Constructing learning dialogically; learners, contexts and resources

Exploring how students and teachers participate in game-based learning and digital storytelling in educational settings

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PART I:
EXTENDED ABSTRACT

1.0 Introduction

> The learning in school should be continuous with that out of school. There should be a free interplay between the two. This is possible only when there are numerous points of contact between the social interests of the one and of the other (Dewey, 1916, p. 358).

Even though nearly 100 years have passed since Dewey stressed the importance of creating connections between students' in-school and out-of-school experiences, such pedagogical ideas continue to evoke interest in the field of educational research (Bekerman, Burbules, & Silberman-Keller, 2006; Brown, Collins, & Duguid, 1989; Gee, Hull, & Lankshear, 1996; Hull & Schultz, 2002; Leander, Phillips, & Taylor, 2010; Resnick, 1987; Sawyer, 2006). New technology has been described as both a driving force in transforming contemporary societies and as having the potential of redesigning schools and teachers' practices (Erstad, 2002; Gee, 2004; Hull & Schultz, 2001; Kozma, 2003; Sawyer, 2006). More specifically, technology has been described as one of the key tools that might enable a pedagogy capable of bringing the world into the classroom, and contribute to a more engaging educational practice for students of the 21st century (Bransford, 2000; Collins & Halverson, 2010; Hull & Schultz, 2001; Lombardi, 2007; Sawyer, 2006; Shaffer & Resnick, 1999).

  The main aim of this thesis is to explore how resources that are made available in learning environments located in educational settings, which involve the use of technology, are interpreted and used by students and their teachers. In educational research, there is a long tradition of testing out new types of learning environments for the purpose of investigating how students can inquire socially relevant problems. In this thesis I will explore how different activities, which are informed by pedagogical ideas rooted in progressive pedagogy, are enacted in technology-rich learning environments at school. These ideas are concerned with creating educational experiences that students consider engaging and relevant for themselves as learners and, simultaneously, are relevant for students as participants of societies and communities. Moreover, activities that are informed by such pedagogical ideas are implemented in order to construct learning environments in schools that expands students' access to resources for inquiring societal and curricular problems.

  In order to pursue the aim of this thesis, I will explore the use of resources in two different learning environments. The first case involves the implementation of *game-based learning* (GBL) for learning about the curricular topic Israeli-Palestinian conflict. The second case involves the implementation of *digital storytelling* (DST) for learning about the

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curricular topic World War II. As I will argue, both learning environments are informed by the pedagogical ideas under consideration.

In the discourse on the potential of GBL in educational settings there exist different arguments for using games for learning purposes (Collins & Halverson, 2010; Gee, 2003; Gredler, 1996; Gros, 2007; Prensky, 2001; Shaffer, 2006; Shaffer, Squire, Halverson, & Gee, 2005). According to Kirriemuir & McFarlane (2004), in this discourse there exists an assumption that the motivational power of playing games contributes to "making learning fun" and that games, such as simulations, provide powerful learning situations where students are "learning through doing" (p. 19). For instance, it has been argued that playing games can in itself be motivating for students (Prensky, 2001), that GBL facilitates exploration and personalized meaning-making (Shaffer et al., 2005) or simply that the design principles of good games should inspire educators to create new learning environments that would be more beneficial for their students to learn in (Gee, 2003). Moreover, computer games have been described as tools that can simulate real-life situations, and facilitate learning environments where students can learn things that are actually done outside school (Shaffer, 2006).

DST is a particular method of content-creation based on the general idea that everyone has a story to tell and that off-the-shelf technology enables people to express and share their stories with others in powerful ways (Lambert, 2002). A digital story is a short story, just a few minutes long, composed by using different modes, such as speech, images, written-text and music. Traditionally, such stories have been self-presentations, in which the topic of the story is something important from the narrator's own personal life (Lundby, 2008)[1]. In the discourse on the potential of DST in educational settings there exist different arguments for using this method (Bjørgen, 2010; Kearney, 2011; Kulla-Abbott, 2006; Nilsson, 2010; Nixon, 2009; Sadik, 2008; Sylvester & Greenidge, 2009; Vasudevan, Schultz, & Bateman, 2010; Ware & Warschauer, 2005). For instance, it has been argued that DST enables a practice that blends traditional and emerging literacy development (Ohler, 2008), gives students the opportunity to connect the academic part of school culture to their own youth culture (Ware & Warschauer, 2005), and makes students reflect deeply upon the topic of the story (Sadik, 2008). According to Vasudevan and colleagues (2010), since DST gives students the

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[1] DST originated at the Centre for Digital Storytelling in California in the early nineties, with Joe Lambert and Dana Atchley as one of the founding fathers (see http://www.storycenter.org/ for more information), and has for a long time been connected to informal workshops and *story circles* (Hartley & McWilliam, 2009). Only quite recently some educators have started to adopt DST for the purpose of creating new learning environments in school (Lowenthal, 2009). DST has been adopted on different educational levels, from early childhood education (Nixon & Gutiérrez, 2008) to higher education (McLellan, 2007; Oppermann, 2008); also in the training of teachers (Savvidou, 2010; Tendero, 2006).

opportunity to draw on resources from their lives outside school it might enable them to "break the frame" (p. 453) of the institutional context of school, something that can support struggling students in participating more competently.

Hence, the pedagogical ideas under consideration can be found in literature on both GBL and DST that reports on the potential of adopting such activities in educational settings. However, research on technology-enhanced learning in educational settings has documented that the potential of technology is generally dependent on the pedagogical practice in which it is embedded (Arnseth & Ludvigsen, 2006; Crook, 1991; Erstad, 2011; Gillen, Littleton, Twiner, Staarman, & Mercer, 2008; Sawyer, 2006). For instance, studies have shown that the success or failure of technology-enhanced learning is dependent on how teachers orient students and frame the activity in which they are engaged (Mercer & Fisher, 1992; Wegerif & Scrimshaw, 1997). Thus, assuming that technological learning tools, such as games or digital stories, can in themselves provide sufficient resources for students' learning is highly problematical. Furthermore, there exist few studies that provide detailed accounts of how DST and GBL are managed in *social interactions* between students and their teachers. Detailed studies might provide rich descriptions of how such activities are enacted in classroom practices, inform us of what kind of function these resources have for students and teachers, and reveal both challenges and opportunities and under what conditions such resources can have an impact on students' learning.

By employing a *dialogical perspective* on meaning-making and learning (Linell, 2009; Wegerif, 2007; Wertsch, 1991), I will analyze in detail how students and their teachers collaboratively make meaning of GBL and DST, in social interactions. The strategy of analyzing such interactions enables me to explore in depth and compare the use of resources in two different learning environments, both of which are informed by the pedagogical ideas under consideration.

1.1 The pedagogical ideas under consideration

These pedagogical ideas have their roots in a pedagogical trend that emerged during the last century and later became known as progressive pedagogy or progressive education. The purpose of this section is not to review the field of progressive pedagogy but, rather, to outline some of the pedagogical ideas that are associated with this tradition.

Proponents of progressive pedagogy, with John Dewey as one of the founding fathers, aimed at reforming the school system and making it more reflective of people's lives in contemporary societies (Zilversmit, 1993). In *My Pedagogic Creed*, Dewey (1959) writes

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about the importance of creating educational practices in which students' experiences are connected to the experiences they have outside school—that students' experiences are situated on the border between their school life and out-of-school life. If education fails to create learning environments that "grow gradually out of" (p. 23) the life that students live outside school, students are not involved in "a continuing reconstruction of experience" (p. 27). This, according to Dewey, is one of the main purposes of education. Furthermore, from this perspective it is possible to argue that in order to actualize this ideal it is important to provide students with learning resources that they consider relevant, especially when inquiring societal problems in school. In everyday life, students are given new resources and tools to engage with the world (Säljö, 2000; Wertsch, 1998). If educational practices are to include experiences that students have outside school, one can argue for the importance of creating learning environments in which technological resources are made available for working on curricular matters.

A pedagogical principle that is closely connected to progressive ideas is *authenticity* or *authentic learning* (Petraglia, 1998a, 1998b). In this regard, authenticity has to do with whether or not learning situations in school correspond or connect in some way to learning situations in the world outside school. One way of understanding authentic learning in school can be seen in attempts to provide students with opportunities to engage in lessons resembling activities that are part of real practices in the society. For instance, according to Brown and colleagues (Brown et al., 1989), students "need to be exposed to the use of a domain's conceptual tools in authentic activity—to teachers acting as practitioners and using these tools in wrestling with problems of the world" (p. 34). Another way of understanding authentic learning is seen in attempts to create learning environments in which abstract knowledge is made concrete, in which diverse forms of cultural resources are made available to students for inquiring relevant societal problems. For example, instead of learning about the lives Norwegian asylum seekers experience in reception centers through reading text books alone, students can visit such places and experience the lives of asylum seekers on their own. It is this latter view of authenticity that is in focus in this thesis. Computers' capacity to bring real world experiences into the educational lives of students have been discussed in terms of authenticity (Lombardi, 2007; Petraglia, 1998a; Shaffer & Resnick, 1999). For instance, according to Shaffer and Resnick (1999), technology enables connectivity (the access to public places to retrieve, share and develop content), modeling (the ability to construct models of the world), and representational pluralism (the opportunity to choose among multiple

representations of a topic in question). From this perspective, it is possible to argue that technology holds the potential of providing students authentic learning situations in school.

However, according to Petraglia (1998a), the connection between technology and authenticity is a problematical one. *Preauthentication*, a term that Petraglia introduces, presumes that it is possible to distinguish different tasks that are authentic from those which are not, and thereby create authentic tasks that students can engage with. According to Petraglia, making assumptions about the quality of learning environments in terms of authenticity prior to student's use of them is problematical since the learning environment is made meaningful by the learner drawing on his or her prior experiences and interests (Petraglia, 1998a). Furthermore, Petraglia (1998a) points to the problem of assuming that a given technology will provide the same learning environment for all students in all educational practices, regardless of what kind of interests and agenda the students and teachers have when engaging with the tools the technology affords. According to Minick and colleagues (1993): "educational failure...can represent an unwillingness to subordinate one's own voice to that of another rather than an inability to learn" (p. 6). Learning is not only about students' capacity to learn, it is also a question of *willingness* to learn under the conditions that are set by the school system and the teachers. Hence, it is possible to argue that even if learning environments are created to be authentic, the potential of such learning environments have to be seen in relation to students' own voices. What educational technologists interpret as authentic, and thereby presumably facilitates learning in a motivating way, might be seen from the student's perspective as irrelevant and meaningless.

Research on technology-enhanced learning has documented that the potential of technology is highly dependent on how it is embedded in a pedagogical practice and how the context of use is created by teachers and students. For instance, according to Arnseth & Ludvigsen (2006) an important issue is whether students are enabled to make sense of the technology they use—to what extent they are guided in interpreting what such tools offer— and how these tools are seen by the students as relevant for themselves as learners. Moreover, the importance of teacher intervention has been emphasized in studies of technology- enhanced learning (Furberg, 2009; Greiffenhagen, 2012; Krange & Ludvigsen, 2008; Littleton & Light, 1999; Mercer & Fisher, 1992; Wegerif & Scrimshaw, 1997). According to Wegerif and Scrimshaw (1997), students' expectations and how they experience their roles as learners when using computers in classroom activities are highly dependent on the talk of the teacher. How the teacher contributes to shaping the pedagogical context through talk has been found to be one of the most important elements for the success of technology-enhanced learning

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(Mercer & Fisher, 1992). Teachers can orient and re-orient students to specific aspects of the technology that can help students see the value of the tool, make links between the technology and the problem that students work on, make students' informal competences in the use of technology relevant when working on curricular topics and so forth.

Hence, in order to study how activities, which are informed by the pedagogical ideas under consideration, are enacted in practice, a productive point of departure is to analyze how students and teachers make meaning of such activities in social interaction.

1.2 Choosing the cases on GBL and DST

In this section, I will first give a short description of each case I have studied[2]. Then, I will point to some similarities and differences between the cases and outline the rationale for choosing exactly these two.

1.2.1 The case on GBL and DST

In the case on GBL, I video-recorded upper secondary students who participated in a school project concerned with the Israeli-Palestinian conflict. The main activity in this project was playing the game *Global Conflicts: Palestine* (GC: P). However, the project also included an introductory lecture, plenary discussions and the watching of documentaries about the conflict on YouTube. In GC: P, the player assumes the role as a journalist (the avatar), and is assigned to cover different themes of the conflict. The journalist has to seek out different non-playing characters (NPC), in a simulated version of Jerusalem, who belong to each side of the conflict. These NPC's tell different stories about the particular theme, and the journalist must collect quotes from the stories told. At the end of each mission the journalist writes an article by using the collected quotes. The students have been playing in dyads, using laptops. During game play the responsible teacher walked around helping the students in different ways and discussing different aspects of the game and the themes which it addressed. After the project ended, the students were given a graded test in which they wrote a news article about an optional theme from the conflict, drawing on their experiences from the project. The pedagogical aim of this school project was that students would gain a subtle understanding of the complexities of the Israeli-Palestinian conflict, and global conflicts in general, through encountering multiple divergent perspectives on this topic.

In the case on DST, I video-recorded lower secondary students who participated in a

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[2] A more detailed description of each case is provided in Chapter 4.

school project on World War II, in which they made digital stories about the war. The project was interdisciplinary, and the students could choose between different themes for their digital stories such as Nazism, communism, concentration camps, fascism, Hitler and the war in Norway. The process of making a digital story is guided by a step-by-step procedure. First, the composer writes a manuscript for the story. Second, the composer records his or her own voice reading the manuscript aloud. Then, other content is added, such as images, sound effects and written text. Finally, everything is edited into a digital story. In this project the students worked in groups, using laptops. The teachers had designed a set of assessment criteria that guided the students' work and was used for the purpose of grading the stories. During the project a team of four teachers walked around guiding the students in their projects. At the end of the week, the digital stories were projected onto a large screen in the school's auditorium, and the students commented on each other's creations. The pedagogical aim of this school project was that students would gain a subtle understanding of their chosen themes, and World War II in general, through making digital stories about these themes.
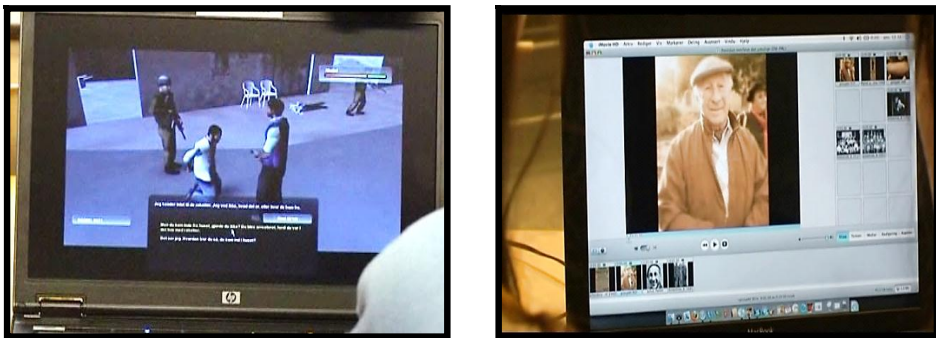
Figure 1: Screenshots from video data on the DST-case and the GBL-case. On the left side students are playing the computer game GC: P. On the right side students are making a digital story.

1.2.2 The rationale for choosing both cases: Similarities and differences

In general, both GBL and DST have in the literature been described as activities that have the potential of motivating and engaging students in school work. In regard to the cases I have studied, both GBL and DST represent activities that are initiated by teachers themselves in order to provide students with alternative tools for learning about curricular topics, and to create teaching practices that presumably will engage and motivate students in beneficial ways. Furthermore, in both cases students are provided tools for engaging with knowledge in a personal way. Instead of providing students with general and de-contextualized stories about the Israeli-Palestinian conflict, the computer game GC: P offers students personal stories from

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both sides of the conflict to engage with. Instead of providing students with ready-made general narratives and stories about World War II, DST gives students the opportunity to produce stories themselves from a first-person perspective.

However, the two cases differ in how resources to work on curricular topics are made available for the students. They are also both different in regard to the idea of authenticity. That is to say, they are quite different in regard to where the pedagogical ideas under consideration are located. In the case on GBL, a set of resources are inscribed into the learning tool (the game) itself, which can be used for the purpose of learning about a topic in a presumably motivating and relevant way. GC: P is designed to create an authentic learning situation by simulating at least two specific dimensions of the real world. First, it gives the player an opportunity to assume the role of a journalist and learn about different aspects of this professional practice. Second, it gives the player an opportunity to experience the conflict in a concrete way through engagement with personal stories that represent some of the perspectives found within the conflict. In contrast, in the case on DST there is not a specific learning tool inscribed by resources to learn with prior to the making of a digital story. The resources used for creating a digital story are to some extent created by the composer(s) by following a specific method of producing content. By making a digital story students are given a pedagogical space in which access to cultural resources for working on a curricular topic is expanded, in a way that presumably will make learning more authentic. First, the students are given the opportunity to not only use the mode of written language to work on and communicate the topic in question, but also other modes such as images and audio. The combination of these different modes will presumably provide a rich representation of the reality they aim to describe. Second, by telling personal stories from World War II, shared from the perspective of a real or imagined person, the students are offered a way of using others experiences from the real world, instead of general descriptions, as cultural resources for inquiring this topic.

