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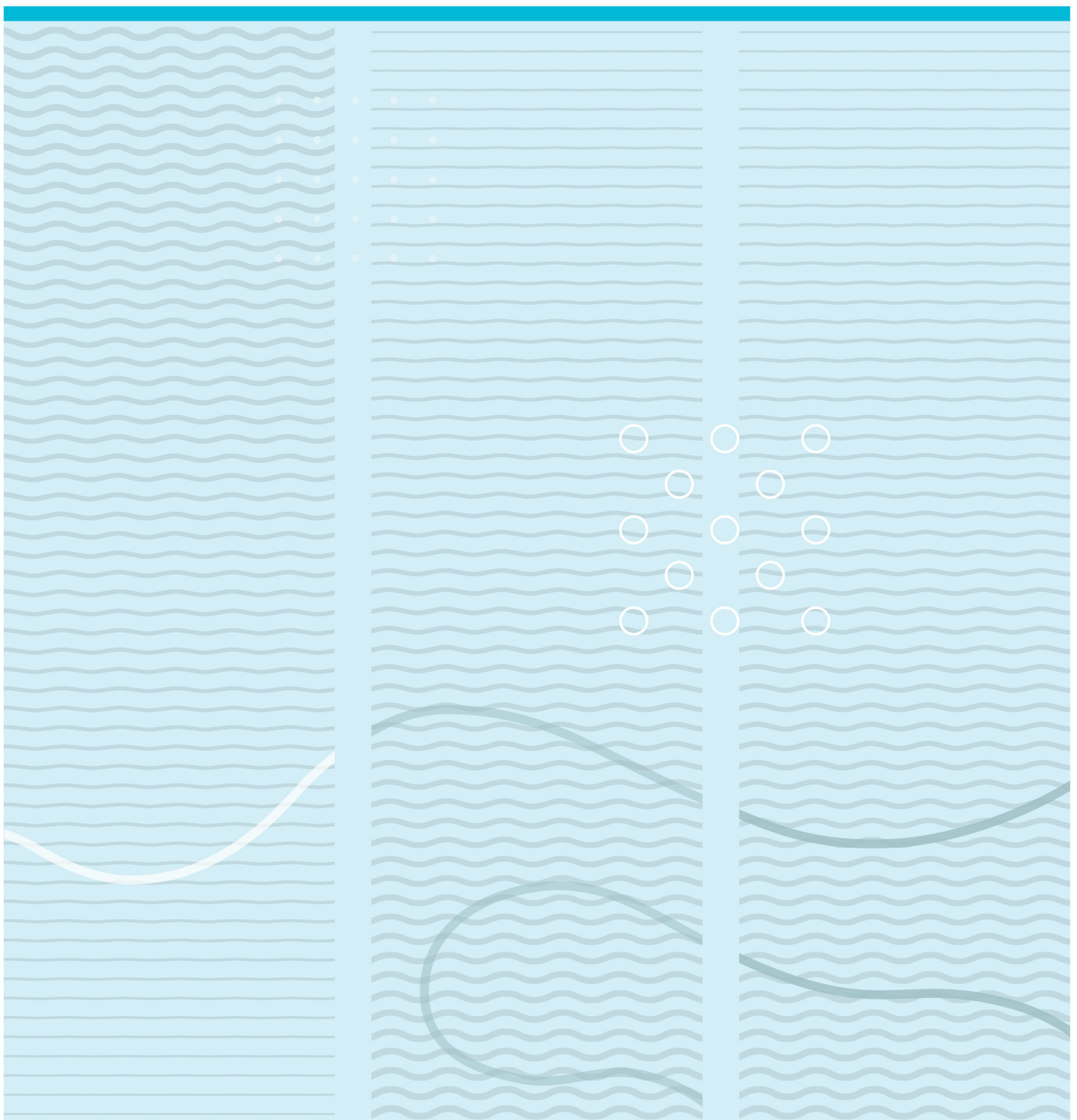
Alexander Joyce

Practice change in a community of dispersed actors

Exploring the role of social practice in virtual community innovation

This thesis is worth 30 study points

Abstract

In order for technological innovations to unfold their full potential on institutionalised education services, there is a need to move away from seeing technology as a complementary resource, into developing information and communication technology (ICT) incorporated practices. A practice approach sees technology as an inherently social phenomenon, and as such implies a need to recognize actors' learning and identity-formation in their resource integrating practices. Learning and identity-formation enables the enactment of field-specific competences, to perform conventionally accepted actions, in social practice. This issue has not been adequately addressed in conventional innovation literature, which has preferred to see the actor as ready-made. Following a practice theoretical perspective, this thesis explores the role of social practice in affecting changes to the arrangement of actors in a technology-mediated community of practice, and how value that is had from education service is contingent on such practice arrangements.

Findings, from a two-step qualitative data collection, indicate that applying practice theoretical perspectives to the empirical case study in question implies a need to emphasise, not only a localized social dimension, but a networked dimension covering widely dispersed sociomaterial actors. This has theoretical, as well as managerial implications for education service innovation.

Keywords: Social practice, learning, service innovation, education service, education technology, education management

Contents

Foreword

When I started studying for my master's two years ago, I had the idea that this thesis would be the culmination of five years of studies, in language, learning, social science, and innovation. However, I have gradually come to realise that any idea of culmination is a troublesome one. I am not attempting to summarize five years of studies with a vain attempt to ameliorate present perspectives. I have instead attempted to open new lines of inquiry I believe to be pertinent to the field. It is from this point of departure that I set out to write this thesis. It is neither written out of passion nor indignation for the role technology plays in changing everyday life, but rather out of curiosity. It is an empirical study of social practices, wherein I attempt to explore phenomena relating to actors' perception and articulation of meaning in changing sociomaterial contexts. There is no denying the implication of technology on life – on social order. Developing technology *grants us* an ability to alter these arrangements of life, but it must also be recognized that we simultaneously grant technology an ability, to *alter us*. We draw meaning from our surroundings, based on the means through which we interact with them, and in some cases, those means are nearly wholly technologically mediated. I do not believe that this thesis will capture and convey the entirety of these phenomena, but that it can amount to a meaningful contribution to a wholly necessary avenue of inquiry.

I would like to thank my sons, for providing me with a life apart from this thesis, and my wife, for encouragement and tenacity. Also, my parents, whose support has enabled me to wholly devote myself to these studies. Lastly, I would like to thank my supervisor, Are Branstad, for guidance, support, criticism and insight.

Horten, Vestfold, Norway, September 2017
Alexander Joyce

1. Introduction

In recent years, large investments have been made in information and communication technology (ICT) for education and learning purposes. Education technology, or EdTech, is increasingly making its way onto personal mobile- and living room devices, in schools and in private homes. Implementations of computers, mobile devices and smart boards, as well as software, as tools for educational purposes, are examples of EdTech. However, recent OECD findings indicate negligible, or even negative, results on reading and maths proficiency in the same period (OECD, 2016).

Education as an institutionalised learning context can be said to constitute a service relationship in which the full realisation of value, might not occur until many years after the initial service provisioning. This thesis suggests that the implicitness of service in education implies a need for innovation, in order to affect change. Recent perspectives on service innovation emphasise a reliance on actors' collective resource integration, in order to co-create value. By applying this service innovation perspective, my aim is to further explore what I see as an inherently social dimension of innovation.

Education is seen to serve a broad range of heterogeneous stakeholders: "the student, the parent, the potential employer, society, and so on" (Chung & Mclarney, 2000, p.485). For a greater part of the potential of new technology to be realised, there is a need for deeper understanding of the preconditions of ICT-incorporated practices; a "close-to-practice" theory of innovation in the provisioning of education services. Education services are highly integrated, composed of a complex network of actors, with a variety of different resource-integrating practices. This thesis explores the empirical setting of the Norwegian Virtual School, an upper secondary education offering, where students attend lectures in a virtual community, mediated by ICT.

Recent studies (OECD, 2016) indicate that the introduction of new technologies have not, for the most part, been adequately met with the development of ICT-incorporated practices, instead leading to practices seeing new technology as complementary resources. Implementing new technologies has implications, not only, for didactic practice, but for the provisioning of education services, and the value they produce. Taken together with the OECD's findings, it can be said, that innovative new practice arrangements are needed, in order to address the wide range of issues and fulfil

the promising potential of ICT in learning. Examples are, issues, such as the "engagement gap" (McGonigal, 2011, p.157-158): an underserved need to be allowed to actively participate in shaping education offerings, as well as "the digital divide" (Djellal, Gallouj, & Miles, 2013, p.102), a potential amplification of social disadvantage, owing to an uneven distribution of ICTs. However, innovation in education services can, so far, largely be seen to have taken a course which has alienated participants in education practice, in favour of adopting off-the-shelf technology, unfit for purpose. This view is consistent with the overarching aim of the OECD. It sees innovation in education as having a capacity to improve teaching and learning practice, as well as in fostering innovation competences, which are seen as advantageous to society in general (OECD, 2016).

Questions concerning learning processes and resources, such as education, are seen to be deeply embedded within, as well as having profound effects on socio-technical change (Young, 1998; Facer, 2011). Structural perspectives see these change process as embedding rules and resources, as structures, within technology (Orlikowski, 2000). Thus, in order to understand and explain socio-technical change, there is a need for a holistic view of practice, learning and innovation which emphasises the interrelated nature of these phenomena (Brown & Duguid, 1991). An important managerial consideration in service innovation processes is the extent to which users and providers integrate resources in the delivery of, and alterations to, the service process. Core competences of involved actors are examples of resources, and their fit with the service can constitute enabling and constraining factors on innovation. Every service, such as teaching, software development and support, can be seen as part of a greater service system, where they draw from and build upon other services. In this thesis, I explore questions of how actors, situated in a community of practice as novice or competent resource integrators, enact competences, in order to shape new services, and the path leading to institutionalisation.

Traditional perspectives on innovation have presupposed an actor ready-made, and competent to assume a role in service provisioning. Scant attention has been paid to issues of learning, and the social dimension, in order to better understand the resource integrating practices of actors who are situated, as novices, in a context with conditions foreign to them. More recently, as increasing focus has been directed towards the particulars of service, the properties of actors, as well as factors enabling and constraining

their actions (Prahalad & Ramaswamy, 2000; Edvardsson, Tronvoll, & Gruber, 2011) have come to the fore. Still, the service innovation literature lacks the ability to provide in-depth illustrations of the ways in which actors affect changes to services, and the way changes to service affects them, through practice.

