokusgruppe med dine kolleger [dato] [tid] ved [sted]. Fokusgruppen arrangeres som en del av datainnsamlingen til min masteroppgave ved Institutt for Industriell økonomi og teknologiledelse ved NTNU.

Temaet for masteroppgaven er implementering av ny teknologi i offentlig skole, med spesielt fokus på praksisfellesskap og læring mellom kolleger. Som eksempel vil læringsplattformen Campus Inkrement brukes som case.

Fokusgruppen vil fungere som et gruppeintervju med spørsmål knyttet til ulike temaer relatert til implementering og bruk av ny teknologi (Campus Inkrement). Intervjuet vil ta ca. 45-60 minutter. Du trenger ikke forberede deg på noe spesielt i forkant av intervjuet, og din erfaring er nyttig uavhengig av omfang og erfaring med den eksemplifiserte teknologien. Jeg vil oppfordre til ærlige svar, kritiske så vel som positive.

I etterkant av fokusgruppen kan du bli spurt om å stille til et kort individuelt oppfølgingsintervju over telefon.

Underveis i intervjuet vil det bli gjort lydopptak slik at disse kan transkriberes og analyseres i etterkant. Svarene vil bli anonymisert gjennom masteroppgaven, og du kan når som helst trekke din deltakelse gjennom å kontakte meg.

Takk for at du bidrar til gjennomføringen av min masteroppgave. Om du har spørsmål eller noe skulle forhindre deg fra å møte må du gjerne gi meg beskjed til:  
[hartviksen.karianne@gmail.com](mailto:hartviksen.karianne@gmail.com)

Med vennlig hilsen  
Karianne Hartviksen  
+47 478 479 04  
Masterstudent, NTNU

## Appendix 5: Interview guide for focus groups

### Innledende ord:

Hei, alle sammen. Takk for at dere deltar på denne fokusgruppen som er en del av datainnsamlingen til min masteroppgave ved NTNU. Fokusgruppen har et uformelt format og det jeg er ute etter er rett og slett deres tanker og erfaringer rundt forskjellige temaer knyttet til det å ta i bruk ny læringsteknologi. Læringsplattformen Campus Inkrement blir brukt som eksempel på en slik type teknologi. Ulikt omfang av erfaring og kjennskap til teknologien er nyttig, så her er det ikke slik at det hovedsakelig er dem som kjenner teknologien best jeg er interessert i å høre fra.

Samtalen vår blir tatt opp på lyd. Lydopptaket publiseres selvfølgelig ikke noe sted. Hva som blir sagt vil bli transkribert, anonymisert og opptakene slettet i etterkant av intervjuet.

Er det noen som har noen spørsmål før vi starter?

*(Rask runde med navn, rolle og ansiennitet)*

### Regler (Rutiner, læreplaner)

1. Hvilke regler eller retningslinjer forholder dere dere til når dere velger læringsressurser?
2. Har disse reglene og/eller retningslinjene noen innvirkning på hva dere velger å bruke av læringsressurser?
  - a. (Hvis det ikke er dekket) Har disse reglene og retningslinjene noen innvirkning på bruk av Campus Inkrement?

### Fellesskapet (klasse, lærerteam og skolen)

3. Har klassen noen betydning på valg og bruk av læringsressurser? (For eksempel hvilket nivå elevene er på i faget? Om det er stor spredning i nivå i klassen? Urolige? Pliktoppfyllende?)
  - a. (Hvis det ikke er dekket) Har hvordan klassen er noen betydning på bruk av Campus Inkrement?
4. På hvilken måte er lærerteamet en del av prosessen med å velge ut hva slags læringsressurser som skal brukes?
  - a. (Hvis det ikke er dekket) På hvilken måte har lærerteamet hatt innspill om bruk av Campus Inkrement?
5. Hva slags kultur opplever dere at dere har hos dere?
6. Har denne kulturen noen betydning for hva dere velger av læringsressurser?
  - a. (Hvis det ikke er dekket) Hvordan påvirker kulturen bruk av Campus Inkrement?

### Arbeidsfordeling

7. Har noen et tildelt ansvar for å vurdere, velge og/eller sette seg inn i, nye læringsressurser?
  - a. (Hvis det ikke er dekket) Har noen hatt dette ansvaret i forhold til Campus Inkrement?
8. Har noen ansvar for å hjelpe kollegene sine å lære seg og å bruke nye læringsressurser i undervisningen?

- a. (Hvis det ikke er dekket) Har noen hjulpet kollegaene sine å lære seg og å bruke Campus Inkrement?

**Verktøyet (championen)**

9. Hvem hos dere er idéhaveren til å bruke nye læringsressurser?
  - a. (Hvis ikke dekket) Hvem var idéhaveren til å bruke Campus Inkrement?

**Målet**

10. Hvordan deler dere erfaringer hos dere? Er det muntlig, skriftlig, faste møter, når det trengs?
11. (Hvis det ikke alt er dekket) Hva hindrer dere fra å ta i bruk nye læringsressurser?
  
12. Er det noe dere synes jeg burde spurt om, eller som dere har lyst til å tilføye?

## Appendix 6: Interview guide for individual interviews

1. Under fokusgruppen så ble du utpekt som en av dem som driver implementeringen av Campus fremover (kom med idéen, viser de andre, snakket med ledelsen, hjelper de andre). Kjenner du deg igjen i dette?
2. Hva er det som driver deg til å gjøre disse aktivitetene?
3. Hva er viktig for deg? /Hva er målet?
4. Hva gjør du for å oppnå dette målet?
5. Hva er utfordrende med å utføre slike oppgaver?
  - a. Hvordan blir du forstått?
  - b. Din rolle mellom ledelse og kollegiet?
  - c. Din rolle mellom Campus og kollegiet?
  - d. Det du prøver å få til i forhold til regler/begrensninger
  - e. Det du prøver å få til i forhold til kulturen?