Hence, the rationale for choosing exactly these two cases is that they represent activities that are informed by the same pedagogical ideas, however, in two quite different ways. Using the case on GBL and the case on DST enable me to explore and compare two different technology-enhanced learning environments that are differently informed by the pedagogical ideas under consideration.

1.3 Aims and objectives

The main aim is to explore how resources that are made available in technology-enhanced learning environments, which are informed by the pedagogical ideas described above, are interpreted and used by the students and their teachers. In order to pursue this aim, I will investigate how students and their teachers interpret and make use of resources that are made available in the case of GBL and DST. More specifically, in order to pursue the overall aim I will address four specific objectives. The first of these objectives functions as the main objective, and the other three function as sub-objectives.

Main objective:

- *To gain knowledge about how GBL and DST are managed within the institutional context of the classroom.*

Exploring in depth how GBL and DST are managed in educational practices enables me to generate knowledge about how two specific ways of arranging technology-enhanced learning, which both are informed by some of the same pedagogical ideas, are enacted in practice. By managing I mean how one makes meaning of the activities as well as how they are made relevant or irrelevant by students and teachers participating in the two practices under consideration. In order to understand participation in these practices I will analyze what kind of cultural resources students here are provided, and how they learn to use these resources for working on the curricular topics Israeli-Palestinian conflict and World War II. In addition, I will analyze how the use of resources stands in a dialogical relationship to the pedagogical framings of the learning situations.

Sub-objectives:

- *To gain knowledge about how students and teachers collaboratively make meaning of GBL and DST in educational practices.*

In order to investigate how GBL and DST are managed in practice, I will analyze how students and teachers collaboratively make meaning of these activities. This objective is informed by a theoretical perspective on meaning-making where meaning is understood as an interactional accomplishment. From this perspective, meaning is not something static and ready-made. Instead, meaning is seen as something unstable and negotiable. However, how

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students and teachers are making meaning in and of the activities under consideration is an empirical question. Important issues that need to be addressed analytically are how the cultural tools are made available for the students, how students are enabled to interpret the activities, how teachers frame the activities and how students respond to these strategies.

- *To gain knowledge about how students are constructed as learners when participating in GBL and DST in educational practices.*

In order to gain knowledge about how GBL and DST are managed in educational practices, I will also explore how students are constructed as learners when participating in such activities. This objective is related to the issue of students' willingness to learn and the various ways of being a learner in educational settings. A student's learner identity relates to how he or she orients to the cultural resources that are made available in the learning environment. This objective has to do both with the question of how GBL and DST is made relevant in regard to students' own voices—whether the students see this kind of activity as relevant or not—and how students learn to be accountable in the educational settings in relation to the tools they are offered.

- *To contribute with knowledge about methodological considerations when empirically studying GBL and DST in educational settings.*

In order to gain knowledge about how GBL and DST are managed in student-teacher interactions, I will argue for the need of studying such interactions in detail. Studying such interactions in detail implies analyzing sequences of utterances, how students and teachers orient to each other's utterances, and how they together build meaning in and of the activities. Although existing research has documented some of the opportunities and challenges of GBL and DST in educational practices, detailed studies of social interaction can contribute to expanding our knowledge about how students and teachers actually interpret and use resources that are made available in these activities.

1.4 Theoretical and methodological considerations

In order to pursue the objectives of the thesis, I will employ a dialogical approach. In this approach, *interaction* and *context* work as guiding principles when studying language, cognition and meaning-making (Linell, 1998, 2009). Three concepts are of particular importance in this thesis: *utterance*, *voice* and *multivoicedness*. In order to understand how

meanings are produced, and what kinds of meaning potentials are realized, sequences of utterances—how different utterances respond to each other—function as a unit of analysis (Linell, 1998, 2009; Rommetveit, 1974; Vološinov, 1973). However, in a dialogical approach, talk and meanings produced in interaction are considered as standing in a dialogical relationship to the social practice in which it is situated (Forman, Minick, & Stone, 1993; Linell, 2009; Vološinov, 1994). For the purpose of studying how students and teachers manage DST and GBL, I will analyze how they create meanings interactionally, by orienting toward each other's utterances, in relation to the contexts of the activities.

Voice is defined as a specific perspective on or interest in a topic, and can be located in utterances. The concept of multivoicedness can be used to describe situations in which meaning is created when different perspectives illuminate each other (Wegerif, 2006, 2007). These concepts enable me to analyze how the presence of multiple perspectives shapes the meaning-making process that students and teachers are involved in during the project on the Israeli-Palestinian conflict and World War II. Voice and multivoicedness enables me to analyze how learning with new technology is not just about dealing with conceptual knowledge but also about dealing with participants' different views, interests and agendas on topics that are discussed in the two classrooms. Moreover, the dialogical approach enables me to study the institutional aspect of meaning-making, that is, how students and teachers make meaning of the activities of GBL and DST in the institutional context of school.

In regard to methodology, the research design is based on the *case study method* (Yin, 2006, 2009). This method is well-suited for an in-depth study of a case that takes place in a real life context. Furthermore, the manner in which resources made available in technology-enhanced learning environments, which are informed by the pedagogical ideas under consideration, are interpreted and used by students and teachers can be considered as the *holistic case*. The manner in which students and teachers interpret and make meaning of GBL and DST can be considered *subcases*. Studying the subcases enables me to shed light on the holistic case.

In this case study I first and foremost rely on video data of classroom interaction. This type of data enables me to study sequences of talk and action, thereby enabling a detailed study of how the participants make meaning of the activities (Goodwin, 1994; Heath, Hindmarsh, & Luff, 2010; Mercer, Littleton, & Wegerif, 2004). The empirical analysis is inspired by the interaction analysis of Jordan and Henderson (1995). In this analytical approach, talk-in-interaction and participants' use of artifacts are given attention. By analyzing carefully selected episodes of talk-in-interaction that occur during the projects on

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the Israeli-Palestinian conflict and World War II, I am able to show how GBL and DST are managed in two educational practices.

1.5 Outline of thesis

The thesis is structured in two parts. Part I consists of the Extended Abstract, which includes six chapters. After this introduction, in Chapter 2, I will provide a review of relevant research. Here, I will focus on empirical research on the use of GBL and DST in educational settings, and point to important trends and challenges in both fields. In Chapter 3, I will outline the theoretical approach I have employed in order to address the objectives of the thesis. The empirical context is addressed in Chapter 4. Here, I will describe both cases in detail and outline how the activities are organized in each educational setting. In Chapter 5, I will deal with methodological considerations. I will give an account of the research design, provide a description of the data corpus, and give an account of interaction analysis the analytical procedures that I have employed. In addition, I will reflect upon research credibility. In the final chapter, I will first summarize the four articles in the thesis. Second, I will carry out a discussion of the findings and point to empirical, theoretical and methodological contributions. Part II consists of the four articles. The articles appear chronologically according to the time I worked on them during the PhD period. The choice of presenting the articles in this order makes visible my development as a researcher, both in regard to theoretical and methodological issues. Article I and IV address data from the case on DST, and Article II and III address data from the case on GBL. The articles appear in the following order:

- Article I: Silseth, K. & Erstad, O. (2012). Mirroring the surfaces of the self: Exploring literacy practices of digital storytelling. In S. Østerud, B. Gentikow & E. G. Skogseth (eds.) *Literacy practices in late modernity*: *Mastering technological and cultural convergences* (pp. 225-244). New York: Hampton Press.

- Article II: Silseth, K. & Arnseth, H. C. (2011). Learning and identity construction across sites: A dialogical approach to analysing the construction of learning selves. *Culture & Psychology*, 17(1), 65-80.

- Article III: Silseth, K. (2012). The multivoicedness of game play: Exploring the unfolding of a student's learning trajectory in a gaming context at school. *International Journal of Computer-Supported Collaborative Learning*, 7(1), 63–84.

- Article IV: Silseth, K. (submitted). Surviving the impossible: Studying students' constructions of digital stories on World War II.

2.0 Review of relevant research

In order to pursue the objectives of the thesis, I see it as necessary to focus the review around existing research on GBL and DST in educational settings[3]. Since I already have reviewed some of the arguments for employing GBL and DST in educational practices, I will begin this review by addressing some of the institutional challenges that have been documented in the research literature. Then, I will concentrate on the role of the teacher, and highlight some of the issues that have been raised in this regard. Finally, I will discuss some of the key studies in each field in more depth. This discussion enables me to document the limitations of existing research on GBL and DST, and point to what can be gained from *detailed studies* of how students and teachers make meaning of such activities in social interaction. By detailed studies I mean studies that analyze in depth how students and teachers talk about the different experiences students have during school projects that involves GBL and DST, how students and teachers orient to each other's utterances, how different resources are activated through talk and interaction, and how students and their teachers collaboratively make meaning of the activities they are engaged in.

2.1 Research on GBL in educational settings

2.1.1 Institutional challenges

Empirical research on the use of computer games[4] in educational settings has shown that educators might face different challenges when employing such tools in their own teaching. Challenges in regard to structural and organizational issues have been reported, including cost issues, technical issues, time-limitation, and physical space (Egenfeldt-Nielsen, 2006). The process of combining gaming activities with existing curricula has also been found to be challenging (Kirriemuir & McFarlane, 2004; McFarlane, Sparrowhawk, & Heald, 2002; Mitchell & Savill-Smith, 2004). For instance, in a study of how students, teachers and parents consider the activity of GBL in their school, McFarlane and colleagues (2002) found that even though teachers and parents actually did value the skills and knowledge students develop

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[3] When comparing the quantity of research literature on GBL and DST in educational settings, there exists considerably less empirical research on the latter case. Gaming is a well-established activity in western youth cultures, and there has been an interest in GBL for several decades. DST is a quite new phenomenon, which has not emerged from youth cultures, and has only recently been adopted by educators.

[4] Some scholars operate with the distinction between commercial games and so-called *serious games* (see for instance Charsky (2010) and Ulicsak and Wright (2010)). According to Kirriemuir and McFarlane (2004), one might distinguish between *mainstream digital games* and *learning-oriented games*. Following such a typology, GC: P can be termed a learning-oriented game that has pedagogical objectives built into it. However, since the same type of software can generate quite different interactions among students and teachers (Mercer, 1996), I will in the following not operate with a sharp distinction between these two game genres.

through gaming, such skills and knowledge are not explicitly valued in the overall formal school culture. In addition, the study reports that the greatest challenge in implementing GBL in education is an often existing mismatch between the content of the game and the content of the curriculum.

Another critical issue is the fact that a player's engagement with the same game can unfold in many different directions (Schott, 2006). The assumption that all students automatically will embrace computer games as desired tools for learning has proven problematic (Hanghøj, 2011; Sandford, Ulicsak, Facer, & Rudd, 2006; Squire, 2005). For example, according to Hanghøj (2011) students might experience *genre clashes* in regard to what they expect of a computer game that are made available in school-based learning. Computer games, which have a clear pedagogical purpose, belong to a different genre than the commercial games that students play outside school. A learning environment in which students are provided the opportunity to engage with an educational game might create a conflict of interest between the teacher's assumption (e.g. the educational game will motivate and engage students) and the students' expectations (e.g. the educational game will provide the same experiences as the commercial games they play outside school do).

Furthermore, a teacher's well-intentioned use of computer games in her classroom can create a situation in which some students feel unease when having to perform identities in school which are developed around game play in settings outside school (Squire, 2005). In youth cultures, computer games are not merely artifacts to be played, but are subjects for discussions where young people position themselves in relation to their peers (Williamson & Facer, 2004). When taking place in classrooms, game play and the surrounding activities are framed by adults and are thereby stripped of some of the qualities that more informal environments for playing games can provide (Lacasa, Mendez, & Martinez, 2008).

These findings do imply that in order for games to be interpreted as valuable learning resources, there is a need for creating a supportive pedagogical practice where game play are framed in such a way that it connects to the curriculum and are made relevant for the students as learners.

2.1.2 The role of the teacher

According to Oliver and Carr (2009), it is problematical to create connections between game experience and formal education, unless the game is specifically designed as a curriculum resource or the pedagogical context for playing provides the players some kind of *post-play*

reflection. The importance of teacher intervention in GBL has been emphasized (Egenfeldt-Nielsen, Smith, & Tosca, 2008; Freitas & Maharg, 2011; Freitas & Oliver, 2006; Sandford et al., 2006). For example, the teacher might have an important role in regard to correcting misinterpretations in students' conceptions gained during game play and bringing together the different players' divergent experiences with the game (Egenfeldt-Nielsen et al., 2008). Moreover, teachers can have an important role in helping students to interpret the game and the themes being raised in it, guiding them in the process of connecting game play to the curriculum, and making it relevant for the students as learners (Squire & Barab, 2004).

Sandford and colleagues (2006) have explored the use of commercial games in education. Their study documents how a teacher's knowledge about the curriculum, and competence in applying it in practice, is more significant in regard to students learning with a game than their competence in playing the game in question. The findings also shows that the success of GBL in educational settings is highly dependent on the teacher's awareness and interpretation of students' capacities, and whether the teacher manages to strategically use games as resources for obtaining well-articulated learning objectives.

Freitas & Oliver (2006) have proposed an interesting four-dimensional framework for guiding the planning and execution of GBL in an educational setting. First, the teacher should consider the *context* for students' game play. This includes both macro-level factors (historical, political and economic) and micro-level factors (for example availability of particular resources). Second, *learner specifications* should be taken into account. The teacher should reflect upon what kind of learners the class consist of, and their multiple preferences, and how well the game adapts to these preferences. Third, features of *the represented world* (the tool that are being used) have to be considered. What is the level of fidelity and what opportunities are given for interacting with elements of the represented world? Fourth, the teacher has to pay attention to *the pedagogical framing* of GBL. The teacher should reflect upon his or her own teaching practice and how to best create a pedagogy that supports GBL. However, even if this type of model provides information about important issues to address in order to successfully employ GBL in schools, the need of more studies that investigate players engagement with computer games in naturalistic settings have been reported (DeVane & Squire, 2008; Oliver & Carr, 2009; Reeves, Brown, & Laurier, 2009; Wideman et al., 2007). Such models do not provide any information or illustration of what actually happens when students use computer games in classrooms.

Furthermore, there are not many existing detailed studies of how students and teachers make meaning of GBL in social interaction. I will argue that detailed studies might reveal the

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complexities of GBL when being used in educational settings. According to Squire (2003, 2011) and Arnseth (2006), GBL is constituted as part of sociocultural practices. Such a perspective on GBL implies that the context of game play, and the resources that are made available for participation and meaning-making, are just as important as the game itself. Studying game play in detail in educational practices, in which students and teachers collaboratively make meaning of games, might expand our knowledge about pedagogical issues that have to be addressed in the discourse on GBL in educational settings.

2.1.3 Key studies

I will here discuss four specific studies on GBL in educational settings. The rationale for choosing exactly these studies is that they represent different methodological and analytical approaches to GBL, and that they are also quite different in how they treat the role of the teacher. By reviewing these studies in more depth, I will point at limitations of these types of studies and show what more detailed studies can offer.

In a well-sited empirical study, Amory and colleagues (1999) identified what type of games and game elements are appropriate for educational purposes. This study relied on quantitative methods, in which the analysis and results are based on data collected by the use of a questionnaire. A group of 20 university students was assigned to play four different types of commercial games: a strategy game (*Command and Conquer: Red Alert*)[5], a so-called shoot 'em up game (*Duke Nukem 3D*)[6], a simulation (*SimIsle*)[7] and an adventure game (*Zork Nemesis*)[8]. After a session of playing each game, the students responded to a questionnaire that consisted of questions regarding various features of each game, such as game enjoyment (sound, graphics, story-line etc.), skills (logic, memory, visualization, problem solving etc.) and game play (addictive, boring, level of difficulty, illogical). Overall, the four different games were rated by the students in the following way: adventure, strategy, shoot-em-up and simulation. The students reported that playing the adventure game required the most skills. In particular, visualization, logic and memory were reported as required skills in order to play

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[5] In Command & Conquer: Red Alert, the player plays either for Allied or Soviet forces in a parallel universe during the 1950s, in a battle for control over the European mainland. For more information see http://en.wikipedia.org/wiki/Command_%26_Conquer:_Red_Alert

[6] In Duke Nukem 3D, the player plays an avatar named Duke Nukem, who fights against an alien invasion of the Earth. For more information see http://en.wikipedia.org/wiki/Duke_Nukem_3D

[7] SimIsle gives players the opportunity to managing a tropical Island, where you have to balance between economical profit and ecological considerations. For more information see http://en.wikipedia.org/wiki/Simisle

[8] In Zork Nemesis the player assumes the role of an adventurer that sets out to investigate the disappearance of four prominent people, and later free these persons that are being held prisoners by a character called Nemesis. For more information see http://en.wikipedia.org/wiki/Zork_Nemesis

adventure games. In addition, realistic graphics, sounds and engaging story-lines were reported to be important features in order to experience a game as engaging and motivating. The authors conclude that the genre of adventure games provides the best foundation for developing games as learning resources. Thus, the authors argue that there exist specific elements, present in some types of games, which are preferable in regard to using games for learning purposes. However, there are several limitations to this type of study. First, this type of study only explores what happens between the player and the game, without taking the context of game play into account. Different types of contexts might produce different player experiences. Second, self-report studies of this kind only provide information about what players say they have experienced, which means we have to trust that they are telling the truth and that they remember what they have experienced during game play. However, such studies do not provide any information about how games actually are enacted as learning resources in educational settings. Third, the role of the teacher is absent in this study. Games are seen as engaging or not in themselves, and the issue of how a teacher might have a role in framing students experience of (different types of) games is left out of the discussion. One could, for example, argue for the possibility of a teacher managing to make a game engaging and relevant for students, even though the game itself is not experienced by students as engaging. A detailed study of how the different types of games are interpreted and made meaning of in classroom interactions can reveal information about how context influences students' experiences of different types of games, how they actually are constituted as learning resources, and how the teacher can frame game play that contributes to students learning.