I have conducted an exploratory study, in the context of the Norwegian Virtual School, hoping to shed additional light on pertinent dimensions of practice theory, such as actors' tool-use, interaction and learning competences, needed to participate meaningfully in social practice. Contrary to system perspectives, social practice perspectives do not presuppose actors' competent participation, but rather emphasises actors' learning to become participants. I believe studies of these dimensions to be necessary preconditions, to advance our understanding of actors' socially situated, collective, efforts to sustain (recreate) and actualize (reshape) the integrative practices that govern value co-creation efforts, in service innovation. The aim of this thesis is to contribute to a deeper understanding of what the role of social practice is, in virtual community innovation. In order to answer this problem formulation, I have operationalised three research questions, which seek elaboration on service system perspectives, as well as emphasising the social and learning aspects of new practice creation, through innovation.

1.1.   Research questions

RQ.1: What roles do pods play, as actors' means of interaction?

RQ.2: What is competent participation in a community of practice?

RQ.3: To what degree do learning processes have implications for practice change?

2. Acting towards mutual intelligibility and shared knowledge

2.1.   Innovation in services

Present day innovation studies are widely seen to trace their lineage back to the work of economist Joseph A. Schumpeter (1934/2004), with the terminology and theoretical work it has spawned being applied to both private and public sector services, such as health and education (Mccoll-Kennedy, Vargo, Dagger, Sweeney, & Kasteren, 2012; Osborne, Radnor, & Strokosch, 2016). A commonly used definition of innovation states that "an **innovation** is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (OECD, 2005, p.46). The focus of interest in studies of innovation have, for the most part, been biased towards technological understandings and explanations to the causes and effects of innovation in services, neglecting non-technological explanations of innovation (Gallouj & Savona, 2008; Djellal et al., 2013). A community system perspective on innovation considers how relationships among participants of a system integrate competences, or "functional specializations" into communities of cooperative activity, where inherent competitive activities among them are determined by emergent "technological paths" (Van de Ven, Polley, Garud, & Venkataraman, 2008, p.167). Integrating competences with the community, in order to affect change, implies the occurrence of a division of labour. For managers seeking practical exemplification, it can be fruitful to consider the work of an artist, who "works in the centre of a network of cooperating people, all of whose work is essential to the final outcome. Wherever he depends on others, a cooperative link exists. The people with whom he cooperates may share in every particular his idea of how their work is to be done" (Becker, 1982, p.25). In this sense, innovation, or practice change, is, inherently, socially determined.

2.1.1. A focus on interaction in innovation and practice

Although a view of technological determinism is still dominant within parts of the field, the emergence of alternative approaches expands the understanding of a process view to services innovation. Grounded in practice theories, such as structuration theory (Giddens, 1984), some studies have offered understandings and explanations of innovation activities, from a social sciences perspective (Edvardsson, Skålén, & Tronvoll, 2012; Edvardsson, Kleinaltenkamp, Tronvoll, McHugh, & Windahl, 2014).

Studies of services innovation emphasise the processual nature of actors' resource integration, in order to create value through services. The resource integrating potential of participating actors in a service system, is the degree to which they are able to meaningfully enact resources, i.e. competencies (knowledge and skills) to bear on context specific tasks. A service system can be defined as a simultaneous resource-integrating effort by supplier networks, in interaction with customer networks (Pinho, Beirão, Patrício, & Fisk, 2014). Resource integrating processes are expressions of practice (Edvardsson et al., 2012), implying that social order and identities of participation are, as from a structuration perspective (Giddens, 1984), enabling and constraining factors.

A service can be defined as "the mobilisation of internal or external competences and internal or external techniques (tangible or intangible) to produce final or service characteristics (use value)" (Djellal et al., 2013, p.111). Value is conceptualised as the "cumulative effect of co-production and consumer competences" (Ranjan & Read, 2014, p.2), always determined by the user based on its value-in-use (Vargo et al., 2004), and within a social context (Edvardsson, Tronvoll, & Gruber, 2011). The emergence of the concept of value co-creation (VCC) in the field of marketing studies came about as result of a discussion on a new service-centred and "relational" theory of marketing (Prahalad & Ramaswamy, 2000). Societal changes, brought about by the advent of information technology, saw an ever-increasing number of people employed in the service industries (den Hertog, 2000), and with it came a realisation that contemporary theory was insufficient to account for the role and creation of "intangible assets"; namely knowledge and skills.

Value co-creation, as a framework for service innovation studies, concerns how multiple stakeholders collaborate to create value, and sees the customer as "part of an emergent social and cultural fabric" (Prahalad & Ramaswamy, 2000, p.80). As the locus

of interaction is seen to be centred on the customer, it is paramount to focus on the development of core competences; "communication, involvement, and a deep commitment to working across organizational boundaries" (Prahalad & Hamel, 1990, p.81), as these intangible, or operant, resources are key to attaining strategic advantage (Vargo & Lusch, 2004). As there are mediating and moderating effects that govern the intention to participate in value co-creation, it should not be presupposed (Füller, Mühlbacher, Matzler, & Jawecki, 2009).

An important aspect of services innovation is that service provisioning can only ever provide a value proposition, with the actual production and use-value being determined by the actions of embedded actors' practices (Fuglsang, Rønning, & Enquist, eds., 2014). It can be argued that innovation has inherently performative conditions. Firstly, actors' agentic qualities are recognized as affecting the dispersion of new ideas, to be adopted as innovations (Rogers, 2003). Secondly, actors' actions require re-action, in order for adoption to occur, and to satisfy the implementation criteria of innovation, as set out in the Oslo Manual guidelines (OECD, 2005). Resource-integrating processes, with the aim of value co-creation, can be seen as instances of negotiating mutual intelligibility, needed for innovation to occur. A practice-theoretical view can be purposeful to gain a deeper understanding of the role that resource-integrating practices have on value co-creation (Edvardsson et al., 2012).

2.2.   Practice theorizing

Practice theorizing is a field of inquiry concerned with knowing as a practical and social activity; focused on articulating the locus of knowing in a spatial sense, as well as fabrication, as the manufacturing process of knowing (Gherardi, 2016, p.681-682). The field of practice theorizing is not characterized, or even dominated, by any one theory, but rather a concern with knowing and organizing, centred on the idea of practice (Gherardi, 2000). Practice theorizing follows situated learning and activity theory perspectives (Gherardi, 2016). The agenda of practice theorizing is not only theoretical, but methodological as well. It concerns itself with studying naturally occurring social activity in the present; attempting to explain its relation to institutional contexts

(Miettinen, Samra-Fredericks, & Yanow, 2009). This restriction of temporality, implies that practice is always "paradigmatically situated" (Giddens, 1979 in Nicolini, 2012, p.47) Changing paradigms lead to changes in practice, and as such, we can speak of "paradigms as practices" (Schatzki, Cetina, and Savigny, eds., 2001, p.20).

Practice theory has so far not supplied a systematized account of social phenomena, and has, as such, been termed a "heuristic device", in terms of its effects on the social sciences (Reckwitz, 2002, p.257). Despite of a perceived lack of generalizability, the field of practice constitutes a study into a wide range of phenomena, contributing to a widening of its "power and scope" (Schatzki, Cetina, & Savigny, eds., 2001, p.13-14).

Practices can be defined as "a mode, relatively stable in time and socially recognized, of ordering heterogeneous items into a coherent set" (Gherardi, 2006, p.34). Practices, as coherent sets of items, are constellations of activity, hierarchically organised nexuses of doings and sayings (Schatzki, 1996). Coherence is achieved and temporarily maintained through communicative processes of expression (Gherardi, 2016, p.693). It is only through relative stability over time that practices are institutionalized, and attain a momentum able to shape habits, routines and resources.

Despite a great deal of diversity within the field, practice theoretical accounts can generally be said to view "shared skills or understandings", embodied within actors, as prerequisites to practical activity (Schatzki et al., eds., 2001, p.12). In this thesis, I draw on studies in practice theorizing that emphasise argumentative and discursive modes of practice, and which can be seen to follow two interwoven strains within the development of practice in organization studies. Firstly, "the practice turn" (Schatzki et al., eds., 2001). Secondly, *the linguistic turn,* which emphasises the role of language in constituting the social world (Rorty, 1967). The fusing of these two strains is owed to a rediscovery of Wittgenstein's perspective on intelligibility as practice, where actions give meaning on the basis of the surrounding practical context, not as individual consciousness, but as intersubjective practical understanding (Nicolini, 2013), Taken together, the study of communicative action and intersubjective understanding focuses the practice lens on processes of linguistic expression of knowledge and social action (Geiger, 2009; Gherardi, 2016). As practices are, provisionally, accepted ways of organizing the social world, by means of the way things are said and done, they are gradually institutionalized (Geiger, 2009).

Practices function within fields, each with its own logic. Field-level logics, or field specific vocabularies of practice can be understood as practices whose function it is to keep the heterogeneous set of sayings and doings functioning in conjunction, within a specific field (Thornton, Ocasio, & Lounsbury, 2012, p. 149). Sayings, which are derived from Wittgenstein's "expressions" (a translation of "ausdruck" in Wittgenstein, 1974, p.11-12), are speech acts: verbal or non-verbal propositional linguistic acts. Whilst doings are defined as "all behaviour that is not a speech act" (Schatzki, 1996, p.47). As such, participants of a community, competent in performing mutually intelligible sayings and doings, are considered as being "party to the same field of dispersed and integrative practices" (Schatzki, 1996, p.116). Taken together, practices constitute phenomena embedded in systems of reproduction and the re-making of actors' social lives (Halkier & Jensen, 2011). An actor is considered a "carrier of practices" (Halkier et al., 2011, p.105), as practices intersect with a plurality of other practices that shift to fit the relevant context. As such, an actor can internalize a multitude of practices that are brought into play as needed, and interact with other actors' comparable practices.

Integrative practices are complex practices which are linked by understandings, rules, and teleoaffective structures, which constitute the organizational structure of practice (Schatzki, 1996, p.99). Firstly, understandings are divided into practical and general understanding. Practical understanding is an actor's ability to understand the actions of another, as they are linked by means of shared sayings and doings. This requires a certain level of field-level competence, within the practice, on the actor's behalf (Nicolini, 2013); implying a certain measure of socialization into the practice and a somewhat comparable set of competences, to those other actors within the social system. General understanding is a reflexive understanding, which, by means of discourse and practical activity, gives any integrative practice its identity. For instance, if a person in a meeting impresses on the others that time is of the essence, as there are more important things to be done, the general understanding could be that the meeting is of lesser importance. Secondly, rules are ways in which actions are meant to be structured, for the purpose of repetitiveness. Sayings and doings are explicably linked to rules, as actors take them into account as guidance when interpreting ongoing practice (Nicolini, 2013). Lastly, teleoaffective structures specify a given direction that any practice should take, as specified by the required or desired ends of that practice.