In another well-sited empirical study, Squire and Barab (2004) studied a group of 18 students participating in a school-project on world history, in which the students played the game *Civilization*[9]. This study relied on case study techniques within a design-based research methodology. An instructional context with clear pedagogical objectives was developed, in which one of the researchers assumed the role as a teacher that framed the game play. The data corpus was constituted by field notes from observations of gaming sessions, interviews of students and different documents that were produced during the project. During observations the researchers focused particularly on instances of social interaction in which, for instance, participants discussed different aspects of the content addressed in the game. The findings suggest that playing *Civilization* enabled students, who were uninterested in world

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[9] In Civilization the player is given the opportunity to build civilizations on a macro-scale level from prehistory up to modern times. For more information see http://en.wikipedia.org/wiki/Civilization_(series)

history prior to the project, to reflect upon historical events and foster understandings of how geography, politics, economics and history are connected. However, the findings also document some challenges. The process of appropriating the game as a valuable tool for learning about world history was time-consuming. Many of the students at first rejected this activity, and had difficulties in seeing how playing *Civilization* was relevant to them, both in regard to personal interests and school work. It was not until the students understood that they could use the game to explore hypothetically historical events, that were linked to the students own interests, that the game was appropriated. The findings also document the importance of a teacher that makes links between the game and the curriculum. The findings suggest that the teacher had an important role in helping students to develop geographical knowledge and historical narratives that they used as resources for playing the game. In contrast to the study conducted by Amory et al. (1999), this study takes both the role of the teacher and the context of game play into account. However, even though the findings of this study are based on observation of social interaction, it does not provide any detailed analysis of how these interactions unfold during the project. A moment-by-moment analysis might reveal how the computer game was made meaning of and appropriated over time. Furthermore, a detailed study could provide in-depth information about how the teacher helped students during game play. The authors explain that it was not until the teacher drew a map of the world and showed where the in-game civilizations were located, and suggested that they could try to reverse colonization (playing alternative scenarios that the students themselves found intriguing) that the students started to appropriate the game. However, they do not provide a systematic and detailed analysis of how the students and the teacher actually talk about this activity and build meaning together. A detailed account could, for example, provide information about what types of utterances the teacher produced and how students interpreted and responded to such utterances. This type of analysis could provide a richer and more detailed account of what types of student-teacher interactions can contribute to students' appropriation of the game.

In a recently conducted empirical study, Nash & Shaffer (2011) explored how a group of students engaged with the epistemic game *Urban Science*[10]. The aim of this game is that through playing it the player will develop so-called *epistemic frames* (professional ways of thinking) in the field of urban planning. This case study took place on a university campus,

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[10] Epistemic games simulate professional practices. In the epistemic game Urban Science, the player assumes the role as an urban planner taking part in different activities that are involved in the real practice of urban planning. For more information see http://epistemicgames.org/eg/category/games/urban-planning/

where 14 middle school students assumed the role of urban planners and four undergraduate students, which had received training in the game, functioned as mentors (planning consultants) that were to support the players. Data was collected by means of individual pre/post interviews, and recording the interactions between players and mentors during the project. The data corpus was analyzed according to what the authors calls Epistemic Network Analysis (ENA). This analytical procedure measures to what extent the player develops epistemic frames. An epistemic frame consists of different frame elements, such as values, knowledge, skills, epistemology and identity, that professionals use to identify and solve problems within their field of expertise. ENA can then, through a mathematical procedure, calculate to what extent the frame elements become linked. The more times frame elements occur together in interactions, the more closely they are connected. The findings suggest that the players developed epistemic frames, and that the interactions between student and mentors during game play were of crucial importance for this development. In these interactions, students first learned to imitate the mentor's professional way of thinking about urban planning and then appropriated these epistemic frames. Hence, this study also takes the context of game play and the role of the teacher/mentor into account. However, the authors do not provide any information about the characteristics of student-mentor interactions that contributed to the development of proper epistemic frames. How did the mentors initiate the modeling process interactionally? How are skills, knowledge, identity, values and epistemology negotiated during the project? How is the transition from imitation to appropriation of the epistemic frames facilitated by the mentor? A detailed study of student-mentor interactions might have revealed the answer to such questions.

As argued above, there exist few detailed studies of GBL in educational settings. One exception is Linderoth's (2004) comprehensive thesis, in which he has investigated how children make meaning of different types of computer games in different types of settings. Linderoth video-recorded 24 gaming sessions with 36 children (age of 6 to 11) in both home and school settings. Through a detailed analysis of video data of social interaction he shows how participants collaboratively make meaning of games, and provides a detailed picture of the complexities of gaming. According to Linderoth, computer games and simulations are not necessarily good learning environments just because they presumably represent reality in a realistic and authentic way. The findings suggests that there is a great risk that students will not learn about the theme being addressed in the game, but rather about the rule dimension that the game is based upon. Furthermore, the findings also document that in order to employ GBL for learning about curricular topics successfully, games have to be embedded in a

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pedagogical practice in which they are interpreted and made meaning of in relation to what students already know about the topic and that other resources beyond what is represented in the game are also made available to the students. Finally, one of the key findings in this study is that computer games are not particularly good learning resources by themselves; rather, they are *thematizisable artifacts* that must be realized as learning resources in practice.

2.2 Research on DST in educational settings

2.2.1 Institutional challenges

In general, the research literature on DST is more oriented towards the benefits of this method compared to literature on GBL. However, some empirical studies of the use of DST in schools have documented challenges that educators might face when employing this method in their own teaching. According to Kearney (2011), DST is a very open-ended and ill-defined method of working with content-production in educational settings. Students are more familiar with traditional ways of producing content in school, such as written assignments. When engaged in written assignments students produce content according to more or less well-defined principles—because of the long tradition of producing written assignments in school. In regard to multi-modal composition, where different modes are used in order to inquire a curricular topic, it might be difficult for students to understand what is expected of them as learners. Moreover, the process of producing digital stories is quite time-consuming, something that might lead educators to consider this activity as stealing valuable time that can be spent on other types of activities they are more familiar with (Ware & Warschauer, 2005).

Furthermore, empirical research has shown that students might have difficulties in making connections between the topic of the story (what is being told) and the topic of the subject in question (Sadik, 2008). Making a 2-3 minute long digital story, in which students carefully pick out the right elements that can represent the curricular topic in question, and combining these elements in a proper way, can be challenging. Even though students have informal competence in using computers to make films or multi-modal compositions, these skills are not necessarily enough when making multi-modal compositions, such as digital stories, for working on curricular matters.

Empirical research has also documented that students' motivation and engagement might decline when making digital stories about curricular topics. First, the fact that the process of making digital stories about curricular topics in school often will be graded, might reduce some students' motivation when working with this method (Davis, 2004). Second,

digital stories about curricular topics are often not directly connected to students' personal lives. In the original method, telling something significant from the life of the producer is emphasized, and the process of making a digital story involves emotional investment. However, when DST is used for the purpose of working with something significant from the curriculum, such as architecture, mathematics, photosynthesis, students can experience a lack of emotional investment, something that can reduce students' motivation (Kulla-Abbott, 2006; Kulla-Abbott & Polman, 2008).

These findings do imply that the use of DST in educational settings requires a supportive pedagogical practice where this activity is framed in such a way that students are enabled to interpret it as a method for working on curricular topics and that it is made relevant for the students as learners.

2.2.1 The role of the teacher

Research on DST has documented the importance of teacher intervention (Davis, 2004; Kearney, 2011; Kulla-Abbott, 2006; Robin, 2008). According to Kearney (2011), since DST is such an ill-defined and open-ended method for working on curricular topics a teacher that guides students in interpreting this method is needed. Teachers can play an important role in discussing the focus for the digital story, what type of content should be used for addressing a particular topic and facilitate group discussions about the final digital story.

According to Davis (2004), students do not necessarily have trouble finding elements for a digital story, such as a topic for the story, images to use, sound effects and music. However, using these elements—arrange them in a proper way, use them to create a focus in the story, use them to create a persuasive argument and so forth—to complete the story as a final object can be more challenging. In the process of making a digital story, a teacher can guide students in using the collected elements to make a digital story that connects with a potential audience.

Assessment is another important issue in regard to the role of the teacher. In educational practices, there exists much experience with assessing written and speech-related assignments. Working with multi-modal composition in schools, such as DST, requires new ways of thinking about assessment (Jewitt, 2003). For example, when assessing this kind of student-produced content, teachers need to take how the different modes expand the meaning of each other into account, and not only each mode separately. Teachers need to develop other assessment criteria for evaluating these types of assignments. However, the teacher also has

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an important role in making such criteria transparent for the students and guiding them in the process of employing these criteria in their work on each singular digital story.

I will argue that, in the same way that GBL is, DST is constituted as part of sociocultural practices. The context of making digital stories, and the available resources for participation and meaning-making, is important for constituting DST as a learning activity. However, there exist few or no studies that examine in detail how students and teachers make meaning of DST in the institutional context of school. A detailed analysis of student-teachers interactions might provide a rich description of how students and teachers collaboratively make meaning of DST and reveal how this activity is managed within an educational practice.

2.2.3 Key studies

In order to show what can be gained from detailed studies of DST in educational settings, I will here discuss three key studies in depth. As with GBL, the rationale for choosing these studies is that they represent different methodological and analytical approaches, and that they are also different in regard to how they treat the role of the teacher. By discussing these studies, I will show the limitations of these types of studies and what can be gained from detailed studies.

In her comprehensive thesis on the use of DST in school, Kulla-Abbott (2006) studied a group of seventh graders that participated in three different DST projects at the same school. In the first project, students made digital stories connected to the subject of social studies and communication arts. The objective was to learn about Greek history and creative writing by making digital stories that connect a Greek god or goddess with issues that are important for teenagers of today. In the second project, the students made digital stories with a more personal narrative. Here, students made stories about something important from their lives outside school, bringing with them artifacts, such as personal photographs, from home. In the third project, the students made digital stories about environmental issues, a topic that was part of the Science curriculum. The objective was to make students more aware of how their own behavior effects the environment. In this ethnographic study, two teachers and 31 seventh grade students participated. Field notes, student and teacher interviews, video data of classroom activity and textual artifacts constituted the data corpus. The findings suggests that by making digital stories students learned about perspectivity (that stories are told and listened to from particular perspectives), about contextualization (the transformation from ideas to an essay, to a script, to a digital story), to be aware of the purpose of expressing themselves

(either to persuade, entertain, make a point or just simply share something about themselves). In addition, students learned to negotiate problems that occurred during the projects and develop meta-cognitive skills (monitoring their own activities when making digital stories). However, the author also reports on challenges. The findings suggest that when comparing students' participation in the three different projects, they had great difficulties in making digital stories about topics from the formal curriculum. Because students experienced a lack of emotional investment—they had challenges in seeing it as relevant to their personal lives— they were not properly motivated and did not manage to produce stories that were assessed as high-quality products by the teachers. The students were much more motivated when making personal digital stories about topics from their lives outside school. Furthermore, the study also reports on the importance of teacher intervention. For instance, the findings suggest that the students needed guidance in conducting research for their digital stories and gathering information about environmental issues. In general, students needed help with interpreting the genre of DST, especially in regard to making digital stories about curricular topics. However, even though this study relies on video data of classroom interaction, and provides a rich description of the process of making digital stories (such as script writing, editing images and recording voice-over), it does not provide any detailed information about how students and teachers collaboratively made meaning of DST. The author describes what happens in the classroom during each project, but does not analytically show how the teachers way of talking with the students lead to specific ways of orienting to the digital story that they are producing. A detailed study could have provided more precise information about why students do not manage to make high-quality digital stories about curricular topics, and how teachers can help students make such stories.

In the most sited empirical study of DST used in school, Sadik (2008) examined how DST can support teachers in developing new teaching practices that includes the use of technology. In this case study, data were collected and analyzed by combining quantitative and qualitative strategies. The study involved eight teachers that were assigned to employ DST in their own teaching. In these teachers' classes, students produced digital stories about curricular topics in the subject of science, mathematics, social studies and English language. First, an evaluation rubric was used to measure the quality of the digital stories. Second, an observation instrument was used to capture the behavior of students and teachers during the project. This instrument was composed by three different forms: pre-observation form (description of lessons), timed interval observation sheet (description of the students' and teacher's work) and post-conference form (for example, description of challenges in the use

of technology). When using the second form, the observer checked off the occurrence of pre-defined behavior of students and teachers whenever it occurred during three-minute intervals. Third, teacher interviews were carried out after the project. The findings suggest that DST enabled students to reflect deeply upon the topic that they worked on. The students did not just report facts about the curricular topic in question, but made stories that reflected personal engagement with the subject. In addition, students learned to think and communicate about other people, places and events. However, the author also reports on challenges. The findings suggest that students have difficulties in connecting the topics of the stories and the curricular topics in question. When this connection is unclear, it is difficult for a potential audience to gain knowledge about the curricular topic that is addressed in the digital story. These findings show that students have difficulties in interpreting DST as a method for working on curricular topics. However, there are limitations to this type of study. Even if the study focuses on how teachers can develop sound teaching practices, by employing DST, it does not provide adequate information about how the teacher can support students in their projects. For instance, it is reported that students often summoned their teachers in order to receive guidance in their creations, such as getting support for developing themes for their stories. Still, the study does not provide information on how these student-teacher encounters actually unfolded. The data collection strategies chosen for this case study—using the evaluation rubric, the observation instrument and the teacher interviews—do not provide this kind of information. Furthermore, Sadik claims that the observations and interviews have "revealed many aspects of the classroom environment and activities that best facilitate digital storytelling integration and support engaged learning" (p. 503). However, the author simply reports these aspects (for example, that students enjoyed editing the digital story with PhotoStory and demonstrated pride in their digital stories) without showing how these aspects actually occur when making digital stories. A detailed study could have revealed how the teachers interacted with the students, and how, for example, she or he did or did not manage to help the students make connections between the topics of the stories and the curricular topics.

In a recent publication, Kearney (2011) introduces a pedagogical framework for supporting teachers in employing DST in their teaching. This framework is based on findings from two empirical studies Kearney and colleagues have carried out: one on students' film-making practices (Kearney & Schuck, 2005) and one on the use of DST in teacher education (Kearney, 2009). In the latter study 11 pre-service teachers at an Australian University

participated. The study relied on qualitative methods, and student and staff questionnaires, focus groups with students, staff interviews, observation and students' digital stories constituted the data corpus. The pedagogical framework includes several teacher strategies for supporting students in the different phases of making a digital story. It is displayed as a matrix where the process of making digital stories is organized according to three descriptors: resources, tasks and support. The matrix describes what kind of resources can be used for working on the different tasks during a project, and what type of support a teacher can provide for each task. The framework suggests, for instance, that teachers might provide suggestions for the purpose of the story when students are dealing with the task of developing ideas (pre-production stage), give advice on different techniques when students are working on the task of recording the voice-over (production stage), and facilitate group discussions when students are dealing with the task of sharing and expanding knowledge that has been generated in a DST-project (post-production stage). This type of pedagogical framework can be useful for teachers when creating and maintaining a learning environment that includes DST. However, this type of framework or model does not provide information about how support can be given in student-teacher interactions. The pedagogical framework is neither based on a detailed analysis of how DST is enacted in student-teacher collaborations that can reveal the complexity of this activity, nor does it provide information about what types of student-teacher interactions can contribute to a good learning environment. The model explains that the teacher can facilitate group discussions about a digital story, but does not provide any illustration of how the teacher can or should participate in such discussions. Moreover, it does not provide specific insights into the role of the teacher in guiding students' interpretation of this genre of content-production. Nor does it shed light on how teachers can support students in reflecting upon what they communicate and make connections between the content they have produced and the curricular topic their stories are addressing. A detailed study of how DST is managed in student-teacher interactions might contribute to a more subtle understanding of how teachers can facilitate student reflection on, for example, ideas for content, script writing, audio-recording and image collection, and how the teacher can facilitate group discussion about the digital story.

2.3 Summary

Computer games and digital stories can become valuable resources that students can use when reflecting upon complex issues of the real world in educational settings. However, a review of empirical research on GBL and DST also documents challenges in this area. Research

suggests that students will not automatically embrace these kinds of activities when working on curricular topics, and do need help from a teacher or instructor in interpreting these genres of technology-enhanced learning in order to participate competently.

The reviewed key studies of GBL and DST show the importance of teacher intervention when students participate in these activities. In regard to GBL, the teacher is important, for instance, in making links between the game being played and the curriculum, making the game relevant for the students (both in regard to personal interests and school work) and guiding students in using the game as a resource for gaining knowledge about the topic in question. In regard to DST, the teacher is important, for instance, in helping students interpreting this method when using it for working on curricular topics, guiding students in making connections between the topic of the digital story and the curricular topic, facilitating student reflection on content, script writing, audio-recording, and facilitating group discussion about what the digital story communicates to a potential audience.

However, as the review also shows, we need more detailed knowledge about how student-teacher interactions unfold in learning environments that involve GBL and DST. Detailed studies of student-teacher interactions in such learning environments might provide more in-depth information about how students and teachers negotiate the meaning of GBL and DST, how curricular topics are made available for students through such activities, how these activities are interpreted in the institutional context, and provide more detailed information about possible teacher interventions that can contribute to good learning environments.

In this thesis, I will provide a detailed account of how GBL and DST are made meaning of in student-teacher interactions. Such an account enables me to explore how these activities are enacted and managed in practice, and how this enactment has implications for students' participation as learners.

3.0 Theoretical framework

In order to address the objectives of the thesis a dialogical approach is employed. This approach is influenced by the writings of scholars associated with the so-called Bakhtin Circle (Brandist, 2002), first and foremost Mikhail Bakhtin (1981, 1984, 1986) and Valentin Vološinov (1973), as well as later interpreters such as Linell (1998, 2009), Wegerif (2006, 2007) and Wertsch (1991, 1998)[11] [12]. *Dialogism* is an epistemological approach to the study of language, cognition and meaning-making as something cultural and historical, which contrasts with what is often coined *monologism*. This latter term is a collective term for approaches that are informed by the idea that language and meanings are something ready-made and normative deriving from a static system of signs (Marková, 1990). A dialogical approach departs from this idea and sees meanings as created in the interactions between real people in particular settings (Valsiner & van der Veer, 2000). In a dialogical approach, *interaction* and *context* work as guiding principles when studying language, cognition and meaning-making (Linell, 1998, 2009).

3.1 Interaction: Meaning-making and utterances as unit of analysis

According to Rommetveit (1974, 2003), the language we use when communicating with others is never our own, but rather something we are *shareholders* in. The meanings of words are not ready-made, but are defined in cooperation between interlocutors[13]. The distinction between *meaning potentials* and *actual* or *situated meanings* is here important (Linell, 2009). According to Linell (2009), meaning potentials are "a structured set of semantic resources that are used in combination with contextual factors to prompt and give rise to situated meanings"

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[11] The connection between Bakhtin and Vološinov has been vividly debated. According to Morson and Emerson (1990), Bakhtin could not have been the author of *Marxism and the philosophy of language* since this work is influenced by Marxist perspectives that differ from many of Bakhtin's core ideas. In contrast, Clark and Holquist (1984) argue that Bakhtin most certainly is the author of the disputed text, and refers to reports made by specific persons in his circle and textual analysis that shows great similarities between the texts of Bakhtin and Vološinov. Wertsch (1991) assumes an intermediate position and claims that "Bakhtin was heavily involved in the authorship of the disputed texts. This does not mean that he actually put pen to paper in the case of each part of each manuscript, but it does mean that his influence is very much in evidence" (p. 49). I will not ponder more on this issue, but rather refer to Bakhtin and Vološinov as two different authors articulating many of the same ideas.

[12] The issue of using Bakhtinian perspectives outside the field of literary research has also been debated. The argument that Bakhtinian ideas and concepts only are applicable to literature, and not human activity more broadly understood, has been criticized by several authors (see for instance Kozulin, 1996; Matusov, 2007). I will not continue this discussion here, but rather argue for the use of Bakhtinian perspectives in analysing all types of meaning-making processes by referring to Holquist's (1990) argument: "'Bakhtin's philosophy' is a pragmatically oriented theory of knowledge; more particularly, it is one of several modern epistemologies that seek to grasp human behaviour through the use humans make of language." (p. 15)

[13] Language can of course be understood as an abstract grammatical system that can be learned, but the function of language and words is dependent on the context of use.

(p. 330). In a dialogical approach, the meaning of a word is never fixed or stable. Words have meaning potentials that can be activated or realized in different ways depending on the interlocutors and the context of interaction.

In a dialogical approach, the concept of *utterance* is important. In principle, an utterance can take all sorts of different shapes (Linell, 2009; Wertsch, 1991). It can be verbal, written, audio-visual and so forth. An utterance can, for example, take shape as a written article in the local school newspaper or manifest itself as some form of statement on the Internet. However, in a dialogical approach, social interaction has been given analytical attention in the study of meaning-making (Linell, 1998, 2009; Rommetveit, 1974; Vološinov, 1973). In order to study meaning-making the principle of *dialogicality* is pertinent. According to this principle any utterance both responds to prior utterances and anticipates future ones (Wegerif, 2007). When students produce utterances in the classroom, they are both attuned to what has been said by other students and their teachers prior to that moment, but also to how their utterances will be reacted on by others[14]. Thus, in order to study meaning-making, and what kinds of meaning potentials that are realized, sequences of utterances—how different utterances respond to each other—function as a unit of analysis.

Scholars have documented how characteristics of student-teacher interactions influence students' participation (Engle, 2006; Lemke, 1990; McDermott, 1977; Mehan, 1979; O'Connor & Michaels, 1993). For instance, O'Conner and Michaels (1993) have shown in detail how teachers can scaffold students work on academic tasks, by using the strategy of *revoicing* during student-teacher interactions. In this regard, to *revoice* means to make an unelaborated and unclear argument found in students' utterances clearer and more refined, while at the same time letting the students retain ownership of the argument. When studying how students and teachers make meaning of DST and GBL, I will analyze how they collaboratively create meaning by orienting toward each other's utterances (respond to and anticipate the utterances of each other). This approach is something that runs through the articles in the thesis[15].

Two other concepts that are of particular importance in this thesis are *voice* and *multivoicedness*. Bakhtin (1984) defines the concept of voice in the following way:

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[14] Of course, as Wells and Arauz (2006) have pointed out; "perfect symmetry of intersubjectivity is rarely attained in practice, because speakers do not always take their listeners' expectations sufficiently into account and listeners are not always able and/or willing to adopt the speaker's perspective" (p. 383). However, even though there are moments when teachers and students do not take each other's utterances into account, they will in some way or another have to position themselves in regard to these utterances (Matusov, 1996).

[15] Except in Article I, where the focus on analyzing social interaction is less present.

> The definition of voice. This includes height, range, timbre, aesthetic category (lyric, dramatic, etc.). It also includes a person's worldview and fate. A person enters into dialogue as an integral voice. He participates in it not only with his thoughts, but with his fate and with his entire individuality. (p. 293)

According to Bakhtin (1981, 1984, 1986), when a person participates in a conversation it is not only the object of talk he or she responds to, but also the attitude and value of the other(s). Linell (2009) interprets voice as "an expressed opinion, view or perspective, something that the person would typically say and presumably (at least at some level of intention) stand for" (p. 116). Voice has to do with a particular perspective that is uttered in one way or another. Voice could, for example, be a specific view on global warming uttered in a conversation on the bus, a specific view on party politics uttered on a blog, or a specific view on child rearing uttered around the dinner table.

However, voices are not invented by persons themselves, but are of social origin. According to Lemke (1995): "we speak with the voices of our communities, and to the extent that we have individual voices, we fashion these out of the social voices already available to us, appropriating the words of others to speak a word of our own" (p. 24-25). The practices and communities people participate in and traverse during their life trajectories are filled with different perspectives and world views that are at their disposal for making meaning of the activities they are engaged in. Meaning-making is thereby a process that involves multiple voices that together shape how interlocutors understand the object of talk. The concept of multivoicedness provides an analytical tool for analyzing how meanings are created when different perspectives illuminate each other (Wegerif, 2006). The concept of voice and multivoicedness enables me to study how the presence of multiple perspectives shapes the meaning-making processes that students and teachers are involved in during the project on the Israeli-Palestinian conflict and World War II.

3.2 Context: What frames meaning-making

In a dialogical approach, talk and meanings produced in interaction are considered as standing in a dialogical relationship to the social practice in which it is situated (Forman et al., 1993; Garfinkel, 1984; Heritage, 1984; Shotter, 1992; Vološinov, 1994). This feature of meaning-making has been called *double dialogicality* (Linell, 2009). The production of utterances in interactions is attuned to the *speech genre* (Bakhtin, 1986) where they are produced—

language-in-use is context-sensitive and is partly structured by the circumstances for meaning-making (Gillen, 2002).

Moreover, activities that take place in institutional contexts are subjected to institutional norms and values that to some extent structure meaning-making (Bliss, Säljö, & Light, 1999; Daniels, 2010; Wertsch, 1998). In order to understand meaning-making in educational settings, it is therefore important to analyze what kind of cultural resources students are provided for working on curricular topics, and how they learn to use such resources within particular pedagogical framings. The institutional context has been given attention in research on technology-enhanced learning (Arnseth, 2004; Arnseth & Ludvigsen, 2006; Crook, 1991; Erstad, 2011; Gillen et al., 2008; Wegerif & Scrimshaw, 1997). For instance, according to Arnseth & Ludvigsen (2006) important questions regarding technology-enhanced learning are whether, and how, students are enabled to make sense of the tools they are provided and consider the tools as relevant for themselves as learners. These issues are of institutional character and have to be addressed when carrying out school projects that involve technology-enhanced learning.

However, context is not a static entity. Anything that has some kind of impact on meaning-making contributes to constituting the context for interaction (Cole, 1996). Even though meaning-making is situated in a practice, people also borrow resources for meaning-making from other surrounding practices. According to Ritva Engeström (1995), cultural resources from "outside" of the particular interactional situation can be used in order to make meaning of the object of talk here-and-know. Such resources can be utterances produced by concrete persons, but also general discourses about the particular topic (or related ones) which constitute the object of talk. Even though the context shapes talk, talk also contributes to shaping the context (Goodwin & Duranti, 1992; Wegerif & Scrimshaw, 1997).

In order to examine how participants make meaning of the activities of DST and GBL, I will analyze how different features that contribute to establishing the institutional context in which the activities are situated intervene and influence meaning-making. In addition, I will analyze how cultural resources from outside the institutional practices are used for managing these activities. In this regard, the concepts of voice and multivoicedness enable me to study what becomes a resource for meaning-making in activities framed in the institutional context of school, and also where such resources come from.

3.3 A dialogical approach to learning

In sociocultural theory, the process of learning is seen through people's participation in socially constituted practices, which to some extent is structured by the use of particular cultural tools (Cole, 1996; Lave & Wenger, 1991; Rogoff, 2003; Vygotsky, 1978). Moreover, learning is defined as "changing patterns of participation in specific social practices within communities of practice" (Gee & Green, 1998, p. 147). Learning can be seen as *enculturation* (Brown et al., 1989) in a social group, in which one adopts specific ways of participating that is recognized as legitimate by the group. Learning is, then, not first and foremost about internalizing knowledge or a set of skills, but about gaining an understanding of what kind of knowledge and skills that are relevant within specific domains, which are defined by the group, and how to use it as tools for participating competently. Learning is about "becoming attuned to constraints and affordances of activity and becoming more centrally involved in the practices of a community" (Greeno & the Middle School Mathematics Through Applications Project Group, 1998, p. 11). However, in order to understand how a person participates in one practice, it is also important to understand how this person's participation is connected to other practices that he has participated in or will participate in the future. The dialogical approach is well-suited to deal with this task[16].

In the dialogical approach, different takes on learning have been proposed, and some of these perspectives are employed in the analytical work in this thesis. According to Ball & Freedman (2004), the more voices we encounter the more opportunities we have to learn about the world. In this line of argument, a normative account of learning is present. Good learning environments enable students to encounter multiple voices or multiple perspectives on curricular topics. This approach to learning is employed in Article I. Here, Erstad and I use such an approach to analyze the literacy practices that emerge through the activity of DST. Literacy has to do with certain ways of communicating in a particular discourse, which are recognized by the members of this discourse (Gillen, 2010; Lankshear & Knobel, 2006). We argue that if learning is about engaging with multiple voices or perspectives on a topic, then literacy is about the capacity to participate in several different practices in which different

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[16] Wegerif's (2008) critique of subsuming the dialogical perspective under the umbrella of sociocultural theory is worth mentioning. According to Wegerif, the new-Vygotskian tradition, as for instance articulated by Wertsch, deals with how people use and appropriate different tools for the social construction of knowledge, but does not adequately handle the notion of creativity. The sociocultural tradition is informed by a dialectic perspective (from Hegel and Marx), that sees meaning as arising out of synthesis of different perspectives. In contrast, a dialogical perspective of knowledge does not look for synthesis; rather, it recognizes and pays tribute to difference. As Wegerif puts it; "dialogic presupposes that meaning arises only in the context of difference, whereas dialectic presupposes that differences are contradictions leading to a movement of overcoming." (p. 359)

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voices are located. Another related take on learning within a dialogical approach is formulated by Wegerif (2006, 2007). He emphasizes the importance of creating *dialogic spaces* in educational settings, in which students and teachers engage in collaborative activities where students learn to see a task or topic from others' perspectives. According to Wegerif, teaching should aim at facilitating learning situations in which multiple voices are allowed to *inter-animate* each other. This approach is adopted in Article III, in order to study how specific characteristics of student-teacher interactions support a student's adoption of a multi-perspective on the Israeli-Palestinian conflict.

From a dialogical approach, it has been argued that in order to understand how students learn with technology in school we need to study how participation changes over time as a response to environmental aspects (Arnseth & Ludvigsen, 2006). In both Article III and IV, I employ this analytical focus. Here, I analyze how the projects on the Israeli-Palestinian conflict and World War II unfold in moment-by-moment interactions between student and teachers. I provide a detailed analysis of how students and their teachers in specific moments negotiate the meaning of both activities, and how these interactions also stand in a dialogical relationship to the institutional practices in which they are situated. In order to study how students' participation changes over time, and how learning that happens in different contexts can be connected, the concept of *learning trajectory* (Dreier, 1999, 2003; Ludvigsen, Rasmussen, Krange, Moen, & Middleton, 2011) is employed in Article III[17]. This concept enables an analysis of learning as a temporal unfolding process. By using this concept on an interactional level, I am able to both analyze how particular student-teacher interactions contribute to a student's changing pattern of participation and how other learning trajectories that are started outside school can be picked up and made relevant for learning about a curricular topic in the classroom.

A final issue of importance in this thesis is the connection between learning and identity. This connection has been addressed in different ways within the sociocultural approach (Gee, 1999; Lave & Wenger, 1991; Moje & Luke, 2009; Sinha, 1999; Wortham, 2006). According to Gee (1999), identity has to do with "different ways of participating in different sorts of social groups" (p. 1). People participate in certain ways and enact different identities, depending on the context of participation. This also means that people participate as learners in certain ways and enact different learner identities, depending on the context of

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[17] In Dreier's (1999, 2003) account of learning trajectory, the use of artifacts in interaction is not given that much attention (Ludvigsen et al., 2011). By contrast, I will use this concept on an interactional level and study how the participants' use of resources in certain ways contributes to the development of a learning trajectory.

participation. In social interaction "the ordering of our utterances must be negotiated with the others around us in ways that they find intelligible *and legitimate*" (Shotter, 1992, p. 13), and what is found intelligible and legitimate depends on the context. In order to study learning in an educational practice, analyzing how people manage their roles or identities as learners becomes a topic of interest. This issue is dealt with, in slightly different ways, in Article II and IV. In Article II, in order to study how people are constituted as learners in and across settings, Arnseth and I introduce the concept of *learning selves* and develop an analytical framework for studying how learning selves are constructed. The concept of learning selves, which builds on a dialogical approach, is a way of characterizing how people are constructed as learners. The analytical framework emphasizes how people use stories, categories and inscriptions in order to construct themselves and others as learners. In article IV, the analytical interest is to examine how students and teachers account for themselves when participating in the activity of DST. When giving accounts in an educational practice participants also enact a certain type of learner identity. Analyzing what kind of discursive devices students and teachers use in order to handle accountability will enable me to explore how this activity is managed in an educational practice.

In sum, in order to address the objectives of the thesis I will employ a dialogical approach, where analytical attention is given to interaction and context. The distinction between meaning potentials and situated meanings is important because it makes visible how meanings are something negotiated by interlocutors in different ways depending on the context of interaction. Three concepts are of particular importance in this thesis: utterance, voice and multivoicedness. In order to understand how meanings are produced, and what kinds of meaning potentials are realized, sequences of utterances function as a unit of analysis. When studying how students and teachers engage in meaning-making activities in the case of DST and GBL, I will analyze how they create meanings interactionally, by orienting toward each other's utterances, in relation to the institutional practices in which they are situated. The concept of voice and multivoicedness enables me to analyze how the presence of multiple perspectives shapes meaning-making in student-teacher interactions. Additionally, these concepts also enable me to analyze what becomes a resource for meaning-making and learning in the two learning environments under consideration, and where such resources come from.

4.0 Empirical context

In this chapter, the empirical context will be outlined. I will first describe the case on DST, and then describe the case on GBL. Under each case description I will provide information about the two schools, the particular classes, the curricular topics that students are working on, the projects that students are engaged in and how these projects were organized[18]. In addition, in regard to the case on GBL I will give a more detailed description of the computer game GC: P.