Practices are bundled activities hierarchically organized into nexuses comprised of doings, sayings, tasks and projects that make up social phenomena (Schatzki, 1996). These bundled activities are contingent on articulation of mutually intelligible action, in order to recreate and reshape practices. It is worth noting, that this is a main point of difference between two perspectives on practice, where the articulation of practice is either directed at strengthening core assumptions about social practice, or as a reinterpretation of practices' shifting "conditions of satisfaction" (Schatzki et al., eds., 2001, p.203-8) – that actions meet satisfactory conditions, when performed.

2.3.   Community interaction as discursive practice

As practices can be seen as nexuses of sayings and doings, actors' performance of language acts contributes to mutually shaping discourse, and as such, practice. The implication of this central position for language is that its role is, not only, to describe emerging phenomenon, but as a form of social and situated action (Lave et al., 1991; Schatzki, 1996; Nicolini, 2012). This can be considered the performative aspect of practice – language not only describes, but performs actions that demand re-action. The role of language and its performative aspect in social organization has been touched upon in various forms, such as rule-following in the systemic communication of a "language game" (Wittgenstein, 1986, p.5). JL Austin proposed the concept of a performative, indicating that "the issuing of the utterance is the performing of an action" (Austin, 1962, p.6). This view implies that communicative action is not an expression of an individual's disposition, but serves the purpose of coordinating future action, within a social system (Mills, 1940). In the perspective of action theory, actors are either concerned with strategic action, the act of attaining success, or communicative action: the act of reaching understanding. "In communicative action participants are not primarily oriented to their own individual success; they pursue their individual goals under the condition that they can harmonize their plans of action on the basis of common situation definitions" (Habermas, 1987, p.286). Although, practice theory does not give primacy to communicative action over other forms of action, such as routines or habits of action

(Dewey, 1938), communication in the form of discursive practices are considered an integral part of practice (Reckwitz, 2002).

The act of understanding can, according to Habermas, be equated to that of reaching agreement, and presupposes that the propositional content of a linguistic construct meets the rationally based validity criteria set by the interacting parties: "A communicatively achieved agreement, or one that is mutually presupposed in communicative action, is propositionally differentiated. Owing to this linguistic structure, it cannot be merely induced through outside influence; it has to be accepted or presupposed as valid by the participants" (Habermas, 1984, p.287). Propositionally differentiated speech actions are performative, in the sense that they contain a reference to something real, or imagined, as well as a predicate expression; the thing they want to point out – they have propositional content (Habermas, 1979). As language philosopher Ludwig Wittgenstein put it: "It is in language that an expectation and its fulfilment make contact" (Wittgenstein, 1986, p.131). The concept of performativity is also applied to the notion that practice is reproduced and reconfigured by means of the participation of skilled actors (Orlikowski, Yates, Okamura, & Fujimoto, 1995; Fligstein, 2001; Lounsbury & Crumley, 2007). Seeing performative actions of skilled actors as affecting change recognizes the role of agency in innovation

2.4. Learning and knowing through participation in communities of practice

A "community of practice" (Lave and Wenger, 1991; Brown and Duguid, 1991; Wenger, 1998) is premised on the pre-existence of a shared set of practices, in which new participants gradually learn to become competent participants. As practices are considered inherently social, the level at which a participant can meaningfully engage with a community is central to the level of experienced participation. There are three dimensions to the coherence of a community of practice: "mutual engagement, joint enterprise and shared repertoire" (Wenger, 1998, p. 73). Mutual engagement is premised on participants being able to interact, in order to sustain key elements of a practice. Joint enterprise concerns the processes of negotiation, in response to, and of

accountability to, the historical, social, cultural and institutional context (Wenger, 1998). As such, the coherence of competent participation in communities of practice "presupposes an institutionalised and constraining context of action" (Nicolini, 2012, p.69). However, even if contextualised shared sets of practices imply a delineation of sort, the community of practice is not seen to revolve around a central core, with an ideal typical practice (Lave et al., 1991; Nicolini, 2012). Context is therefore not seen to be a container within which certain practices are valid, but as a network emerging out of practice where negotiation of practice is continually ongoing (Edwards et al., eds., 2009).

From a community of practice perspective, the social dimension can be perceived of as, both, a close-knit community of practice, and as widely dispersed networks of actors (Edwards, Biesta, & Thorpe, eds., 2009). Philosopher and sociologist Ferdinand Tönnies conceptualises a dichotomy between "gemeinschaft"; strong communal bonds, and "gesellschaft"; weak societal bonds, as conceptualisations of the connections that make out a context (Tönnies, 2001, p.17-19). However, integrative practices establish "tissues of coexistence", combining aspects of, both, community and society, mediated by normativized intelligibility, into social practice (Schatzki, 1996, p.193-4). Zygmunt Bauman also criticises a preoccupation with the dichotomy between agency and structure, or the individual and structured community and society, by emphasising the social (Bauman, 1989, p.179). Araujo (1998) extends the concept of a community of practice into the network outside the community, by employing Tsoukas' (1992) definition of the organization as a confluence of social and technological actors, which are spread across multiple locations and shifting states. As such, although communities of practice are considered nexuses of practices, they are, for the purpose of ethnographic study, treated in participants' discourse as "bounded communities" (Hui, Schatzki and Shove, eds., 2017, p.134). This implies, that although it is difficult to delineate communities of practice, both researchers' and participants' perceptions of the social are bounded by intelligible properties of practice, delineating the community from the environment. These properties can be seen to have implications for participants' learning and knowing, in a community of practice.

Knowledge as resources and processes of knowing, in an organization, such as a community of practice, are two inherently different perspectives. The mentalistic perspective, of knowledge as resources, sees knowledge as residing tacitly in individuals

or explicitly in codified form (Polanyi, 2009) – the latter being in an easily replicable and transferrable form, for instance as texts. As such, the total knowledge of an organization is the aggregate sum of these individuals' tacit knowledge and the volumes of codified knowledge (Simon, 1991). The process perspective sees knowledge as inherently unstable, context-bound, and conditioned on participation in social practices (Lave & Wenger, 1991). Novices learn from competent members of a practice, attaining higher levels of participation through social skill acquisition.

Skill acquisition is the incremental increase in qualitatively different levels of competence, and is seen to stretch over five discreet levels between novice and expert (Dreyfus, Dreyfus, & Athanasiou, 2012). The dichotomy between novice and expert can also be seen as a dichotomy between context-free and context bound competence. The level of skill acquisition an individual has attained within a given situation means that at higher-level skills, a person will exhibit expert competence, while at the same time being novice in other situations (Dreyfus et al., 2012). However, the "stages" model doesn't necessarily capture analogue activity between actors at the same skill level, as those employing the kind of thinking characterizing the situation in question.

2.4.1. Learning, identity, and practice change

A practice theoretical perspective on learning is useful, as it sees learning as changes in practices that are primarily situated in social interaction, as opposed to, primarily psychological phenomena, in the consciousness of individuals (Lave, 1996). Such a perspective on learning, as a phenomenon bound to specific contexts, means that it should not be studied separately from the field, or institutional setting, within which social practices create and sustain meaningful interaction (Edwards et al., eds., 2009). Brown and Duguid (1991) regard learning as the process connecting work and innovation; seeing work as reliant on canonical practice, as opposed to innovation, which emerges in fault lines that occur in the breakdown of practice. It is through learning processes that practices change, to accommodate new situations. If, as a result of a breakdown in practice, participants' identities are no longer perceived to be valuable or meaningful to suit the context, then it is through learning that participants are, again, able to negotiate identities suited to meaningful participation in a social community.

In the communities of practice perspective, practice and identity are mutually contingent, and where ongoing participation implies harmonizing lived experiences of practice with the negotiated self, along a learning trajectory where things are incorporated as either central or marginal to a developing identity. As such, identity is "lived, negotiated, social, a learning process, a nexus, and a local-global interplay" (Wenger, 1998, p.149-163). A participant's identity is the function of its relations in social order: "arrangements of people and the organisms, artefacts, and things through which they coexist" (Schatzki et al., eds., 2001, p.43). Relations, again, are a function of identity. Learning takes place along an inbound trajectory, from non-participating membership, towards inclusion in the community of practice as a competent, participating, member. Temporary non-participation, in this sense, can be a legitimate way of observing social practice, before attempting full participation (Wenger, 1998). Alternatively, novices, or even competent members, who are on an outbound trajectory, towards marginality, will experience a limited ability to negotiate meaning, and as such, to affect community practice.

In order to affect changes to practice, participants need to develop identities of participation. This implies that participants locate themselves on inbound trajectories, where learning higher-level social skills enables them to perform purposeful actions, in the context of that community. The importance of attaining higher-level social skills, as a means of affecting alterations to practice, lie in their performative nature. Social skills can be defined as "the ability to induce cooperation in others" (Fligstein, 2001, p.105), and as such can be seen as a measure of definitional power and influence within the community of practice. This, play-ability, is a measure of their competence to participate in practice, in a conventionally accepted manner and to perform conventionally accepted actions (Hui et al., eds., 2017). However, participants do not affect change, directly, on social practice. Their play-ability is purposeful for enabling identities of participation, in the context of social practice, in such a way as to competently affect means at their disposal.

2.5.   Sociomateriality as mediation in a community of practice

For activity theory in general, and in the work of Vygotsky (1978) in particular, human actors' actions are never directly related to the environment, but always mediated by the sociomaterial context of a situation (Nicolini, 2012). In this sense, tools enable actors to maintain meaningful relations to their external environment, and in the words of Friedrich Engels, to purposefully alter it in their own image: "The specialisation of the hand - this implies the *tool*, and the tool implies specific human activity, the transforming reaction of man on nature, production" (Engels, 2012, p.34, emphasis in original). Vygotsky draws directly on Engels in emphasising the mediating function of tools for humans, on their environment: "The tool's function is to serve as the conductor of human influence on the object of activity" (Vygotsky, 1978, p.55). Assigning sociomateriality such a prominent role as mediator of action also recognizes the contribution of nonhuman entities to practice, not as a dichotomy, but acting together (Schatzki et al., eds., 2001). In this perspective, "mind and being" as properties of the individual, instead become inherently social phenomena, situating analysis of human activity as "action in context" (Nicolini, 2012, p.107).

2.6.   Conceptual framework

Based on the perspectives offered by practice theories outlined here, I propose a conceptual framework combining three dimensions of mutually intelligible practice: tools, interaction and learning. The aim of this framework is to assist in exploring the role of participants' enacted context-specific resources, such as relevant competences, in sayings and doings that articulate practice, for the purpose of intelligibility (Schatzki, 1996; Schatzki et al., eds., 2001), as well as coincide with three dimensions to the coherence of a community of practice: "mutual engagement, joint enterprise and shared repertoire" (Wenger, 1998, p.73).
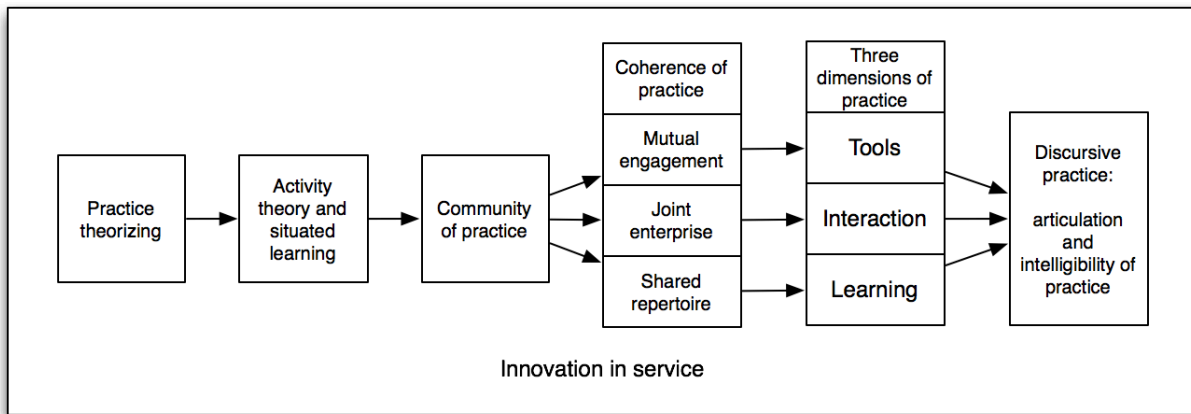
Fig. 2 Theory overview of practice, relating to innovation in service

I consider these important to advancing the understanding of the role of practice change, in education service innovation. Taken together as a framework, the dimensions (tools, interaction and learning) highlight, both, resource and process considerations, that have practical managerial implications for education service.

3. Method

3.1.   Case-study design

The purpose of applying case-study research to my thesis is to treat the collection and analysis of data as a learning process. The aim is to gain a deeper knowledge of practical, "context-dependent", knowledge (Flyvbjerg, 2006, p.224). In this study of practice change in an organization, I have chosen to employ a case method approach, in order to study emerging phenomena, in a limited context. In this study, I regard cases as theoretical constructs that emerge out of discursive practices within a field, and are either general or specific (Ragin & Becker, 1992). This differs from a view of a case as a "bounded system" (Stake, 1995, p.2), where the totality equals the sum of its parts. From a hermeneutic point of view, the validity of a case is determined by the understanding held by both the researcher, and those actors that the researcher is studying (Flyvbjerg, 2006). As such, this "double hermeneutic" implies that, as understanding is subject to change, so is the validity of any articulated phenomena (Flyvbjerg, 2006, p33).

3.2.   Empirical setting

The Norwegian Virtual School is an upper secondary education service, by the Vestfold County Council. As upper secondary education is voluntary, in a legal sense, the school's pupils are not compulsory attendees; nor are they alternatively obligated to attend another education offering. The school markets its offering through school councillors, as well as at other functions. It primarily aims its offering at residents within the county's borders, but also open to applicants from other counties. Its courses are exclusively online, with both preparatory work and classes conducted through an online learning platform.

Online education occurs in different forms depending on choice of method; as **synchronous distance learning**, where IP-based communication functions as a pure

substitute for telephone or radio communication; as **asynchronous education**, where IP-based communication functions as a vehicle for digital educational- or test-material. Synchronous distance learning means that both the teacher and students are present at the same time, and that interaction can occur in real-time between them. Asynchronous education on the other hand, means that the teacher prepares lecture material and/or tasks in advance, and that the students then work with the material in accordance with their own schedule. In the case of the Norwegian Virtual School, there is a combination of both, although my thesis is primarily concerned with synchronous sessions, that simultaneously include both teacher and student participants.
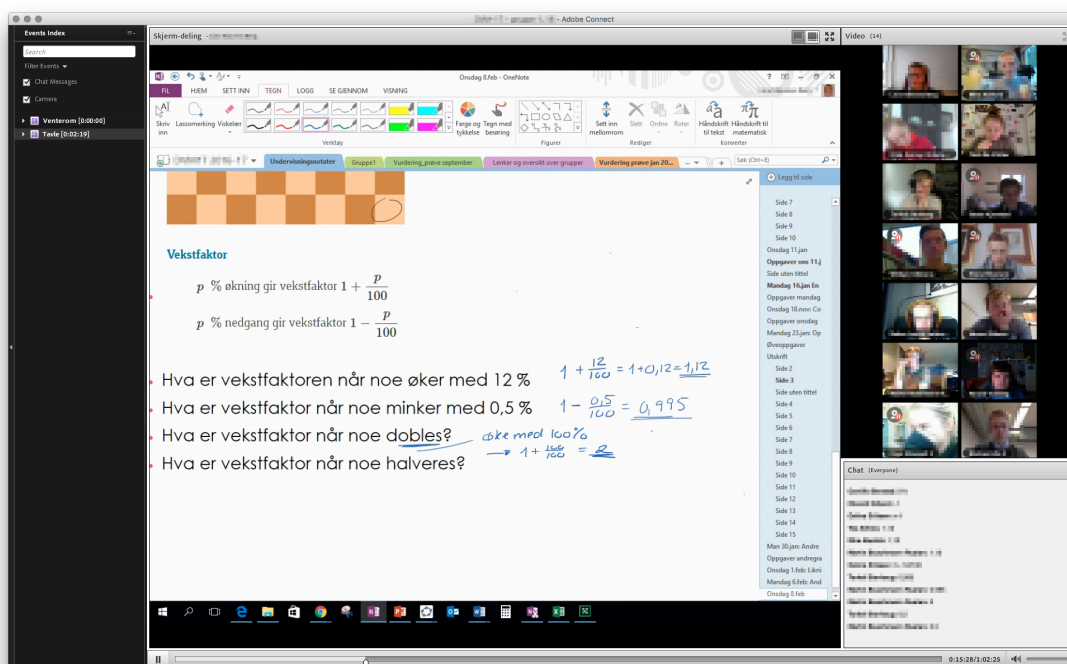
Illustration 3.1 Pod-layout of a virtual classroom

In the sociomaterial context of the Norwegian Virtual School, participants' interaction is "technologically mediated" (Silverman, 2010, p.58) by tools that are termed 'pods'. These are technological artefacts capable of mediating interaction, by utilising media such as video, image, text, and games. A YouTube-pod can bring videos from the popular platform into the classroom context, a presentation-pod can share a participants' own computer desktop, and a games-pod can randomly choose participants. There are also pods that list all participants by name, that displays all participants' video signals, as well as a chat-pod for exchange of messages between participants. Pods can be arranged

in a layout that suits participants, but can also conform to a best-practice layout, set by default.

The Norwegian Virtual School can be seen as a "deviant case"(Silverman, 2010, p.146), or extreme case, of the role that social practices play in innovation processes, as all interactions are mediated by technology. Such cases are considered useful, as "atypical or extreme cases often reveal more information because they activate more actors and more basic mechanisms in the situation studied" (Flyvbjerg, 2006, p.229).

A "historical hermeneutic" perspective can be useful in attempting to understand the role of social practices in innovation: as social practices undergo change, as part of the innovation process, the researcher's interpretations of phenomena need to change, as any interpretation of the practice in question needs to be understood in the context of the time it was enacted (Gadamer, 2004, p.277).

3.3.   Data collection and choice of methodology

As the purpose of this thesis is to explore the role of actors' social practices in service innovation, it is purposeful to utilise two, complementary, methods of data collection: observation and in-depth interviews. Being able to produce complementary and multidimensional data, through a combination of research methods, would increase the validity of any findings (Halkier, 2010).

3.3.1. Observation

Observation affords a direct means of opening social interaction, and as such encourages the researcher to engage with the real world, observing social practices as they unfold (Repstad, 2007). One way to observe social practices is through video recording of events. As social practices are articulated by means of language, bodily behaviour, and reactions (Schatzki, 1996, p.13), practices appear intelligible by studying and interpreting these phenomena, and audio-visual recording offers a relatively non-obtrusive way of achieving this, with the benefit of being able to study interactions repeatedly and non-consecutively.

Observation-based research can be categorised into three ideal types: participant-, reactive- and unobtrusive observation (Denzin & Lincoln, eds., 2005, p.732). Unobtrusive observation is the preferred form of observation by many researchers because it strengthens the reliability of findings, "the degree to which the finding is independent of accidental circumstances of the research" (Kirk & Miller, 1986, p.20). Audio and video recordings remove issues of "unspecified accuracy" in written accounts, strengthening the reliability of the findings (Silverman, ed. 8i, 2004, p.283). In the process of gathering observational data, audio-visual recording and the transcription of these is a way to overcome some of the inherent inaccuracy of field notes, and "the active contribution of the researcher in constructing the descriptions he or she produces about language use" (Silverman, ed., 2004, p.285). This also has implications for validity, "the degree to which the finding is interpreted in a correct way" (Kirk & Miller, 1986, p.20). Improving the accuracy of observational data, to the point where it renders as full a picture as possible of the situation under study, should leave less room for the researcher to exercise undue influence on the analysis, post factum. As my video recordings contain both the audio and a visual rendition of the situational events, such as gestures, have less need to recall events from memory, from which I could be introducing errors into the analysis.