4.1 The case on DST

The case on DST was the first case I started to work on. Prior to the work on this thesis, my supervisor and I had carried out a small pilot study at a lower secondary school in a medium-sized city in Norway. In this pilot, students were involved in a project called "Young today," in which they produced digital stories about different issues of importance for young people in contemporary societies (Erstad & Silseth, 2008). This particular school has been working on DST for several years, with one of the teachers serving as a driving force. This teacher, here called Lene, has attended courses in DST held by Joe Lambert (one of the founding fathers of DST), and has for several years been working on adapting this method to the educational setting. Lene and some of her colleagues planned to carry out a project where DST would be used for working on a more formal curricular topic than what was the case in the project "Young today." I then decided that this new project was well-suited as a case on DST for this thesis.

This school is a public school located in a typical suburban area outside the city center, and houses about 400 students. In 2005, the school went through major organizational and structural changes. It moved into a new building with new facilitates and was restructured into a so-called *base school*. This means that the school went from organizing teaching in traditional classrooms to organizing teaching in a more loosely defined physical space called a base. Each base consists of smaller rooms organized around an open space for learning (primary room). Normally 40-50 students occupy each base, depending on how many students there are at each level, with three *contact teachers* that share the responsibility of all subjects to be taught.

In the spring of 2008, I followed an interdisciplinary school project on World War II, where a group of 64 9th grade students were involved. In this project, students could choose

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[18] All participants are given pseudonyms.

to work with either DST or drama. The students that decided to make digital stories worked in groups. Each group was given the opportunity to choose between different themes associated with World War II for their digital stories, such as Nazism, communism, concentration camps, fascism, Hitler, and the war in Norway. Even though the students were making digital stories connected to a curricular topic, the teachers had an ambition of attuning the students to some important principles from the original method. For instance, the students were instructed to make stories that did not solely contain factual descriptions of the topic they addressed. Rather, the digital stories should communicate personal stories about the topic. This meant that when students made their stories they had to focus on a person, either imagined or real, that would become the center of the stories.

Furthermore, in this project the teachers had decided to grade the digital stories. The teachers had designed a set of assessment criteria that had a dual function. The criteria constituted a guide for students when working on their projects, but also the grading system that the teachers would use when assessing the final digital stories. In addition, students were instructed to keep an *assignment book* during the project. In this document they were to reflect upon what they did as a group during the production process, and justify their choices and strategies. The student groups received a total grade on the project based on both the assignment book and the digital story. Keeping an assignment book in this way, in addition to the fact that the digital stories were to be graded, are clearly significant aspects that distinguish the educational use of DST from engaging in such an activity in more non-formal practices.

4.1.1 Organization of the project

The project unfolded during a week, in which 16 hours were set off to work on the digital stories. I followed the participants through the entire project. The temporal organization of the project is displayed in Table 1.

Time	Day 1	Day 2	Day 3	Day 4	Day 5
Activity	- Introductory lecture - Students working on the digital story - Teacher team meeting	- Students working on the digital story	- Students working on the digital story	- Students working on the digital story - Teacher team meeting	- Students working on the digital story - Students presenting their digital story
Duration	2 hours	5 hours	2,5 hours	4,5 hours	2 hours

Table 1: Temporal organization of the World War II project.

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The first day of the project started with an introductory lecture, given by Lene in the primary room. Most of this lecture was dedicated to talk about the assessment criteria. The students received a sheet where the criteria were described. Lene explained each criterion carefully, and the students were invited to ask questions about the criteria and the project in general.

For the rest of the day, and the four following days, the students composed their digital stories. When making the digital stories each group had their own laptop. The student groups were organized loosely at tables located in the primary room and other rooms in the base. This organization resulted in a situation where the students, and teachers, often traversed different locations within the space at their disposal when working on the stories. The team of four teachers was guiding the students during the project. Even though each teacher had the main responsibility for certain groups, all teachers were moving between the different groups assisting them towards the completion of a final digital story.
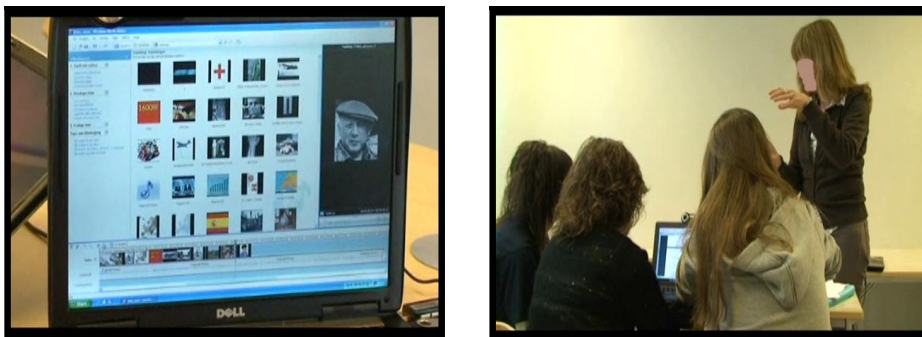
Figure 2: Screenshots from video data on the DST-case. On the left side, two boys are making a digital story about Guernica (the bombing of a small town in Spain during World War II and the painting made by Picasso). On the right side, three girls are discussing their digital story with one of the teachers.

At the end of the week, the students presented their digital stories in the school's auditorium. The stories were projected onto a large screen, and the students were to watch and comment on each other's productions. During the week the teachers had two team meetings, in which different issues regarding planning of activities and students' progression and challenges were discussed.

Thus, in the case on DST students were given *the task* of producing digital stories about a theme connected to *the curricular topic* World War II, from a personal point of view. For the purpose of dealing with this task different *resources* were used. Some of these resources were already designed, such as the editing program used for the story, images downloaded from the Internet and information about the theme provided on different sites on the Internet. Other resources were made by the students themselves, such as images they had

captured, information about the theme of the story collected through interviewing particular persons relevant to the theme, and the voice-over for narrating the story.

4.2 The case on GBL

After work on the thesis had been progressing for several months, I decided to expand the total corpus of data. In order to pursue the main aim of the thesis I found it necessary to include a second case that represented a different type of learning environment involving technology. I decided to use a case on GBL. As argued in the Introduction, computer games have been described as tools that can be used in order to facilitate authentic learning in school. Data on the actual use of GBL in an educational setting was an interesting and relevant supplement to the data on the use of DST.

At the time, when I was searching for a second case, I was made aware of a teacher that was using a particular computer game in his teaching of a curricular topic, which seemed very relevant in regard to the aim of the thesis. This school, and the particular teacher, had earlier been working with colleagues in another institution at my faculty. Through colleagues I got in touch with the teacher, and was invited to follow his teaching in two different classes on upper secondary level. This school is a public school located outside Oslo in a multi-ethnic community and houses about 700 students. The school offers different branches of studies, such as general studies and different vocational courses. Most of the students at this school live in the local area, something which reflects the composition of student mass in regard to demographic characteristics.

In the autumn of 2008, I followed, together with a fellow researcher, a vocational class and a general class in a school project on the Israeli-Palestinian conflict, in which playing GC: P constituted the main activity. I first followed the vocational class, and then the general class. I have decided to only use data collected on the vocational class for the case on GBL in this thesis[19]. The students I decided to focus on were part of a multi-ethnic class, consisting of 12 boys between the ages of 16-17 years old that were training to become car mechanics. The Israeli-Palestinian project was carried out in the students' regular classroom as part of the subject of social studies. The students played as dyads, using laptops. The classroom was

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[19] The reason for this is that the learning environment of the two classes was designed very differently. The vocational students were in their regular classroom during the whole project, using lap tops, something that facilitated much interaction between the students and the teacher. Students of the general class played the game in a large computer room, using stationary computers, which had "small walls" separating the students. This way of organizing the project led to a less dynamic relationship between the students and little interaction between the students and their teacher. Since I will study how GBL is managed in educational settings through analyzing student-teacher interactions, I have decided not to include data on the general class in this thesis.

organized in a more traditional way compared to the learning environment under consideration in the case on DST. This classroom had a rectangular shape, in which students sit in dyads at desks that were placed in rows. The students did not have the same opportunity to move around in the classroom, nor between the regular classroom and other nearby rooms. Posters of cars were hanging on the walls, different parts of cars were sometimes lying around on the floor and the tables, and car- and motor-related issues were quite important ingredients in the conversations that were carried out in this classroom.

The teacher who was responsible for the Israeli-Palestine project, here called Christian, had himself initiated the game play. Christian had employed several computer games in his teaching at this school, and had spent much time playing computer games in his leisure time. According to Christian, students that attend vocational classes, who are not that motivated by and interested in academic subjects, find the theme Israeli-Palestinian conflict, or international conflicts and politics in general, very abstract and difficult to engage in. In his opinion, GC: P makes the conflict more concrete for the students and easier to relate to.

4.2.1 Global Conflicts: Palestine

GC: P is developed by Serious Games Interactive[20]. It is a 3D computer game about the Israeli-Palestinian conflict, in which the player assumes the role of a journalist, represented by an avatar. In the beginning of each mission the player has to choose between writing for an Israeli, Palestinian, or European newspaper. The journalist is then sent out to write articles about different topics on the conflict, such as military raids, checkpoints, and settlements. On his way, the journalist has to seek out different non-player characters (NPC) that tell different stories about the topic in question, and has to collect quotes which will be used in the final article. When talking to NPCs, the player must choose actions (questions and answers) from predetermined categories, and the response given by the NPC depends on the action of the player. At the end of each mission, the player chooses what quotes he will use, combines these with pictures, and composes an article. When the article is finalized, the player receives an evaluation according to the general news value of the piece and how well the story fits with the core values (perspectives on the conflict) of the newspaper he has chosen to write for.

GC: P is also quite packed with written text. The player must read a large amount of text when talking to the different NPCs, something that makes it different from many of the computer games that students are familiar with from outside school. However, the game

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[20] See http://www.seriousgames.dk/ for more information about this company.

designers argue that GC: P might become a learning resource that gives students the opportunity to experience the Israeli-Palestinian conflict in a concrete and personal way (Buch & Egenfeldt-Nielsen, 2006). A desirable outcome of playing GC: P is that the player, through her encounter with different and often contrasting stories about the conflict, will gain insight into its complexity.

4.2.2 Organization of the project

The project unfolded during four weeks, and a total of 11 hours was set off to work on it. I followed the participants through the entire project. The temporal organization of the project is displayed in Table 2 (Day 2 takes place two weeks after the initial day of the project).

Time	Day 1	Day 2	Day 3	Day 4
Activity	- Introductory lecture - Game play	- Plenary discussion - Watching a documentary - Game play	- Plenary discussion - Watching a documentary - Game play - Plenary discussion	Final test
Duration	3 hours	3 hours	3 hours	2 hours

Table 2: Temporal organization of the Israeli-Palestinian project

The first day of the project started with an introductory lecture, in which Christian addressed historical, geographical, religious and political aspects of the conflict. He invited the students to contribute with their knowledge about and perspectives on the conflict. In addition, Christian explained what GC: P was about and how to play the game. After this lecture students began to play the game.

During Day 2 and Day 3, Christian alternated between letting the students play the game, showing documentaries on YouTube, and orchestrating plenary discussions. During game play, he walked around the classroom and supported the students in different ways. For instance, Christian guided the students in the process of understanding how the game was designed, and talked to them about different issues that were raised in the missions. The students were encouraged to read the conversations that occurred between the journalist and the different NPCs aloud, since this strategy supposedly would facilitate discussions among the students. The documentaries that students watched on Day 2 and 3 addressed some of the issues that had been raised in the missions. The first documentary was about an innocent Palestinian family that got in the firing zone in a military raid carried out by the Israel

Defense Forces (IDF). The second documentary was about Palestinians transiting through the checkpoints that separate the Palestinian and Israeli territories of Jerusalem. In the plenary discussions, Christian facilitated students' reflection upon what GC: P is about, and the particular missions that students had played.
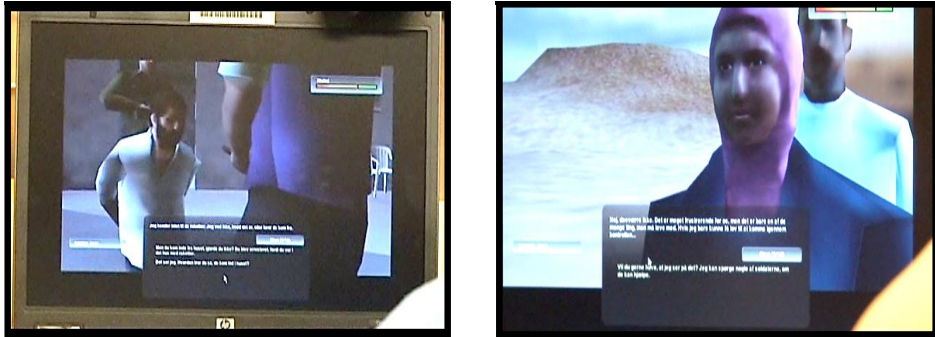
Figure 3: Screenshots from video data on the GBL-case. On the left side, students are interviewing a Palestinian man that is captivated during a military raid carried out by the IDF. On the right side, students are interviewing a pregnant Palestinian woman that has trouble getting through one of the checkpoints in Jerusalem.

The fourth day was set aside for a test on the topic of the Israeli-Palestinian conflict. The students took the test individually, using their laptops while sitting at their desks, and were given the opportunity to play the game during the test. The test consisted of two different tasks. In the first part the students had to answer four questions about the conflict: "Which parties does the conflict consist of?", "What is their disagreement?", "How did the conflict start?" and "How can it be solved?" In the second part the students had to write a news article (using Word on their computers) based on experiences gained during the project.

Hence, in the case on GBL students were given *the task* of writing news articles about different themes connected to *the curricular topic* Israeli-Palestinian conflict. For the purpose of dealing with this task different *resources* were used. These resources had already been designed and were inscribed into the game, and could be found in the different stories that NPCs tell during the different missions that students played.

5.0 Methodology

In this chapter I will consider methodological issues. First, I will give an account of the research design, and reflect upon the process of video-recording classroom interactions. Second, I will provide a description of the total data corpus. Then, I will provide an account of interaction analysis and the analytical procedures that have been deployed in this thesis. Finally, I will reflect upon research credibility. Here, I will consider matters such as reliability, validity, generalizability and reflect upon ethical issues.

5.1 Research design

The research design is based on the *case study method* (Yin, 2006, 2009). According to Yin (2006), "*compared to other methods, the strength of the case study method is its ability to examine, in-depth, a 'case' within its 'real-life' context*" (p.111). The case study method is well-suited when the research project either is informed by a descriptive question (what happened) or an explanatory question (how or why did something happen). This case study consists of two different cases. I will study in-depth two different learning environments located in real life educational settings, one that includes GBL and one that includes DST. I will also make analytical comparisons between these environments. I have chosen these two cases because they represent interesting phenomena, which enables me to pursue the main aim of the thesis. More specifically, according to Yin's terminology I have "*embedded* subcases within an overall holistic case" (p. 113). How resources that are made available in technology-enhanced learning environments, which are informed by the pedagogical ideas under consideration, are interpreted and used by students and teachers can be seen as the holistic case, and how GBL and DST are interpreted and made meaning of can be seen as subcases. While the two subcases are in themselves interesting phenomenon to study, collected data from the two subcases can also illuminate the holistic case.

Furthermore, even though case studies and ethnography are often considered as being informed by different methodologies, I have been inspired by ethnographic principles when collecting data in the two cases. An ethnographic approach aims at studying the activities under consideration in naturalistic settings, in which participation and observation are seen as essential elements of being a researcher (Bryman, 2004; Hymes, 1982). By following the participants through the entire project, and collecting data of *naturally occurring interaction* (Silverman, 2006), my ambition has been to gain an emic understanding of their participation in the learning environments under consideration (Heath & Street, 2008). In order to give a

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detailed account of how some students and their teachers participated in the different learning environments, I have in each case decided to only follow two student groups. Furthermore, the focal groups have been picked out by the teacher. The reason for letting the teachers choose focal groups is that they have knowledge about the students and the dynamics of the groups. Since I have been focusing on a small sample of student groups, I found it necessary to follow groups that consisted of students who came along with each other; that is to say, groups that would not "brake down" during the project.

In qualitative educational research, video-recording has been described as a fruitful strategy for collecting rich data on students' and teachers' participation in classrooms (Derry et al., 2010; Goldman-Segall, 1998; Goldman, Pea, Barron, & Derry, 2007). In this case study I first and foremost rely on video data of classroom interaction (student-student and student-teacher interaction). Video-recordings function as primary data and work as the foreground in the analytical work. Other types of data, such as interviews and documents, which will be accounted for below, work as ethnographical background data that informs the analysis of video data. In both cases, I have video-recorded the entire work of the focal groups. The advantage of video data is that it enable examination of actual sequences of talk and action in detail in the settings where the studied activities are carried out (Goodwin, 1994; Heath et al., 2010; Mercer et al., 2004). In contrast to data generated by different versions of self-reporting, such as questionnaires and interviews, video data enables me to study what students and teachers actually do—how meanings are created moment-by-moment through social interaction (Heritage, 1984)—when participating in the project on World War II and the Israeli-Palestinian conflict.