Observation in an ongoing learning environment would requires to some extent that the researcher remains passive, so as to not disturb the natural situation. However, the presence of a researcher is itself a deviation from the normal, and total passivity could be seen then to only add in the situation deviating from the normal. An advantage to conducting observation in the context of the Norwegian Virtual School is the relatively non-obtrusive presence of the recording equipment. As all interaction is mediated through the same recording equipment as classes are recorded with, actors can be considered relatively acclimatized to the presence of a camera and microphone. Being able to observe a past learning environment, that has been recorded on video in this way, offers "naturally occurring data" (Silverman, 2010, p.131-132), where actors' actions are not initiated as a result of the researcher's influence on the situation. As such, it is especially advantageous that in a virtual community, the recording equipment is the same as that which mediates the social interaction. There is no separate camera or microphone for recording the observational data, and as every class is recorded, the

practice can be considered somewhat normalized. Being able to conduct observations of situations recorded over the course of a year means that it is possible to observe changes in practice from the start, and up to the end, of the period under observation.

However, this does raise some ethical considerations. If pupils expect to be recorded for teacher training purposes it can be ethically unsound to utilise the same recordings for research purposes, highlighting the need for informed and understood consent from all participants. I therefore discuss this issue further in the subchapter on ethical considerations.

3.3.2. Sequencing and sampling of observations

In conducting observations of a sample of six classes, I have looked for phenomena indicating changes in practices. These changes can, however, become invisible as one is immersed in the observational context. In order to overcome this phenomenon, I have chosen observations at the extreme ends of the temporal spectrum. In order to overcome, I have conducted in-depth interviews, in order to account for the role of actors.

3.3.3. In-depth interviews

I have drawn on observation data to inform the process of formulating questions for a semi-structured interview guide, reflecting three dimensions of practice which I use to analyse my findings. I have conducted three in-depth interviews, applying my conceptual framework, reaching the level of saturation (Repstad, 2007). Each interview lasted for 45-50 minutes. They were conducted via Skype, and also via the Adobe Connect service; the same as used for the Norwegian Virtual School. Conducting the interviews in this context, allowed me the interview informants in a relatively close approximation to the sociomaterial contexts that were previously observed, and which the interview guide was concerned with. This also had the benefit of enabling the informants to demonstrate their own teaching practice during the interview, concerning pod layout and use, as well as interaction with student participants.

As with observational data, interviews were recorded on video, and included both the informant and the pod layout.
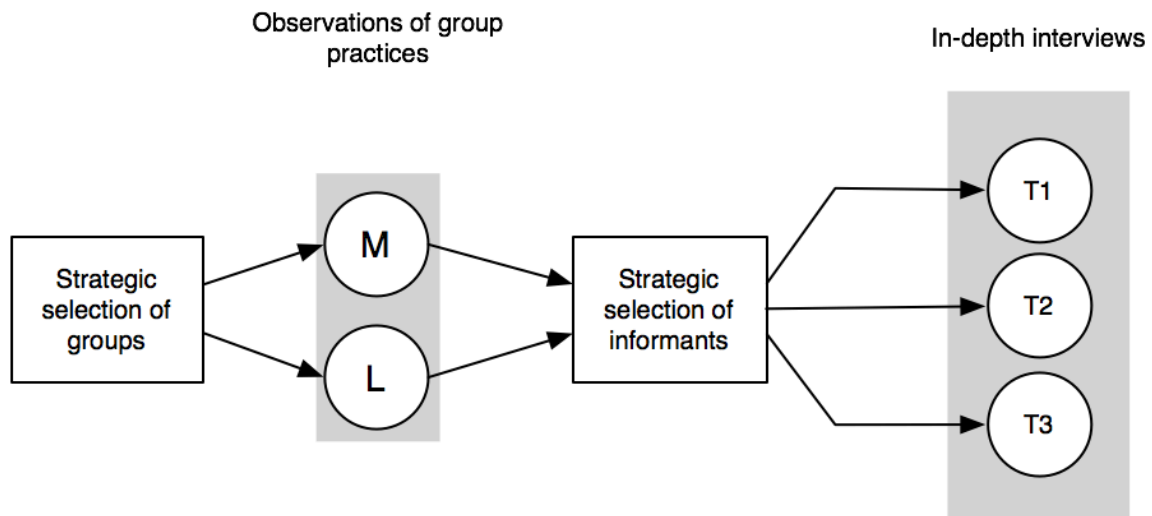

Fig.3.1 Two-step model of data collection process

Step 1: Observation and operationalization of questions for in-depth interviews. Observed phenomena are grouped according to operationalised dimensions, numbered and denoted by M or L for the community it was observed in.

Step 2: Interviews that serve to produce data on interpretations, reactions, and norms as basis for social interaction. Informants are denoted by T and numbered.

3.3.4. Samples, procedure and measures

In selecting informants for in-depth interviews, it is important to keep in mind *who* to select, as well as *how* the groups are composed into a unit of study (Jacobsen, 2015 p.184). Important characteristics of the problem formulation need to be considered, in order to be present within the samples (Halkier, 2010, p.30).

In conducting a theoretically guided strategic selection of informants; those who have direct knowledge of the case; it is purposeful to align the characteristics of the theoretical perspective and those of the informants (Halkier, 2010). One way of accomplishing this is to select those believed to have in-depth knowledge, and who are

predisposed to divulge this in an interview setting; requiring that we first determine the qualitative aspect of the respondents as information sources (Jacobsen, 2015, p.181). Such an information-oriented selection is strategically guided, under an expectation that the chosen sample exhibits a certain level of information content (Flyvbjerg, 2006, p.230).

Although gender, ethnicity, and socio-economic factors could be relevant variables, my problem formulation does not make the case for considering them.

This thesis takes the form of an empirical case study, wherein I consider the interaction between actors as a case (Halkier, 2010, p.31). Such a view takes into consideration the collaborative nature of social institutions, such as a classroom.

3.4. Ethical considerations in drawing samples

The sample consist of students enrolled with the Norwegian Virtual School, drawing respondents from both language and mathematics groups (communities M and L). The strategic selection, as well as the process of reaching out to the respondents is done in cooperation with the school.

It is important to consider how conducting research on people, and especially students and other groups of young people has implications for several issues of research ethics and privacy. Whether the research conducted plays an active part in collecting and disseminating information on an individual's self-respect, integrity, right to privacy, or other important aspects of its existence (Forskningsetiske Retningslinjer for Samfunnsvitenskap, Humaniora, Juss og Teologi, 2016). This is especially pertinent in cases where there is a possibility that a participant (a respondent or an informant) can be directly or indirectly identified through the text. Indirect identification can occur where an anonymous participant is identified by means of connecting other identifying information (Jacobsen, 2015, p.49-50). It is also important to consider group rights and rights of third parties, as an individual who could be trying to illustrate their own condition, might inadvertently divulge information that can incriminate or identify those who have not had the option to give consent or not. The issue of inflicting harm on a third party is especially relevant for qualitative research (Forskningsetiske Retningslinjer for Samfunnsvitenskap, Humaniora, Juss og Teologi, 2016), but can also be relevant in

quantitative research where respondents are given the ability to textually articulate their understanding of a question. In this regard, it might be purposeful to limit a respondent's choices in answering. Considering the rights of individuals; primary informants and respondents, third parties, as well as groups, it is important to ensure measures are taken to have consent from those potentially identifiable, directly or indirectly, through the data.

Western research ethics are commonly seen to abide by the three main points of codes and consent, confidentiality and trust, however, if the research implicates individuals or groups of other cultures, it is important not to see these as universal values, but to consider other possible issues (Ryen, 2011). In this regard, a typical class can have students with a variety of cultural backgrounds. This potentiality can have implications on whether the participants fully understand the scope and intentions of the research project, as well as the choice of research method employed, and which they will be subject to. A cultural consideration might be necessary, in advance of recruiting informants, if there are fundamental incompatibilities or moral and ethical questions that remain unanswered.

In the strictest sense, the ability to give an informed consent to participate in a research project, not only means that it is given voluntarily, but that full disclosure has been given and that it has been fully understood by the person giving consent (Jacobsen, 2015, p.48). In practice, it can be difficult to assess whether something is fully understood, in which case, careful consideration needs to be given to how information is articulated textually or verbally, this, in order to mediate the imbalance between the researcher and the participants. Social factors might also constitute a pressure, and I need to carefully balance the consent of the Norwegian Virtual School for access to their data, and the consent of the students for their participation. Again, this is especially important regarding younger participants, who might also need parents' consent.

4. Analysis and findings

Here, I present findings from the two-step data collection outlined in the previous section. Firstly, I analyse observational phenomenon using relevant practice theories. Secondly, I analyse in-depth interviews with three informants, in which they reflect on their own practice, relating to these theoretical constructs. The aim of this analysis is to gain a deeper understanding of observed phenomenon, within the context of The Norwegian Virtual School and two observed communities of practice. These are anonymized as M and L.

The first group of observed participants are students. I analyse their actions in relation to other participants within the group, the teacher, as well as the non-human, material actors of the virtual community context. I have focused on three dimensions of practice theory: tools, interaction and learning. These dimensions reflect the role of sayings and doings in the articulation and intelligibility of practice (Schatzki, 1996; Schatzki et al., eds., 2001), as well as coincide with three dimensions to the coherence of a community of practice: "mutual engagement, joint enterprise and shared repertoire" (Wenger, 1998, p.73).

4.1.   Networked toolset

A networked toolset is characterized by the interconnectedness and mutual dependability of a set of tools, connected through the means of protocols aimed at making them functional and intelligible to users. As such, networked toolsets can be considered "practice-arrangement bundles" (Hui et al., eds., 2017, p.133). Phenomena indicating networked toolsets are denoted X, based on observation, and S, based on in-depth interviews.

The networked nature of the utilized toolset shapes the sociomaterial context for each participant and for the community of practice, as breakdowns in toolset functionality and intelligibility can lead to a breakdown in practice. This can be illustrated by observational findings where two students describe a break-down in practice owing

to the malfunctioning of networked toolsets, where YouTube is utilized through a pod in the Adobe Connect classroom software: [Participant 1]"I didn't catch any of it, almost, because it was very choppy ... [Participant 2] Me neither" (X_1L). One interpretation of this situation is that the student participants are simply pointing out the unintelligibility of the video, due to the high connection latency, which causes the "choppy" video feed. Another is that the student participants are articulating their perceived unintelligibility of a situated action, which can be seen as a minor breakdown in practice. Breakdowns, in this sense, are temporary suspensions of commonly accepted actions, within the community of practice. This situation appears to result in a sense of unintelligibility, where student participants question the use-value of the utilised networked toolset. However, informant T1 states: "The YouTube-pod that is available provides very high-quality audio ... Instead of lecturing, I can show three minutes from a video ... I can play it again, and once more" (S_0). This can suggest that breakdowns in practice are temporary, and that use-value is negotiated on a situation basis, as part of discursive practice.