Furthermore, my argument for the importance of detailed studies is informed by the assumption from dialogical theory that meanings are created interactionally, in the way people orient towards each other's utterances (the principle of dialogicality), depending on the context of interaction. The advantage of a detailed study of social interaction is that it enables me to locate particular aspects of how students and teachers produce meanings collaboratively, and locate particular aspects of the institutional context that influence meaning-making. In order to study how students and teachers make meaning of DST and GBL in educational practices, a detailed study can provide in-depth evidence of how the participants actually build meaning together—thereby providing detailed information about the complexities of technology-enhanced learning.

5.1.1 Video-recording classroom interactions

In both cases, two cameras were used for each focal group; one handheld camera and one web camera mounted on top of students' computer screens. In order to obtain optimal sound quality, a wireless microphone was placed on the students' desks. In the case on DST, I collected all the video data myself. In the case on GBL, I was assisted by a fellow researcher. In both cases, I/we used the handheld camera, standing behind the students, to video-record what happened between the students and their teachers and on the computer screen. The web camera captured the interactions from the front.

It has been argued than when students are being monitored by a camera in classrooms they habituate to the camera after a while, especially when a person is not operating the camera (Jordan & Henderson, 1995). However, since the students were constantly moving their bodies while in front of the computers, the view of the computer screen from a stationary camera would often have been blocked. In addition, since I consider myself as a participant-observer I do not find an objection in regard to using a handheld camera relevant in this case study.

Furthermore, since I had chosen to focus on two groups in the case on DST, and I was the only researcher present, I had to alternate between video-recording the groups. I then had to use some kind of criterion for how long each recording sequence should be. I decided that I should try to limit such sequences to approximately 20 minutes, but if the students were engaged in interesting and important activity I would not end the video-recording too early. However, the web camera was filming the whole time. This means that even if I did not record everything that happened on the screen, I recorded all talk produced during the project.

5.2 Description of the data corpus

5.2.1 Data corpus on the case on DST

One of the groups I focused on in the case on DST consisted of two boys that made a digital story about Guernica. In their digital story, Kevin and Peter address both the bombing of the small town in Northern Spain during World War II and the famous painting made by Pablo Picasso as a reaction to this event. The other group I focused on consisted of three girls that made a digital story about Julius Paltiel, one of the few Norwegian Jews that survived a longer stay in Auschwitz during the war. In their digital story, Ellen, Sarah and Hannah address his arrival at Auschwitz, the terrible conditions that prisoners lived under and how Paltiel managed to survive.

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The data corpus is constituted by video-recordings of the production process, group interviews of the students, a teacher interview of Lene from the pilot study, audio recordings of teachers' team meetings, reflection notes, the actual digital stories, and different documents that circulate this practice. During the project, I have also engaged in numerous informal conversations with students and teachers. In addition to following the students at school, I visited the focal students at home. Two visits were made, one for each group, where the group members gathered in one of the student's homes some weeks after the DST-project. These visits appeared as informal conversations lasting about 1-2 hours, and provided me with some ethnographical background information about the lives of these students outside school. Audio from these conversations was recorded. The data corpus is listed in more detail in Table 3.

Type of data	Description of data
Video-recordings	15 hours of video-recordings from handheld camera and additional footage from the web camera. The video-recordings capture the introductory lecture and the production of two digital stories made by the focal groups. This type of data functions as primary data.
Student interviews	Group interviews of the focal students. These semi-structured interviews provide additional information about the student's participation in the project and ethnographic information about the students in general and their perspectives on the educational setting. See Appendix 2 for the interview guide.
Teacher interview	Semi-structured interview of Lene carried out in the pilot study. This data provides information about the pedagogical rationale behind the work on DST. See Appendix 3 for the interview guide.
Audio recordings	Audio recordings of two teacher team meetings. This data captures discussions about different issues that occur during the project.
	Audio recordings of two home visits.
Digital stories	The digital stories about Guernica and Julius Paltiel made by the two focal groups.
Reflection notes	Notes taken about the educational setting and particular events that occurred during the project.
Documents	Two documents describing the assignment of each of the focal groups.
	A document that describes the assessment criteria.
	The assignment books of the two focal groups.
	A document that describes the teacher's assessment of the two digital stories.

Table 3: Description of data corpus on the DST-case.

5.2.2 Data corpus on the case on GBL

In the Israeli-Palestinian project, I focused on two dyads of boys. The data corpus is constituted by video-recordings of the different activities in the project, group interviews of students, teacher interview, reflection notes, the students' papers from the test, and the teacher manual about GC: P. I have also engaged in numerous informal conversations with the students and the teacher. In Table 4, the different types of data are listed in more detail.

Type of data	Description of data
Video-recordings	8.5 hours of video-recordings from the handheld camera and additional footage from the web camera. The video-recordings capture the introductory lecture, all game play of the two focal groups, plenary discussions, and the viewing of documentaries. This type of data functions as primary data.
Student interviews	Group interviews of the focal students. These semi-structured interviews provide additional information about the student's participation during the project and ethnographic information about the students in general and their perspectives on the educational setting. See Appendix 4 for the interview guide.
Teacher interview	Semi-structured interview of the teacher. This type of data provides information about the teacher's perspectives on teaching with GC: P and additional information about the project. See Appendix 5 for the interview guide.
Reflection notes	Notes taken about the educational setting and particular events that occurred during the project.
Documents	The student's papers from the test.
	A teacher manual produced by the designers of the game that contains information about the conflict, the design of the game, and suggestions for how teachers can employ the game in their own teaching.

Table 4: Description of data corpus on the GBL-case.

5.3 Interaction analysis and analytical procedures

The analytical work of this thesis is inspired by the interaction analysis of Jordan and Henderson (1995), which is informed by the assumption that meanings are socially constructed in interactions. The analytical interest is to study participation by focusing on talk-in-interaction and how participants use artifacts for managing the activities under consideration (Furberg, 2010; Linderoth, 2004).

In interaction analysis, the preparation of data for analysis and the actual analytical work are two sides of the same coin. When preparing video data for analysis two important tasks are *transcribing* and *coding*. After collecting the video data on both cases, I started to transcribe the data. Since I soon discovered that important meanings could slip my attention unless utterances actually were written down, I decided to transcribe all talk produced around the focal groups[21]. In this stage of the process I only transcribed the data on a lexical level (preserving the meanings as a whole) (Lemke, 1998). I also decided to transcribe all the video data myself, something that resulted in a very time-consuming process. This aspect of a detailed study that relies on transcripts of talk and action has been described as one of its weaknesses. For instance, since transcribing talk and action is extremely time-consuming it is difficult to employ this type of analytical approach to larger data sets (Mercer et al., 2004).

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[21] Except talk produced by the focal group that made a digital story about Guernica, due to the nature of their participation in the project. On Day 3 of the project the boys left the classroom and went to a professional radio studio, in which the father of Peter worked, to record the audio for their digital story. Furthermore, on Day 4 and 5 one of the boys got sick and had to stay home. These events had consequences for the pattern of interaction, not only between the students but also between the students and their teachers. Therefore, I have not been able to document the same type of trajectory for this group—how they interacted as students with their teachers during the project—as I did in regard to the other focal groups.

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However, viewing the video data over and over again, writing down all utterances that were produced, made me more familiar with the data. In addition, having two video data sources, the handheld camera and the web camera, gave me the opportunity to orient to the web camera when the audio on the handheld camera could not be deciphered and vice versa.

Markova and Linell (1996) have described coding as a *situated decontextualizing practice*. In order to study what happens in an activity, the researcher freezes a particular moment of interaction which is part of a continuous flow of interactions. Even though some researchers are critical of the idea of coding since such a procedure might threat the authenticity of meaning-making (Hymes, 1982), a data corpus has to be organized in one way or another (Goodwin, 1994). According to Jordan and Henderson (1995), an important analytical foci when analyzing participation in a practice is to examine particular events ("stretches of interaction" [p. 57]). School lessons, breakfasts, bedtime stories, and soccer practice are examples of events. Furthermore, when doing analysis smaller units of interaction, here called *episodes*, which occur in these events, are selected for more detailed analysis. After transcribing all talk, I started to locate different themes that occurred in episodes of interactions during the project, using the computer software NVivo. These thematic codes were not developed prior to the coding process, but emerged from what students and teachers actually talked about. For instance, one theme that became important in the case on GBL was talk about the Israeli-Palestinian conflict. The technique of thematic coding enabled me to map every instance where the students and their teacher talked about and discussed different aspects of the conflict. After locating all episodes that addresses a particular theme, I selected themes to focus on that could tell me something significant about the activity under consideration. From these themes I located a series of episodes, in which important negotiations occurred, which enabled me to analyze in detail how students and teachers managed GBL and DST over time. Then, I transcribed and analyzed the episodes with a sufficient level of detail for the purpose of the study[22]. I often listened to particular sequences at a slower pace in order to get at the content of the utterances produced by the participants (Erickson & Shultz, 1982). The transcription conventions I used in the analysis is a slightly modified version of Poland's (2001) system, which is listed in Appendix 1.

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[22] However, I have not addressed "micro-details" in the transcripts and the analysis, such as breath and intonation; details that are often associated with ethnomethodology and conversation analysis. Paying attention to such details can provide an even more detailed description of how subtle communicative elements contribute to meaning-making. However, for the purpose of this study I have chosen to focus on sequences of utterances on a general level and how these stand in a dialogical relationship to the institutional contexts.

In Article III and IV, I carried out what Derry et al. (2010) have called *play-by-play analyses*. This analytical strategy consists in analyzing "selected episodes that all focus on a particular topic or other issue over the course of days, weeks, or even months to show how that issue was transformed over time" (p. 22). In Article III, I analyze how GC: P transforms as a learning resource over time, by focusing on selected episodes that occur during the project. In article IV, by analyzing selected episodes, in which important negotiations concerning the production of a digital story are identified, a trajectory of participation is revealed.

In interaction analysis, turn-taking is an important analytical focus. This focus has to do with who does the speaking, and the shift between the roles of a speaker and listener (in interaction analysis turns are not only related to talk, but also to artifacts). Analyzing how the participants responds to each other's utterances turn-by-turn in interactional episodes has been a crucial analytical focus. An analytical concept that was important in the analytical work, which is related to turn-taking, is *sequentiality*. Sequentiality has to do with how utterances are produced in a chain of utterances and events that are sensitive to each other (Heritage & Atkinson, 1984; Laurier, 2008). An important analytical strategy has been to consider meaning-making as an interactional accomplishment, and analyze how the participants respond to each other's utterances, turn-by-turn, in the selected episodes. Furthermore, according to Jordan and Henderson (1995), when studying participation in a social practice it is crucial to analyze how the participants use different artifacts that are made available. Artifacts function both as resources that participants can use for their own purposes and resources that structure what can be done by the participants[23]. In this thesis, students and teachers use of different artifacts for managing the activities of GBL and DST is an important analytical focus. For instance, in Article IV I analyze how the assessment criteria are being used as an artifact that enables the teacher to guide the students in student-teacher interactions towards making a digital story.

Moreover, analyzing video data is an iterative process (Derry et al., 2010). When analyzing the video data I constantly shifted back and forth between the selected episodes, the interpretations and research questions, continually (re)watching video and (re)reading transcripts. This process of moving back and forth is crucial in order to understand the activities and practices that have been studied. Furthermore, Jordan and Henderson (1995)

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[23] As Latour (1996, 1999) has argued, artifacts often have particular agencies themselves, which intervene in how social practices are organized and structured—they become *actants*. Norms and values are inscribed into artifacts and influence what kind of action that can be carried out by using them (Roth, 1998).

also stress the importance of discussing particular sequences with colleagues when working with video data. I have presented some of my video material and transcripts of selected episodes with colleagues in different forums, such as research group meetings, doctoral courses, seminars with international researchers, and international conferences, something that has been crucial in refining the analysis and broadening my understanding of the two practices I studied.

5.4 On research credibility

5.4.1 Reliability

In qualitative research, *reliability* refers to the "fit between what the researchers record as data and what actually occurs in the natural setting that is being researched" (Cohen, Morrison, & Manion, 2007, p. 149). Reliability is about consistency of the research findings (Kvale, 1996), and to what extent other researchers can reach the same interpretations and conclusions if repeating the research project (Silverman, 2006).

The principle of transparency is important here (Moisander & Valtonen, 2006). High reliability presupposes transparency in regard to research design, how the data have been analyzed and the theoretical stance that guides the analysis. Video data gives me some advantages in regard to reliability. Studies that rely on video tapes, and transcripts of these, can be more reliable than studies that only rely on field notes or interviews, since video tapes and transcripts are available for inspection by other researchers (Peräkylä, 2004; Silverman, 2005). I video-recorded naturally occurring talk and action in two classrooms, and thereby captured what students and teachers actually do and talk about during the projects under consideration. By relying on video data I am able to display parts of the collected data through transcripts, and make analytical procedures visible for potential readers that can scrutinize both my theoretical and methodological stances, and my interpretation of data based on these stances.

Furthermore, according to Peräkylä (2004), the main principles of securing reliability in detailed studies of social interaction are selection of what is recorded, the technical quality of recordings and the adequacy of transcripts. In this thesis, I have carefully selected episodes that document how a particular theme has been discussed and negotiated during the project. By using a high definition video camera and a wire-less microphone, placed on the students' desks, I managed to gain high-quality recordings. In addition, the opportunity to draw on two sources of video data made it possible to refer to the other source when something was

unclear. Finally, by using a (slightly modified) standardized system of transcribing talk (Poland, 2001), I have employed a strategy that enables me to produce high quality transcripts of talk and actions. These strategies have contributed to increasing the reliability of this study.

5.4.2 Validity

Validity concerns whether a method is appropriate for investigating what it intends to investigate (Kvale, 1996) and whether findings are correctly interpreted (Kirk & Miller, 1986). According to Mishler (1990), in qualitative research assessment of validity cannot be an issue of whether a researcher has used standardized procedures. Rather, validity and validation is connected to judgment and interpretation carried out in a scientific community, and concerns "the process(es) through which we make claims for and evaluate the 'trustworthiness' of reported observations, interpretations, and generalizations" (p. 419).

Working with data on naturally occurring interaction affords me some advantages in regard to validity. Relying on video data, and transcripts of this data, can reduce the risk of individual bias in the analysis (Heritage & Atkinson, 1984). Other people can examine the episodes I have analyzed, and judge my interpretations (Sacks, 1984). Video data enables me to make visible the grounds for the analysis and the generated findings. Of course, since I have only selected some episodes from the data corpus on the two cases, in order to give a detailed account, a major portion of the video data is not included in the articles. These episodes will then only be snapshots of the activities. This aspect of a detailed study that relies on transcripts of talk and action has been described as one of its weaknesses (Mercer et al., 2004). However, as already mentioned, I have selected these episodes in regard to particular themes that are relevant in order to illuminate how GBL and DST is managed by the students and their teachers. The reader can make her own judgments about the trustworthiness of my interpretations of the activities based on the selected themes and episodes.

Furthermore, in regard to validity the principle of *validation through next turn* is pertinent (Peräkylä, 2004). Referring to Sacks, Schegloff and Jefferson's (1974) notion of a *proof criterion* in analyzing social interaction Peräkylä (2004) points out that responses to a particular utterance can tell us something about how the utterance is picked up and interpreted by interlocutors. This means that the next turn in an episode of interaction provides the reader a tool for judging whether the analyst's interpretation is valid or not. In the analytical work of this thesis meanings are analyzed as a result of how utterances respond to each other. This means that the reader of this thesis can examine on what grounds I make claims about the analyzed interactions, something that strengthens the validity of my claims. Finally, during

the work on this thesis I have shared video data with colleagues and the participants, and critically discussed possible interpretations of the data, something that also contributes to strengthen the validity of this study.

5.4.3 Generalizability

The possibility of making generalizations in qualitative research, and especially case studies with small samples, has been vividly discussed (Lincoln & Guba, 1985; Silverman, 2005; Williams, 2002). Broadly speaking, *generalizability* refers to "the extent to which one can extend the account of a particular situation or population to other persons, times, or settings than those directly studied" (Maxwell, 2002, p. 52). In order to provide a detailed and fine-grained analysis of how students and their teachers are making meaning of the activities of DST and GBL in educational practices, I have chosen to focus on a relatively small sample. Convenient sampling has been used in both cases, and the focal groups were picked out by the teacher. It is difficult to argue for the possibility of generalizing the findings of this type of case study to large populations.

However, even if the findings of this thesis cannot be considered as *statistical* generalizations they can be seen as *analytical generalizations* (Kvale & Brinkmann, 2009; Yin, 2006). According to Kvale and Brinkman (2009), analytical generalization "involves a reasoned judgment about the extent to which the findings of one study can be used as a guide to what might occur in another situation. It is based on an analysis of the similarities and differences of the two situations" (p. 262). Analytical generalization can be obtained if the researcher provides rich contextual descriptions of the research process and strong arguments for the transferability of the findings to other situations, so that a potential reader can judge the soundness of the generalizations. Furthermore, analytical generalization implies that the findings and conclusions are based on a combination of theoretical assumptions that guide the study, findings from the empirical analysis and findings from related studies (Furberg, 2010). In this thesis, I have provided a rich description of the research design, the process of carrying out the research project, and the analytical procedures. Furthermore, the theoretical framework that guides the empirical analysis, and how it guides the analysis, has been explicitly described. In addition, through the review I have documented what previous related studies of the use of GBL and DST in educational settings have shown. I have then discussed the findings of this thesis (see Chapter 6), which has been generated through empirical analysis of the two cases, in relation to key studies in the field. By relating case studies of

GBL and DST in educational settings to what has been done previously, we can over time generate more robust knowledge about how students and teachers manage such activities in general.

5.4.4 Ethical considerations about the project

Pre-field work period. Since both cases involve the process of collecting and storing sound- and video data the project had to be reported to the *Norwegian Social Science Data Services* (NSD)[24]. Two separate applications were submitted to the NSD, one for each case. In these applications I described the project in detail and included the consent form that would be distributed to the participants. The application was approved by the NSD, and I was given permission to carry out the research project. An important part of the pre-field work period was to inform the participants about the research project, and collecting informed consent. Since all students were under 18 years of age, I found it necessary to collect such consent from their guardians. The consent form described the project in general: that the students would be video-recorded, that participation was strictly voluntary, that the students and the school would be kept anonymous, and that the students at any time could withdraw from the project. In both cases, the consent form was distributed to the students by the teacher in advance of the actual fieldwork.

The field work period. Since it was the teacher, in both cases, that had initiated the activities under consideration, I did not directly intervene in the ordinary school life of the participants. However, when you enter the lives of students as a researcher you do make a difference. Punch (2002) has pointed out that ethical discussions about research on young people often tend to focus on informed consent and confidentiality and disregards other aspects of the research process. Such aspects include, for example, the importance of establishing a good relationship with the participants and avoiding adult biases when encountering young people. To say whether I, as a researcher, intervened in the natural flow of students' participation in a negative way is a delicate matter. One could argue that my presence as an outsider might have led to "obstructions" in the students' daily activities of some kind, perhaps causing some students frustration. However, on the contrary, the fact that someone from the outside is interested in their learning community might have led to a situation in which the students were more focused in their work. Furthermore, even though the researcher gets access to students in the classroom, and is given the opportunity to video-

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[24] See http://www.nsd.uib.no/nsd/english/index.html and http://www.nsd.uib.no/personvern/om/english.html for more information about NSD.

record their participation, this access has to be maintained during the project (Heath et al., 2010). Even though the students have agreed to participate in the research project and, furthermore, that people in general are getting used to have video cameras around (Derry et al., 2010), the possibility of some students feeling unease when video cameras are "monitoring" them does exist. In order to create a comfortable situation in regard to the technical devices that surrounded the students I let them play with some of these devices, such as the wireless microphone and the web camera. The choice of focusing on groups of students might have contributed to a safer environment, compared to a situation where singular students are in focus. According to Bryman (2004), the participants' understanding of the researcher's status and the nature of the research project is an important issue. Even though I do not doubt that the students understood that I was a researcher from the University, a weakness in the project could be the fact that I did not spend time in the classroom together with the students, and especially the focal students, prior to the studied projects. Spending time with the students prior to video-recording them could have led to a safer environment that would have made my reason for being there even clearer. However, the group interviews, which were carried out after the video-recording, gave me an opportunity to debrief the students. When I asked them what they thought of being video-recorded, none of the students showed negative reactions. Some students explained that they felt somewhat awkward in the beginning of the project, but that this feeling decreased as the project unfolded. One way of investigating what participants feel about being video-recorded is to let them watch parts of video data that have been collected (Heath et al., 2010). In the interviews in the case on GBL, the students and the teacher watched episodes of themselves from the project. Even though these interviews provided the participants an opportunity to comment on negative experiences in regard to being video-recorded, none of them did so. Moreover, the students had the opportunity to withdraw from the research project at any time. However, this did not happen in any of the cases.

6.0 Summary of the articles and discussion of the findings

In this chapter I will first provide a summary of each of the four articles that are included in this thesis. Then, I will summarize and discuss the findings. First, I will discuss the contribution to research on GBL and DST in educational settings. Second, I will compare and contrast students and teachers use of the resources made available in the two learning environments. Finally, I will address theoretical and methodological contributions and provide some a final remark. The four articles are summarized here in chronological order according to when in the PhD cycle I worked on them (not when they were published). Article I and II are written together with my supervisors, in which I am the first author, and I am the sole author of Article III and IV.

6.1 Summary of articles

6.1.1 Article I

Silseth, K. & Erstad, O. (2012). Mirroring the surfaces of the self: Exploring literacy practices of digital storytelling. In S. Østerud, B. Gentikow & E. G. Skogseth (eds.) *Literacy practices in late modernity*: *Mastering technological and cultural convergences* (pp. 225-244). New York: Hampton Press.

This book chapter reports on the case on DST. The purpose of this chapter is both to engage in theoretical reflections about learning with technology in educational settings, and to show how DST can activate multiple resources that students can use when learning about a curricular topic. The following research question guides the analysis:

- *What opportunities can DST provide students as learners in an educational setting?*

In order to address this research question we draw on Flusser's (2002) distinction between *linear fiction* and *surface fiction*. Linear fictions are media that gives us the opportunity to represent the world through written text (e.g. books, letters, scientific publications), and surface fictions are media that enables representation of the world through images (e.g. photography, films, TV). We argue that this distinction captures the different types of media that often are associated with either school or out-of-school practices, but that it is quite possible to combine both types of media in learning activities at school. In order to address the notion of *identity* and *literacy*, ideas from Flusser are combined with principles and concepts from dialogical theory, such as *dialogicality* and *multivoicedness* (Wertsch, 1991). Here, literacy and what it means to be literate in contemporary societies is seen as the capacity

to adequately participate in the multiple practices that young people travel between in their daily lives. Furthermore, we argue that good learning environments enable students to encounter multiple voices or perspectives on the curricular topics that they work on.

In order to discuss our argument we analyze the process of making a digital story about the curricular topic World War II. Here, we focus on the two students that made a digital story about Guernica. In regard to methodology, we do not employ interaction analysis in this chapter. Instead, we undertake an analysis of the content of the digital story, and provide an analytical account of some of the activities they participated in when producing this content, based on video data and data from the group interview. The data work as an illustration of the different activities that are facilitated by DST as a method, as well as what opportunities this method can provide students for learning about a curricular topic.

The findings show that DST might provide students with valuable tools for engaging in identity work and learning. The analysis reveals that by making the digital story as a news program by means of using and manipulating multiple modes, in which they assumed different roles or identities (e.g. the news anchor, Picasso, news correspondent), the students managed to make a digital story that consisted of multiple perspectives on the topic of Guernica. Furthermore, the findings show that the potential of DST can also be found in the way it creates an opportunity for students to share produced content with others (people other than the teacher). Written assignments do often have submission to the teacher as its final aim. In DST, writing a manuscript is only one step in the production process. The written manuscript is the starting point for the digital story and other content is added on into a final multimodal composition, which is shared with the other students in the class and potentially anyone that is interested in learning about the topic that it addresses.

Hence, the findings show that DST can motivate students in their work on curricular topics, and provide students with opportunities to encounter multiple perspectives or voices on these topics.

6.1.2 Article II

Silseth, K. & Arnseth, H. C. (2011). Learning and identity construction across sites: A dialogical approach to analysing the construction of learning selves. *Culture & Psychology*, 17(1), 65-80.

The aim of this article is to develop an approach to studying learning in and across practices, taking a dialogical standpoint as the point of departure. While reporting from the two cases is

not in the foreground, data from the case on GBL is used for the purpose of illustrating our approach. Two interrelated research questions guide the development of this approach:

- *How is the person constructed as a learner?*
- *How can we study such constructions?*

In order to address these research questions we introduce the concept of *learning selves*. This concept is based on dialogical perspectives on meaning-making (Bakhtin, 1981, 1986; Linell, 2009; Vološinov, 1973), and is a way of characterizing how people are constructed as learners. Learning selves are discursive constructions that are negotiated between human and non-human actors. When people make meaning of a particular activity here and now, they use voices or perspectives gained from practices they have participated in earlier as resources for the current participation. The different voices that different actors use when making meaning of the same activity has consequences for what kinds of learning selves can be constructed, and what kinds of learning selves are seen as favorable or unfavorable. Departing from the idea that learning must be studied as continuities and discontinuities *within* a practice (Lave & Wenger, 1991), we aim to develop an approach to studying how learning selves are constructed *within and across* practices, and what consequences this has for a person's participation. We outline three analytical resources that enable us to study how learning selves are constructed in and across sites: *narratives/stories*, *categories* and *inscriptions*. First, learning selves can be found in narrative creations about the learner—in the topic of the story that is being told by people about themselves and others. Second, people can use particular categories to describe themselves and others in ways that have implications for how they and others participate in a practice. Third, inscriptions points to how knowledge, values, and norms are inscribed into material representations and travel across one setting to another and can be used to construct particular learning selves.

In order to demonstrate how the three resources enable us to study the construction of learning selves we analyze an episode of classroom interaction taken from the case on GBL, in which two students discuss the activity of playing computer games in school with their teacher. In regard to methodology, we employ an interaction analytical approach. We study in detail how two students and their teacher orient to each other's utterances, and how they use different voices for achieving particular goals and construct different favorable and unfavorable learning selves when making meaning of GBL.

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The analysis reveals how the participants use stories, categories and inscriptions in order to construct different learning selves that have significance for the students' participation when playing GC: P. Conflicts between the relevance of the different learning selves occur. Some learning selves are seen as relevant by the teacher and others by the students, however, these learning selves stand in a dialogical relationship to each other. This type of negotiation has implications for the students' participation, but the students also have agency in this process. The analysis documents how the analytical resources might function as tools for grasping how people are constructed as learners across different sites of participation. Even though GBL is not the main theme of the article, the data suggests that students will not uncritically embrace games as tools for learning in school, and that the relevance of using a game for learning about a curricular topic are negotiated in student-teacher interactions and that GBL should be seen with regard to how students are constructed as learners.

6.1.3 Article III

Silseth, K. (2012). The multivoicedness of game play: Exploring the unfolding of a student's learning trajectory in a gaming context at school. *International Journal of Computer-Supported Collaborative Learning*, 7(1), 63–84.

This article reports on the case on GBL. The purpose of this article is to explore how a computer game is constituted as a learning resource, for working on a curricular topic, in classroom interactions. Two interrelated research questions guide the analysis:

- *How do classroom interactions contribute to a student's learning trajectory in a gaming context?*
- *How are games constituted as learning resources in classroom interactions?*

In order to address these research questions, I employ analytical concepts from a sociocultural and dialogical approach to meaning-making and learning. In particular, I employ the concept of *learning trajectory* (Dreier, 1999, 2003) on an interactional level, *voice* and *multivoicedness* (Linell, 2009; Wegerif, 2006, 2007). The concept of learning trajectory enables me to analyze how meaning-making and learning unfolds chronologically on different time scales. In addition, this concept enables me to analyze how students' work on a curricular topic in school can be connected with knowledge they possesses about the topic gained in practices located outside school—how different learning trajectories can intersect in

school work. The concepts of voice and multivoicedness enables me to show how contrasting perspectives on a curricular topic emerge in classroom interactions, and how these perspectives are managed and used for different purposes by students and their teacher. In addition, voice enables me to analyze what becomes a resource for making meaning of the GC: P and the Israeli-Palestinian conflict, and where such resources come from.

In order to answer the research questions I analyze one student's learning trajectory in the project. By analyzing different interactional episodes that take place around this student during the project, and a news article that he produced on the final test, I document how this learning trajectory changed and became intersected by other learning trajectories that had started outside school. In regard to methodology, I employ an interaction analytical approach and analyze in detail how students and their teacher orient to each other's utterances and collaboratively make meaning of the game and the conflict.

The findings show that the teacher has a crucial role in constituting the computer game as a learning resource. Competence in playing computer games outside school might be relevantly invoked when students engage in game play as part of curriculum-guided teaching. However, the findings show that such competence might not be enough to foster subtle understandings of the topic that is addressed in the game. The findings show that the constitution of a computer game as a learning resource is a highly collaborative activity, in which multiple resources for meaning-making are in play, and shed light on what might characterize student-teacher interactions that contribute to students' subtle understandings. The findings show how a teacher can use resources in the game (personal and concrete stories from the different sides of the conflict) when facilitating discussions about different aspects of the curricular topic. By making the students use the personal stories from the game as resources for giving accounts and evaluations of what happened during game play, the teacher manages to create what Wegerif (2006, 2007) has called a *dialogic space*, in which the different voices of the conflict *inter-animate* each other. In addition, the findings also show that in order to realize the potential of GBL in educational practices, and enable students to develop subtle understandings of the topic addressed in the game, it is important for the teacher to find ways of creating learning environments in which the learning trajectories about the topic started in the classroom become linked with learning trajectories about the same topic started outside school.

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6.1.4 Article IV

Silseth, K. (submitted). Surviving the impossible: Studying students' constructions of digital
        stories on World War II.

This article reports on the case on DST. The purpose of the article is to explore in detail how DST is interpreted and used by students and teachers as a method for working on a curricular topic in school. The following research question guides the analysis:

- *How is the activity of digital storytelling managed within an educational practice?*

In order to address this research question, I employ analytical concepts from a sociocultural and dialogical approach to learning and meaning-making. First, the concept of *accountability* is used as an analytical resource (Mäkitalo, 2003; Shotter, 1984). Different contexts of interaction require different ways of being accountable. In school, students have to be accountable in ways that are recognized by the teacher and vice versa. Analyzing how the participants handle accountability enables me to study how they manage DST in their practice. Second, in order to analyze how students and their teachers handle accountability, I employ two analytical concepts from dialogical theory: *third parties* and *reported speech* (Linell, 2009; Vološinov, 1973). Third parties are resources (for example institutional norms and values, virtual participants, artifacts) that primary parties orient to in social interaction for different purposes, such as developing arguments, persuading others or solving problems. Reported speech is the act of quoting other persons when taking part in interactional encounters in order to achieve particular goals. Moreover, third parties and reported speech are discursive devices that people can use in order to give accounts. Analyzing how participants use such devices enables me to study how they manage the activity of DST in an educational practice.

        In order to answer the research question I analyze in detail how the student group that made a digital story about Julius Paltiel participated in the project on World War II. Here, I zoom in on different interactional episodes that occurred during the project and analyze how the students, in cooperation with different teachers, make meaning of DST. In regard to methodology, I employ an interaction analytical approach and analyze in detail how students and teachers make meaning of the activity by orienting to each other's utterances, and by using different discursive devices for handling accountability.

The findings show that DST might contribute to the creation of an educational practice that expands students' access to resources for working on a curricular topic. However, the findings also show that the realization of a learning environment that includes DST has to be considered in light of several issues. The findings show that learning with DST in the institutional context of school is not just about learning to use technology in order to express oneself, but also about becoming a specific kind of learner with new technology. Students need to learn how to use different resources that are activated in order to be accountable and manage the institutional context for learning with DST. Furthermore, the findings show that the teacher's way of framing this activity is crucial. The potential of DST depends on, for example, to what extent a balance between institutional demands and students' agency is created. Well-suited tools that enable students to interpret this genre of content-creation have to be developed. However, the findings also show that students' understanding of such tools, such as well-defined assessment criteria, are something that continually has to be negotiated during the process of making a digital story. In addition, the findings show that teachers need to be aware of how the diverse interests of the students influence the process of making a digital story, and how they can use content that is composed by the students as tools for expanding students' knowledge about the curricular topic they are working on.

6.2 Discussion

6.2.1 Contributions to research on GBL in educational settings

The findings of this thesis show that computer games *can* become valuable learning tools in school, and to some extent supports some of the positive accounts in the discourse of GBL (Collins & Halverson, 2010; Gee, 2003; Gredler, 1996; Gros, 2007; Prensky, 2001; Shaffer, 2006; Shaffer et al., 2005). However, the findings also show that there is not much ground for claiming that computer games are beneficial and motivating learning resources *in general*. Although games have the potential of being valuable learning resources, this potential has to be realized in practice.

McFarlane et al. (2002) have argued that if simulations are to be used successfully for learning purposes in school they need to be consistent with the reality that they simulate—that is, they have to be authentic. However, the findings of this thesis show that the authenticity of the game itself is just one part of the whole picture. The authenticity of a game is partly framed by the teacher. Whether the game functions as a valuable learning resource is also dependent on how it is being used by the teacher as a resource for facilitating student reflection on a curricular topic. Previous research has also emphasized that the teacher has an

important role in school projects that involve GBL (Egenfeldt-Nielsen et al., 2008; Freitas & Maharg, 2011; Freitas & Oliver, 2006; Sandford et al., 2006). However, few attempts have been made to analyze in detail how students and teachers collaboratively make meaning of games as resources for learning about the world outside the classroom. In order to elaborate the findings of this thesis, I will now discuss my contributions in regard to the key studies on GBL reviewed in Chapter 2.

Amory and colleagues (1999) have argued that there exist specific elements, present in some types of games, which are more effective in regard to enhancing students learning than others. Thus, the authors imply that it is possible to distinguish games and game elements that are effective from those which are not, and thereby determine a priori what type of games will engage, motivate, and facilitate learning—an assumption that resembles what Petraglia (1998a) has called pre-authentication. However, in this type of study conclusions are based solely on students' self-reported experiences from playing games individually. A detailed study of how games are made meaning of in student-teacher interactions provides a more fine-grained account of GBL. The findings in this thesis show that the constitution of games as learning resources is not only dependent on the design of the game, but also depends greatly on students' understanding of game play in general (Article III), students identity work (Article II) and how teachers frame GBL and orient/re-orient students to specific aspects of the game that has relevance for inquiring the curricular topic that students work on (Article III).