Breakdowns affect the articulation and intelligibility of practice by hampering actors' efforts to perform meaningful actions. One student participant notifies of a problem with staying connected with the community: "I'm losing the connection and dropping from the class". Here, the student participant appears to act to notify the other participants of its situation, and calling attention to the problem between its utilised toolset and the sociomaterial context, which requires a sustained connection in order to participate. Findings suggest that utilising a multiplicity of tools counteracts fragility, associated with a perceived commonality of breakdowns to communications within the community of practice. An observed situation illustrates this. Student: "Are you receiving the messages I am sending?" Teacher: "I have not received the messages. Contact me by Jammer, phone or Facebook". Because of this breakdown in practice, the teacher participant suggests alternate means of utilising the networked toolset, to the student participant. This type of situation can illustrate the difficulties of a highly-networked sociomaterial context for participants to act meaningfully in discursive practice.

Utilising a networked toolset, as with the Adobe Connect service, necessitates placing an interaction protocol between different toolsets in the network, meaning that breakdowns in interaction have systemic effects. This illustrates the fragility of sociomaterial contexts reliant on networked toolsets, especially where interaction and

work is completely mediated by technology, something I discuss further in the discussion part of the thesis. However, findings from interview data suggests that a networked toolset gives participants flexibility to choose tools they believe are suited to the task they aim to achieve. Informant T2 states that: "You have great opportunities in Adobe Connect. More or less anything you can do via a computer, you can do here" (S_1), but the informant also emphasises that "you tend to use the tools that you succeed with." Informant T1 states: "I can take a few minutes from a video, play it again, and again"(S_2). This implies that there is an iterative element of trial and error, but also that there can be a certain barrier to adopting new toolsets.

4.2.   Suspending interaction

Student participants can intentionally or unintentionally act to suspend interaction in a variety of ways, as well as have their interaction suspended by other human and non-human actors within the sociomaterial context of the virtual community. Phenomena indicating suspended interaction are denoted Y, based on observation, and T, based on in-depth interviews.

Observational findings, as well as findings from in-depth interviews, indicate that student participants intentionally suspending the interaction can do so by cancelling the camera or microphone signal, which connects them audio-visually to the community. Unintentionally acting to suspend the interaction can occur when students perform actions that have unintended consequences on interaction. Higher-level participant competence can, possibly, alleviate unintentional acts, as higher expertise in actions pertaining to handling interaction can reduce the severity of functional errors. Having means of interaction suspended by other sociomaterial actors can occur when a teacher or administrator revoke privileges, i.e. for microphone or text input, or where events take place in the system, which are outside of students' control, i.e. loss of internet connectivity, or software and hardware glitches. Findings suggest that these three categories of occurrences take shape within the sociomaterial context of the virtual community.

Observational data as well as interviews with informants indicate that the camera as a means of interaction, and a tool, is at the locus of activity in the virtual community, but practice relating to its use varies between the two observed communities. Informant T1 states: "I want the camera on ... the camera must be on. We mute the microphone when they are not speaking, to avoid echo"(T_0). Informant T3 also states: "It's hard to interact when you do not see each other. As we are on-screen, it has to be in place"(T_1). However, observations of samples M and L indicate substantial difference in practice, concerning the camera as a means of interaction. In sample L, the camera pod is regularly resized, so that it takes a prominent position in the pod-layout of the virtual community. Redesigning the pod-layout, in order to emphasize a certain participant in the group, could be a way of further drawing the camera, as a means of interaction, towards the locus of activity. In sample M, the camera can, to a greater extent, be seen to function as an avatar. It indicates presence, as well as rendering a recognizable image of the of the student participant. Taken together, these findings indicate that the function of the camera, as a means of interaction, emerges out of actors' activities, in practice. Because students' names are listed in the participant pod as being present, suspending interaction, without leaving the group, heightens the visibility of the action. This illustrates the degree of technological mediation in the sociomaterial context, its fragility to disturbance, and the perceived nature of the phenomenon.

Although muting student participants' microphones keeps down ambient noise, the action also reduces the number of pods and functionality, as means of interaction, available to participants. Observational findings indicate that this causes a shift in interaction to different pods. For instance, when some students suggest an alternative way of using of a tool (Z_0), they textually articulate their proposition in the chat-pod. As students' microphones are muted during this observation, their only real-time input is through the chat-pod. This underlines the importance of the chat-pod, to the students, as a means of interaction; letting them perform communicative actions that can have implications for the making and re-making of practice.

4.3.   Learning play-ability

Findings suggest that participants play-ability in practice is developed and coordinated according to articulation and intelligibility of actions, and that it is a shared activity. Phenomena indicating play-ability have been denoted Z, based on observations, and U, based on in-depth interviews.

As practice is inherently social, distributing work on tasks between participants in a community is seen to be necessary, and mutually beneficial, for all participants. Informant T3 states: "The work load should be placed on the students. We don't want the teacher lecturing" (U_0). Findings indicate that work as a shared activity is more demanding on individual participants, as they can no longer rely on an expert participant performing work on a task. Informant T2 emphasizes the highly demanding context of the virtual community, and point to a sharp learning curve for student participants: "In a way it is a new landscape for them. One thing is to participate in the classroom. It is something else entirely to do this digitally, to step forward to say something and to do something. And perhaps then, to consider how the other student participants react". (U_1).

An emphasis on work as a shared activity, can have the added benefit of counteracting the inherently asymmetrical learning relationship between teacher and student participants, often found in classroom contexts. From this perspective, learning is not seen as a function of a dyadic relationship, but as emergent through the shared activity of multiple participants, in social practice. Informant T2 states that: "I constantly learn something new. I have learned a lot. Like small tricks that they have managed to figure out on their own." (U_3) Here, the teacher illustrates how learning play-ability is contingent on attaining necessary competences, and that the learning process is a negotiated enterprise between all participants. The distinction between novice and expert can be seen to be continually made and remade depending on the competences demanded of each situation. The implication is that changes to practice do not take form solely in individual action, but as actions in a social context.

Learning play-ability in a social context implies a need to habituate that context. Informant T1 states that: "I notice a big difference in participation, after we have been on the study trip, at the beginning of the year. They form cliques, interacting regularly

through social media." (U4) Within the community of practice, cliques, or small groups, are formed either informally, through relational means, or more formally, assigned by the teacher participant. Informant T2 states: "The greatest challenge is to get interactivity with the students. Getting them to talk, to share"(U5). Interaction in the virtual community context appears to exhibit similar phenomenon to similar, but less technologically mediated, contexts, in terms of relational factors, such as mutually beneficial experiences and interests. However, play-ability in this context places added emphasis on the need for beneficial technology-use competences, to enable student participants to perform purposeful actions. This includes work on tasks, performed in tight-knit cliques or, more open, community centred groups, within the virtual community. This implies a need to acquire technology-use competences in social context.

Observational findings highlight phenomena relating to participants' actions to develop or manifest their play-ability within the community of practice, and that this is done with the aim of learning. Attempting to define a situation or task, and seeking to clarify that their own actions are intelligible to those of others, are examples of such actions. At the start of a game, the teacher explains its rules to the student participants (Z8). Teacher: "I ask student 1. And student 1, after you have answered, chooses the next person." Student 1 articulates an answer in Spanish, then asks: "Do I ask someone else then?". The affirmative question posed by the student participant can be interpreted as a means of clarification of future action, in order to ensure intelligibility.

Findings suggest that means of ensuring the intelligibility of practice and learning play-ability are inherently communicative, such as when a student proposes a definition of a task, through the chat pod, in response to a request from another student: "Student 1: I don't understand what we are supposed to do? [Sic] Student 2: Write a sentence starting with en cuanto a:)" (Z6). Both these statements have propositional content aimed at learning. For student 1, the unintelligibility of the task implies that a learning process is needed to enact competences, and perform conventionally accepted actions. Participants perform actions aimed at clarifying and enhancing play-ability: "Student 1: Do we have to know which number the rule is? Student 2: No, don't think so student 1." Here, neither participant is certain of their understanding of the task, and are therefore compelled to check and align, with the community. Actions like these provide opportunities to manifest play-ability, although, because of the public nature of the

statement, the possibility is left open of being questioned and corrected by those to whom it is unintelligible. This can suggest that unintelligibility offers potential for learning and overcoming breakdowns in practice.

Participants act to clarify with others if they are audible, before performing a presentation: Student: "Can you hear me?" Teacher: "We hear you". These short interactions, relating to technological means of interaction, occur regularly. It has not been part of my methodological design to quantify them, but I have noted that their occurrence appears more regular in sessions from earlier in the year, than towards the end. I take this to be an indication that interactions, such as these, are part of wider learning processes where participants' actions align with convention, improving their play-ability. In the virtual classroom, audibility is joined by visibility in improving intelligibility and thus enhancing play-ability. In one observed sessions, the teacher addresses the issue to students: "It is easier to understand what we want, and to communicate when we not only hear the voice, but actually see each other" (Z_{10M}).

4.4.   Summary of findings

In the analysis, I isolate three dimensions of practice, based on relevant practice theory. I have outlined these, along with their related findings, in tables 4.1 and 4.2. Table 4.1 provides an overview of observations in communities of practice M and L, and table 4.2 provides an overview of categories of findings, based on in-depth interviews with informants, relating to three dimensions of practice, that are part of this analysis. These three dimensions of practice call attention to both the inherently social and material characteristics of social activity.

Networked toolset	Suspending interaction	Learning play-ability
X_{0M} Local software in pod	Y_{0M} Pausing webcam	Z_{0M} Suggesting alternate practice
X_{1L} YouTube interconnectivity issue	Y_{1M} Muting microphone	Z_{1M} Shared work action
X_{2L} Participant connectivity issue	Y_{2M} No camera possible	Z_{2M} Individual or group task
X_{3L} Tool multiplicity	Y_{3M} Commitments outside of community context	Z_{3M} Socialising
X_{4L} Tool breakdown	Y_{4M} Can't get camera to work	Z_{4M} Attempted task clarification
	Y_{5M} Actions outside of community	Z_{5M} Shared task clarification
	Y_{6M} Effects of surroundings	Z_{6L} Shared task clarification
		Z_{7L} Clarifying audibility
		Z_{8L} Language game
		Z_{9L} Disseminating information
		Z_{10M} Rule elaboration
		Z_{11M} Rule setting

Table 4.1: Categorisation of observed phenomena, in communities of practice M and L

Networked toolset	Suspending interaction	Learning play-ability
S_0 YouTube replayability	T_0 Muting microphone	U_0 Student-driven work
S_1 Adobe Connect tool multiplicity	T_1 Essentiality of video	U_1 Learning curve
S_2 Toolset replayability		U_2 Participant identities
		U_3 Learning in social action
		U_4 Group formation
		U_5 Barriers to interactivity

Table 4.2: Categorisation of findings from in-depth interviews, with teachers and education managers

4.4.1. Networked toolset

The samples within categories X and S indicate that the tools actors choose to utilise in the virtual community function in conjunction with, not in isolation from, other tools within the sociomaterial context. Tools can be seen to constitute arrangements of bundled activities, that are by their very nature interactive and highly network-reliant. All of the samples indicated that the inherent multiplicity of a networked toolset exhibits a fragility in the ability to constitute an intelligible activity. Break-downs, as a result of severed linkages, caused participants to question the inclusion of a particular toolset in community practice. However, they were also shown to provide great flexibility to participants, offering a potential to change practice outside the scope of any one tool.

4.4.2. Suspended interaction

In categories Y and T, samples illustrate how interaction between actors is suspended, both purposefully and not. Suspending interaction is shown to have implications for actors' participation and non-participation, in a community of practice. Findings indicate that the camera is seen as the locus of interaction and activity. Much emphasis is put on the importance of visual representation of the participants, to such a degree that the phenomenon recurs throughout the observed sessions. The camera is seen to provide compelling visual evidence for participants' attendance, meaning that the moving image serves as basic proof that the student participant is actually there. Complemented by sound and type, the camera image is also seen to provide a necessary component of face-to-face interaction.

4.4.3. Learning play-ability

Samples in category Z and U indicate that actors learn play-ability, by unfolding context-specific competences in order to solve shared tasks. Findings suggest that performing tasks to amend break-downs to practice, offer opportunities for learning play-ability, enabling actors to intelligibly articulate their actions, in the context of social practice. Performing intelligible actions, as a manifestation of play-ability, can be seen as a measure of participants' ability to co-ordinate activity with others.

In the next section I further discuss my findings in relation to relevant practice theory.

5. Discussion and conclusion

In this explorative thesis, I discuss the results of an empirical study into changes to social practice, in virtual communities of practice. I discuss findings from a two-step qualitative data collection, with observations and in-depth interviews, and their relation to relevant practice theory. I explore the role of pods as actors' means of interaction (RQ.1), what phenomenon are encountered in the process of learning to become a competent participant in a community of practice (RQ.2), and what ways learning processes have implications for practice change (RQ.3). Two communities of practice, M and L, are studied, through a series of observations from September 2016 through to March 2017. These communities were selected based on preliminary observations. Both these communities of practice are interesting for study purposes as they were both newly constituted and time-limited, within the context of the Norwegian Virtual School. In order to answer the three outlined research questions, I have developed an analytical framework covering three dimensions of practice theory: tools, interaction and learning.

Based on findings from my two-step data collection, I have further operationalised these dimensions as networked toolset, suspending interaction, and learning play-ability. RQ.1 covers networked toolset and suspending interaction, whilst RQ.2 and RQ.3 cover learning play-ability. There is no hierarchical ordering of these dimensions, as they *interdependently* constitute the sayings and doings that articulate and make social practice intelligible. As I see it, these dimensions are part and parcel of practice arrangements, and as such, their inclusion in analysis and discussion of practice is a precondition for exploring and conveying the phenomena I seek, in this thesis.

5.1. Networked toolset

Tools are artefacts that mediate actors' actions in the sociomaterial context of social practice. The central importance of tools, as mediators of action, implies that human actors have limited externally directed influence, on their environment. The role of mediation is especially pertinent in the context of the Norwegian Virtual School, where

technological artefacts, such as properties of the camera, microphone, screen and speaker, play a significant role in mediating the language and perception of actors' interaction. These artefacts determine the reach and effect of actors' resource integration, based on their properties and actors' use-competences. For instance, student participants regularly express an inability to get their camera or microphone functioning. If and when the student participant is unable to use a toolset, their reach, in relation to the rest of the community is negatively affected. In the context of the virtual community, they could find it more difficult to interact meaningfully with the other participants of the community, or even unable to interact at all, potentially placing them on a trajectory of non-participation. From the student participant's perspective, non-participation can be detrimental to learning higher-level competences. From the perspective of the institutional arrangement, the school, the community, this can be detrimental to furthering ideological forms of participation, such as democratic leadership, perceived as central to the institution. Actors' inability to enact necessary competences can also be seen to challenge the functioning of the institution, on a fundamental, value-creating, basis. Enabling value co-creation to occur is seen to require the concerted effort of a multiplicity of actors, meaning that actors unable to enact competences prerequisite for identities of participation, are simultaneously excluded from the arrangement of that practice. This degree of difference, from full participation to non-participation, is temporally bounded, meaning its state is not permanently set. This implies a role for learning, in advancing actors' degrees of participation.

Observational findings in category X, indicate that significant attention is paid to learning: getting to function, and error-correcting tools. When one participant experiences problems with the toolset, others appear to act based on a reciprocal understanding of the event. Such "actions in context" (Nicolini, 2012, p.107) are a concerted effort performed by multiple participants, attempting to help the non-participating actor back into the community. Because an actors' utilisation of a tool, immediately becomes visible to the community, it situates their action in a context, where others can perform re-actions. I see this as a clear strength of a toolset which links actors' actions, in the community of practice.

Findings, such as this, indicate that tools are not only locally assembled and adopted, but are networked toolsets, dispersed throughout a network of sociomaterial

actors. It could be argued that all tools emerge in networks. The wooden handle of a hammer and its metal head emerge out of different parts of a network. However, it does not depend on this network, in order to function. In fact, the hammer's ability to function, when it comes into use, is more dependent on the competences of the person wielding it, than the network out of which it emerged. The idea I put forth, of a networked toolset, builds on Engels' notion of a correlative development of the hand and the brain: "the hand alone would never have achieved the steam-engine if, along with and parallel to the hand, and partly owing to it, the brain of man had not correspondingly developed" (Engels, 2012, p.35). In this sense, it is not necessarily in the procurement of the tool that it is networked with other tools to form sets, but through use. Network-effects in use can be succinctly illustrated by the telephone, whose use-value is a function of the number of actors participating in the phone network, and whether they are of interest to each other. Gradually removing participating actors degrades the functional value, to the point where it no longer has any value-in-use. As I see it, this is the case with digitally networked toolsets, which are moderated by the competent work of dispersed actors and mediated by the functionality of protocols. From a service system perspective, "value-in-social-context" is inherently intersubjective (Edvardsson et al., 2011, p.333), meaning that value is not a measure of individual perception, but determined by arrangements making out social order.

Findings indicate that participants' interaction in the context of the virtual community is mediated through technological artefacts, and that participants' direct influence on their environment is limited. A networked toolset is suggested as a phenomenon related to the mediated nature of interaction. In the context of the virtual community, this appears to give participants a wider scope of possible means, with which to interact with the external environment. All informants regarded the wide range of pods, as means of interaction, as a benefit of a virtual community, as it provided opportunities to interact in, what they perceived to be, a manner purposeful to the context. However, a networked toolset also has limitations, in terms of both participants' use-competences and network-related issues. Findings suggest that a confluence of these factors can increase unpredictability for the community of practice, making it harder for participants to articulate practice, and ultimately making it less intelligible.

5.2.   Suspending interaction

All interaction, in the context of the Norwegian Virtual School, is mediated by technological artefacts, such as the camera and microphone. Observational findings, as well as findings from in-depth interviews indicate that especially the camera is perceived as the locus of activity. This prominence ascribed to the visual representation provided by the camera has several possible explanations. Informants generally regarded the image as the best evidence of participation. Also, informant T3 pointed to the need to see each other, emphasising its importance to interaction. Taken together, these findings highlight the importance of technological means of interaction. As such, when issues arise pertaining to these technological artefacts, participant's means of interaction are suspended, causing temporary break-down to practice. Findings indicate that these occurrences are both intentional and unintentional, and that they reveal the fragility of the sociomaterial context.

A common practice in both sample M and L is to mute the microphones of participants who are not speaking. Suspending participants' means of interacting verbally is done to avoid a confluence of ambient noise from participants, and to make the actively speaking participant, audible to everyone. This reduces audible noise, but also places restrictions on participants' ability to engage in verbal discourse. Because of the practical impossibility of muting other participants in non-technologically mediated face-to-face interaction, audibility is usually achieved by speaking louder, and by appealing for relative quietness. Sociomaterial aspects, such as the architectural design, building materials, saturation and lividness of people in the room, will all effect audibility. However, in those contexts, participants don't each wear microphones that record breathing and other usually inaudible sounds. The practically appealing solution of suspending a means of interaction, by muting participants' microphones, consequently causes interaction to shift to other means, such as the chat pod, where participants can textually articulate their propositions. However, in addition to having their means of interaction suspended, a phenomenon that becomes apparent through observing samples M and L, is that participants themselves, also, purposefully suspend interaction.

Observational findings indicate that the act of purposefully suspending a means of interaction, i.e. by pausing the web camera or by proposing a reason for not being able

to activate it in the first place, such as being at home or on a bad line. When a participant connects to the virtual community and activate their camera, their image is added to the participants pod overview, together with all other participants. Thus, all participants see each other in real-time, as if interacting face-to-face. When the camera signal is suspended, the image is frozen, and a pause symbol appears (illustration 3.1), indicating this to other participants. This category of action (Y) was more prevalent within samples M, than samples L, suggesting that community social practice, and learning from other participants plays part in performance of the action. As with a propositional utterance, the action can be analysed in terms of having performativity, which facilitates re-action on the part of other participants. If an action is observed to be condoned by the community, and it appears advantageous to other participants, it is reasonable to assume that it will be adopted by them as well. The observed difference in the samples indicates, that in terms of service innovation, participants in various communities relating to the same service, could exhibit variations in the adoption of new types of actions, forming bundled activities that participants find intelligible, to that sociomaterial context.

Within the sociomaterial context of the Norwegian Virtual School, visual representation, through video, can be considered inseparable from the means of discourse, namely acts of sayings and doings. As such, when the phenomenon of suspending a means of interaction transpires, it links to other practices; forming "practice-arrangement bundles", which in their multiplicity constitute constellations, and again, nexuses of practices and arrangements (Hui et al., eds., 2017, p.133). An act of suspending interaction can be seen as a shifting of a participants position along "a range of interactions between participation and non-participation" (Wenger, 1998, p.164). These acts define the trajectory of participants' roles in the community of practice. Depending on whether a participant is negotiating for a position on an inbound trajectory, from the periphery, or on an outbound trajectory, towards marginalisation, affects a participant's ability to negotiate an identity of participation, in the community of practice. Non-participation can allow participants to maintain their position along the periphery of a community, although communities that strive towards an egalitarian ideal and equal opportunities for participants, will find that those kept on the periphery or margins of a community experience learning difficulties, as well as diminishing influence over community activities (Wenger, 1998). From a service innovation perspective, it is

perceived to be advantageous to utilise the resource integrating potential of all participating actors, in order to co-create value. As I see it, suspending interaction is an enactment of non-participation, one which is best counteracted by participants learning play-ability.

5.3.   Learning play-ability

I have touched on the performative aspect of communicative action competences, combinations of skills and knowledge situated in practice, which enable actors to solve theoretical as well as practical issues, as they emerge (Lave et al., 1991). Findings indicate that participation in a community of practice, requires particular competences, to perform mutually intelligible sayings and doings. I do not see it as the case, that communities of practice are empty vessels, into which, inbound participants offload their collective repertoire of competences. Neither do I see it as the case, that communities of practice are inherently stable contexts, of best-practices, with prerequisite competency requirements. Participants' learning play-ability unfold context-specific competences necessary for competent participation in practice, at the same time as practice unfolds in new ways.

Becoming more competent participants in social practice, both, enables and constrains participants' ability to interact intelligibly with a greater part of other competent participants, of a field's dispersed and integrative practices. Integrative practices, such as utilising tools, for purposes that are intelligible to others, as well as error-checking and correcting issues that emerge, entails performing multiple acts of sayings and doings. Tool-use competences play an important role in play-ability, because of their central role as mediators of action, but play-ability also necessitates an ability to perform conventionally accepted actions (Hui et al., eds., 2017).
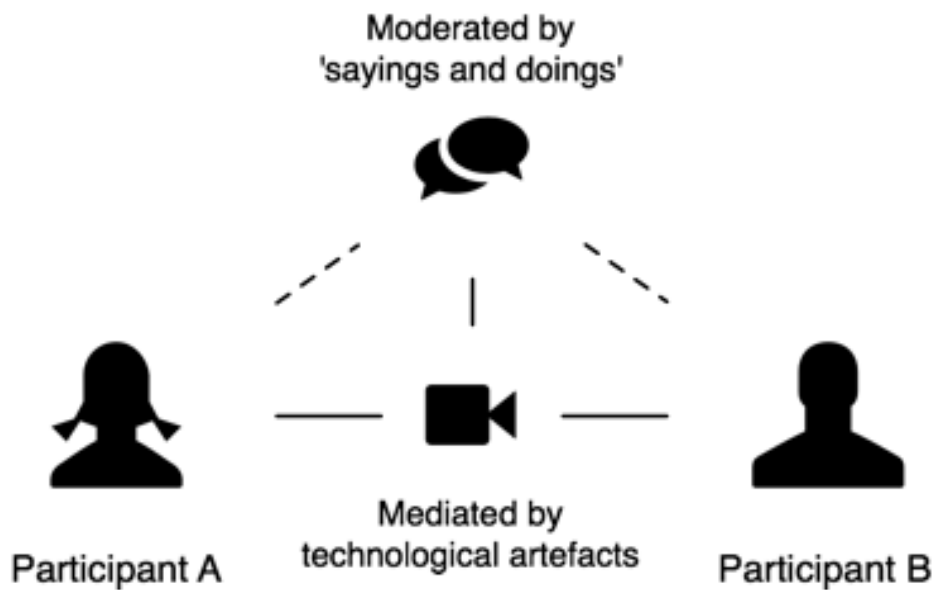
Fig. 5.1 Mediating and moderating factors, enabling and constraining play-ability

Several phenomenon of learning play-ability emerged throughout the observed samples. Participants expressing unintelligibility and an inability to amend issues were followed by other participants subsequently acting to amend issues and assist in fellow participants' learning. As I see it, it is actions like these that enable participants' play-ability. Whenever issues are encountered, or ideas for new, innovative, ways of doing things are dispersed throughout a network, for adoption, participants need to engage in intelligible interaction, as a part of learning play-ability. Hence, learning play-ability can be seen as processes of dispersion and adoption of innovation.

The sociomaterial context of the virtual communities in the Norwegian Virtual School, can be especially demanding for participants learning play-ability. Informants T1 and T2 both emphasized this, and pointed to the fact that in one group, one half of participants no longer attended. Informant T2 put it pointedly: "They were perhaps not the right kind of participants" (U_2). This brings forth questions of participants' identities of participation or non-participation, and how inbound or outbound trajectories of participation affect participants' abilities to learn play-ability, in a sociomaterial context perceived to be as demanding as the virtual community. In this context, I believe this is an issue of espoused practices, intersecting with the unfolding practices of a community which is constrained by time and space. Participants learning play-ability for intelligible

use of tools utilised in mediating interaction, articulating and perceiving social practice in an intelligible manner, will utilise varying measures of time and of boundary objects. This is contingent on their ability to enact approximate field-level competences, and to support further development of these.

5.4. Managerial and theoretical implications

Findings, from my exploratory study into the Norwegian Virtual Schools suggest practical implications for education managers, as well as theoretical implications for further development of practice theory.

From a managerial perspective, findings advocate for maintaining a holistic view in planning and performing changes to practice. This implies having an eye for articulating perceptions of arrangements from an agentic, as well as a network perspective, throughout trajectories of change inherent to innovation. In the perspective of Gadamer's "historical hermeneutics" (Gadamer, 2004, p.277), the manager, likewise to the researcher, needs to change its interpretation to fit the temporal aspect of the sociomaterial context of practice. According to observational findings, managers in the Norwegian Virtual School are, relatively, removed from the day-to-day value co-creating activities of the community. They maintain a role on the periphery of the community, interacting with both teacher and student participants on practical issues, but are rarely seen participating in sharing of tasks. Interpretations of perceived phenomenon should be enacted in the context of identities of participation at the time of observation, not as non-participants in a later, relatively removed, context. This does not imply that managers maintain identities of non-participation, but that their participation could be peripheral, in relation to other actors in the network.

In the Norwegian Virtual School, as in educational practice in general, the teacher can be seen as a navigator, providing agency to a vehicle in which participants in a community group negotiate trajectories of participation and non-participation (Wenger, 1998). The role of teacher participant is bestowed an inherently asymmetrical definitional power, relative to student participants, in negotiating arrangements in the community of practice. Findings from in-depth interviews indicate a perception among managers and teachers that changes to practice primarily originate in expert systems, which they are

part of. As a result, students could end up being perceived as non-participants, simply responding to change in practice, not as participants affecting arrangements to its social order. Education managers need to consider arrangements that acknowledge student participants' identities of participation.

From a theoretical perspective, findings suggest that emerging communities of practice are contingent on networked toolsets, suspending interaction and learning play-ability, in order for actors to perform intelligibly acts, in social practice. As such, the conceptual framework, encompassing these three dimensions of practice, is an attempt to explore and better understand phenomena relating to practice change, in the context of the virtual classroom.

5.4.1. Implications for service innovation

Education services are part of the wider social systems, affected by private interests as well as publically mediated obligations. Taking such a broad perspective, whilst recognizing that the primary stakeholder is and should be the student, has implications for managing education service innovation processes. Private interests are centred on generalized perceptions that service offerings should be tailored to individual wants, and that actors do more than consume service. The "shifting locus of core competences" (Prahalad & Ramaswamy, 2000), observed in organizational business-to-business and business-to-consumer interactions, are comparable to that observed in the shift towards networked governance in public sector service, where actors take on the role of co-producers (Hartley, 2005). An implication of a shifting perspective towards value co-creation in service, implies a need to recognize the resource-integrating potential of actors, and the role of learning, in enabling the enacting of context-specific resources, in practice. As education technology (EdTech) becomes ever more prevalent in education service, participating actors resource-integrating practices demands increased attention from education managers. In this perspective, actors cannot be considered ready-made to fit the sociomaterial context of the service system, but develop their resource-integrating potential through learning play-ability.

5.5. Further research

Although outside the scope of this thesis, accounting for a wider range of participating actors' perspectives – for instance, those of student participants – could yield additional insight into the role of social practice in affecting changes to institutional arrangements, such as the Norwegian Virtual School. Also, applying conversation analysis (CA) to visual data, such as virtual classroom video recordings, could yield further insights to social interaction, and is consistent with developments in practice theory.

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Annexes

Annex 1: Interview guide

- Fortell kort om deg selv og din rolle
- Hvor lenge har du undervist ved nettskolen?

Interaksjon gjennom kamera og mikrofon

- Kan du forklare litt rundt din opplevelse av interaksjon i nettskoleklasserommet.
- Er det noen spesifikke regler som gjelder for interaksjon i klasserommet?
- Er det tenkt hensiktsmessighet (noen ønskelig eller påkrevd målsetning) ved hvordan interaksjonen organiseres?
- Ser du noen utfordringer ved interaksjonen i nettskoleklasserommet?
    - Opplever du at omgivelsene eleven befinner seg i påvirker interaksjonen?
    - Opplever du at det å kunne "melde seg ut" har en påvirkning på interaksjonen?
- Hva er din oppfatning av elevenes forpliktelse til gruppen i forhold til arbeidsoppgaver eller tilstedeværelse i rommet?
    - Har du noen tanker om individualistisk opptreden i nettklasserommet?

Pods

- Hvordan opplever du bruken av pods som verktøy til å fasilitere klasseromsinteraksjonen?
    - Hvilke utfordringer er det?
    - Hvilke muligheter?
    - Opplever du å få tilbakemeldinger på bruken av pods?
        - Hvilke typer tilbakemeldinger og hva gjøres i forhold til de?

Deling av arbeidsoppgaver

- Hvordan opplever du elevenes forpliktelse til å løse oppgaver i grupper, dersom de oppfordres, men ikke tvinges til det?
- Hvordan opplever du tilbakemeldinger fra elevene i forhold til forståelsen av forespørseler?
- Har du noen opplevelse av hvordan elevenes evne til å delta meningsfult utvikles over tid?

Egen refleksjon
- Er det noe du ønsker å tilføye?