That students' appropriation of games as learning tools is a complex process is shown in the study conducted by Squire and Barab (2004). The findings of this study show that students' appropriation of a game requires several hours of game play in a learning environment that enables them to use the game for pursuing their own interests. Squire and Barab show that the teacher is important when it comes to providing students historical narratives and geographical knowledge that they can use as resources for "replaying history" successfully. Moreover, the study shows that the teacher is important in regard to making links between the game and the curriculum, and shows that teacher interventions can support students in seeing how the game can be relevant for pursuing own interests. However, even though this study shows how a teacher can facilitate students' appropriation of the game, it does not provide detailed information about how the teacher can orient and re-orient students, in student-teacher interactions, to essential aspects of the game that contribute to its potential as a learning resource. Nor does it provide detailed information about how the teacher can use

game experiences as resources in plenary discussions. According to Oliver and Carr (2009), connections between game experience and formal education rely on a learning environment in which students receive some kind of post-play reflection.

Article III demonstrates what characterizes student-teacher interactions that contribute to students' adoption of subtle understandings of the curricular topic that is addressed in a computer game. First, the findings show how the teacher enables students to comprehend what kind of complexity the game simulates. The students do not on their own grasp the fact that the different stories about the Israeli-Palestinian conflict they encounter during game play belong to different sides, and that the NPCs have different agendas depending on what side they represent. By using utterances produced by the different NPCs as resources, the teacher enables students to reflect upon the multisidedness that the game simulates. In contrast to the findings of Squire and Barab (2004), the teacher does not only provide the students with general narratives and political facts about the topic in question. The teacher uses specific utterances that students have encountered in the game as resources for attuning students to the complexity of the curricular topic that is addressed in the game. Second, the findings show that post-play discussions are important in GBL, and also *how* such discussions can be framed. The importance of using resources in the game (personal and concrete stories from the different sides of the conflict) when facilitating discussions about different aspects of the curricular topic is made visible. The teacher makes students produce accounts and evaluations of what happened during game play, and also make them take different stances towards the conflict by using the utterances of the NPCs as resources when giving accounts. Furthermore, the teacher is using the students' utterances produced in the discussion as resources for re-orienting the students to the different sides of the conflict and as resources for driving the discussion forward. He does not present general and abstract accounts of the two sides, but always focuses on students' own experience during game play. By using these different strategies the teacher manages to create what Wegerif (2006, 2007) has called a *dialogic space*, in which the different voices of the conflict inter-animate each other.

The analysis carried out in Article II shows how the use of GBL in educational settings has to be considered in relation to students identity work, and that students will not uncritically embrace games as motivating tools for learning. Squire and Barab (2004) have also shown that the appropriation of a game is connected to identity work and dependent on whether students see the game as relevant for pursuing their own interests or not. However, Article II demonstrates that the issue of appropriation or resistance is also connected to how students are constructed as learners—what kinds of learning selves are seen as favorable in

such types of learning environments. The findings show that what it means to be a learner in learning environments that involve GBL is negotiated by students and teachers. In the interactional episode that is analyzed in Article II, the teacher starts to criticize the students' way of playing the game. This leads to a situation in which the students and their teacher construct different types of learning selves as favorable when learning with GC: P. Thus, creating learning environments that involves GBL is not just about finding ways of making games relevant for students' own interests, but also about finding ways of participation that students themselves find relevant. Students need to be provided with knowledge about possible models of participation, and knowledge about the rationale for why some models are favorable in educational practices and others not. Without this knowledge it is difficult for students to participate as learners in ways that they see as relevant in a gaming context.

Furthermore, in Nash and Schaffer's (2011) study of GBL in an educational setting, the interactions between students and mentors were given even more attention than in Squire and Barab's (2004) study. The findings show that in these interactions students first learn to imitate the mentor's professional way of thinking about urban planning and then appropriate the epistemic frames. However, this study does not provide information about the transition from imitation to appropriation. Actually, Nash and Shaffer (2011) state when discussing their findings that "while it is unclear exactly when the transformation took place, there is evidence that the players of *Urban Science* began to achieve some autonomy in their ability to think as professionals, and that their autonomy was derived from their interactions with mentors" (p. 187). Thus, this type of study does not say anything about what kind of student-teacher interactions leads to appropriation. The detailed analysis in Article III shows how the students first learned to see how the game simulated complexity, and later used the experiences gained through game play as resources for discussing different aspects of the Israeli-Palestinian conflict. This analysis located moments of transition, and shows what kind of teacher intervention contributed to such transitions. According to Linderoth (2004), games can become valuable learning resources if they are interpreted and made meaning of in relation to what students already know about the topic, and used as one of many resources made available in the learning environment. The findings show that learning with the type of simulation that GC: P represents is not just about being enabled to participate in the practice that it simulates (e.g. journalism), but has to be seen in relation to how students are enabled to use prior gained knowledge (e.g. from participation in practices outside school) about the curricular topic that is addressed in the game and in the teaching. The findings in this thesis

provide detailed information about how various resources and different learning trajectories about a topic started both inside and outside school might become linked in ways that together enable students to develop subtle understandings of the topic that is addressed in the game.

6.2.2 Contributions to research on DST in educational settings

The findings of this thesis to some extent support existing research that report on the benefits of creating learning environments in schools that involves DST (Bjørgen, 2010; Nilsson, 2010; Nixon, 2009; Sadik, 2008; Sylvester & Greenidge, 2009; Vasudevan et al., 2010; Ware & Warschauer, 2005). However, the findings also show that there is not much ground for claiming that DST as a method for working on curricular topics is beneficial and motivating for students *in general*. As documented in Article I and IV, DST has the potential of contributing to a learning environment in which students have rich access to various resources for working on a curricular topic. However, as the detailed analysis in Article IV shows, there are several important issues to consider when employing DST in the institutional context of school. As with GBL, the potential of DST has to be realized in practice.

Previous research has shown that the success of using DST for working on curricular topics is highly dependent on the teacher (Davis, 2004; Kearney, 2011; Kulla-Abbott, 2006; Robin, 2008). However, there is a lack of studies that provide a detailed account of how students and teachers collaboratively make meaning of this activity. In order to demonstrate what can be gained from detailed studies of student-teacher interactions and elaborate the findings of this thesis, I will now discuss my contributions in regard to the key studies on DST reviewed in Chapter 2.

The findings show that DST has to be re-interpreted to fit educational practices. For instance, the personal and emotional aspects that are emphasized in the original genre (Lambert, 2002) have to be interpreted differently when this method is employed for working on curricular topics. When working on such topics the personal is not necessarily seen in how digital stories contain stories from the students' own lives, but can be seen in how students manage to decenter and tell a story from the perspective of another person(s) according to criteria set by the teachers. However, the criteria are not static entities, but negotiable. They must be re-interpreted in relation to each particular digital story.

Kearney's (2011) pedagogical framework for guiding teachers in DST-projects includes different teacher strategies for supporting students in the different phases of making a digital story. This framework highlights issues that are important for a teacher to reflect upon before, during and after a DST-project. However, even if this framework displays potential

teacher interventions, it does not deal with the issue of teacher expectations. According to Mercer (1996), there are "educational ground rules" (p. 363)—norms and expectations—in every classroom that students must learn in order to participate competently. Mercer further argues that these ground rules often are not talked about and made visible for the students, something that constitutes a major challenge for many students. The pedagogical framework provided by Kearney (2011) does not address how teachers can make what is expected of students when participating in DST-projects visible, in order to, for example, achieve good grades. The findings of this thesis show that the proper ways to interpret this method for working on curricular topics, which stress the personal and emotional aspect, are not self-evident. Hence, it becomes important to make what counts as a good digital story visible to the students. Furthermore, the students that I have followed are given the criteria that the teacher will use in the assessment process prior to the creation of their digital stories. The detailed analysis in Article IV shows how these criteria are being used in discussions between the teachers and students, and used by the teachers as a resource for orienting and re-orienting students to different aspects of making a digital story. However, the findings also show that the students do have difficulties in making sense of the criteria, and need support when trying to adapt these criteria in their own projects. Thus, the findings show that even if students are provided tools they can use for making digital stories that will be assessed as high-quality products, tools that make what is expected of them as learners more transparent, the meaning of such tools are not given a priori. The meaning of such tools is an object of negotiation throughout the project, where students and teachers collaboratively make meaning of these in relation to students' particular projects.

Both Sadik (2008) and Kulla-Abbott (2006) have stressed that students need guidance in interpreting DST as a method for working on curricular topics. According to Sadik (2008), students might have difficulties in connecting the objective of the story to the objective of the subject matter. According to Kulla-Abbott (2006), students might experience a lack of motivation when making digital stories about curricular topics, such as environmental issues, since they are not emotionally connected to such topics—students are much more motivated when making personal digital stories about topics connected to their own interests. Even though these findings are interesting, the studies do not provide detailed information about possible teacher interventions that can support students. The findings of this thesis provide such information. First, the findings show the importance of creating a balance between student's agency and institutional expectations, and how this can be achieved. Students need

to take what is expected of them as learners in an institutional context into account. However, if their own voice is not heard it might be difficult for students to be motivated by this activity. The detailed analysis in Article IV shows how students both had an interest in achieving a good grade, and an interest in making the digital story in their own way. The analysis shows how the teacher, by both encouraging own decision-making and making them accountable to the assessment criteria, enabled the students to use content that they had created themselves for the purpose of making a digital story that both met the institutional expectations and students own desire for self-expression.

Second, the findings show that how teachers position themselves towards the tools that students are provided for producing digital stories (e.g. assessment criteria) might influence students' participation in DST-projects. Making students aware that the criteria has a specific author (the teacher), and what type of considerations are taken into account when such criteria are made, might make it easier for students to relate to these tools. If students are uncertain about the rationale behind the criteria, and where these criteria comes from (who is the author?), they might be less willing to appropriate such tools and take the teacher's instruction into account when working on their projects.

Third, the findings show that students might not be able, by themselves, to see how the message of their story often is related to broader themes beyond what is explicitly addressed in the story. The teacher should be aware of how he or she can use student-produced content as resources for expanding their understanding of the curricular topic that their digital stories address. Rather than providing students with general narratives about the topic they inquire through making digital stories, teachers can use content that already is produced by the students to expand their understanding of the topic and make them reflect upon issues that here are more or less implicitly addressed.

Fourth, the findings of this thesis suggest that what kind of topics that motivate students in their work on DST is highly dependent on student-teacher interactions and how teachers frame the context of production. Hence, focusing on the topic as the motivating factor might lead educators in the wrong direction. Instead, by carefully developing strategies for making DST and topics to work on relevant for the students the teacher can frame this activity in motivating ways, regardless of if the topic is related to students' own interests or the formal curriculum.

Finally, learning with DST in the institutional context of school is not just about learning to use technology in order to express knowledge about a particular topic, but also about becoming a specific kind of learner with new technology. Students need to learn how to

use different resources that are activated in order to manage the institutional context for learning with DST.

6.2.3 Comparing use of resources in two learning environments

According to Petraglia (1998a, 1998b), the problem with pre-authentication in regard to technology-enhanced learning—assuming that learning activities that involve the use of technology are authentic prior to students' engagement in them—is that the multiple ways that technological resources can be interpreted and used are not taken into account. Whether activities are authentic or not and whether they motivate and how students engage in them is ultimately an empirical question. The findings of this thesis show that even if the pedagogical ideas under consideration are present in the technology itself, such as a computer game, this does not in itself make it a valuable learning resource. The process of making technological resources into learning resources is dependent on different issues, for example, the context of use and learner specifications. I will now go back to the rationale for the study and discuss some of the empirical findings across the two learning environments, and also point to some practical implications of this thesis.

First, as already argued, the localization of the pedagogical ideas is different in the two learning environments I have explored. In GBL the ideas are inscribed into the technology (the game) and in DST the ideas are located in the method of producing content. However, the findings show that students of both types of learning environments need guidance in interpreting the activities facilitated by the technology. Hence, the findings show that whether the pedagogical ideas are located in the technology itself or in the method of using technology, students need tools for making sense of the learning resources that are made available. They need support both in order to use such resources to gain knowledge about the curricular topics they are working on and to see how such resources are relevant for themselves as learners. Even though students will use resources they have gained from other practices they have participated in (such as competence in playing computer games in general), for the purpose of interpreting the learning resource made available in the classroom, students are dependent on a teacher that supports them in adapting these tools to educational practices.

Second, the findings show that in order to expand students' understanding of the curricular topic they are working on by means of DST and GBL, the teacher needs to pay attention to and use students' own experiences gained during their participation. To use these

experiences in student-teacher interactions is both about making rather complex issues, such as the Israeli-Palestinian conflict and World War II, more concrete and easier to relate to, and also about recognizing students' efforts in these types of learning environments. As seen in Article III on GBL, the expert teacher uses students' own experiences from game play as resources for discussing the different issues raised in the game and the different perspectives on these issues that here emerge. For instance, when making the students evaluate the actions of the Israelis and the Palestinians, the teacher orients the students towards specific episodes that occur in the game. The teacher employs the content of the utterances produced by the students to expand their understanding of the complexity of the conflict. This strategy enables him to use, sometimes by means of revoicing, students' experiences as resources for discussing issues about the conflict. As seen in Article IV on DST, the teacher also uses students' own experiences and perspectives as ways of expanding their understanding of DST and the curricular topic in question. However, the way of using such experiences is different in the case on DST, something that partly is due to a difference in the nature of the resources that are used in each activity. In the case on GBL, the students do not first and foremost produce resources to learn with. Students are provided a learning tool that already is inscribed with a set of resources that they can use for learning about a topic. In contrast, in the case on DST, many of the resources that students are supposed to learn with (e.g. images, sound-clips and narratives; resources that will be used when making the digital story), are created by the students. This means that the resources that teachers can use to expand students' understanding are made by the students themselves. As seen in Article IV, the teacher uses content that students have made themselves in order to expand their understanding of the topic they address in their digital story. More specifically, the strategy of using the content of the sound clip that the students have made themselves, taken from their interview with Julius Paltiel, enables the teacher to attune the students to the fact that the story is not just about Julius Paltiel as a person; the story is also about more universal themes such as totalitarian ideology and the consequences that actions guided by such ideology can have.

Third, the findings show that the interpretation and use of resources in technology-enhanced learning environments are dependent on students' identity work as learners—what types of learning selves that are produced. According to Minick et al. (1993), learning has not only to do with the capacity to learn, but also the willingness to learn in the learning environments that are created in educational practices. As illustrated in Article II, episodes in which students are in opposition to the teacher and argue against the teacher's view on their participation with technological resources can occur. However, in the episode that is analyzed

in Article II, the student's resistance occurred when the teacher started to question the student's way of playing the game. The teacher believes that the students would participate in a more productive way if they read the conversations between their avatar and NPCs aloud during game play (the teacher has a pedagogical argument). It is when the teacher tells them to read aloud that the students assume their critical stance. The type of identity work revealed in this episode shows how students can question teachers' pedagogical intentions in using digital tools that the teacher assumes will create authentic learning for students, especially when a conflict of interest in how to participate with them occurs. In the student-teacher interactions analyzed in Article IV on DST, very few disputes of this kind occurred between the students and their teacher. These students are very sensitive to and aware of how they should respond to the teacher's utterances in order to minimize tensions, and thereby represent a different kind of learner identity than that which is illustrated in Article II. The students in Article IV are trying to find out what is expected of them as learners, and interact with their teacher in certain ways in order to gain such insight. The students are actively orienting to and sensitive to the educational ground rules of the World War II project.

Finally, according to Mäkitalo (2003) different contexts of interaction require different ways of being accountable. The findings of this thesis show that different ways of making curricular topics available for students also provides students with different ways of handling accountability. Giving adequate accounts can often be challenging for students. When being held accountable in the classroom, students draw on available resources in order to manage such situations. In the case on GBL, students are held accountable in regard to their experiences gained during their engagement with the pre-made content that is available in the game. Compared to learning environments where students are just provided general and abstract stories about and perspectives on the Israeli-Palestinian conflict, it might be easier to give adequate accounts in the learning environment created by means of GC: P, since students can use experiences gained through game play—personal stories about the conflict told by the different NPCs they here encounter. In the case on DST, the pedagogical ideas under consideration are located in the method and students themselves create content in order to learn about a curricular topic. As seen in Article IV, the detailed analysis revealed characteristics of student-teachers interactions in which student-composed content becomes discursive devices used by students and teachers for different purposes during the process of making a digital story. When students make content themselves, by means of technological resources, this content might also function as resources for handling accountability. This

aspect of technology-enhanced learning in educational settings should not be underestimated, because it illustrate that learning with technological resources is not just about being able to gain knowledge about a particular curricular topic but also about learning to participate in ways that are favored in the institutional context of school.

6.2.4 Theoretical and methodological contributions

According to Dewey, as well as other proponents of the progressive pedagogical tradition, schools need to develop an education that bridges students' experiences gained in school with the world outside. Technology has been described as a tool that might foster connections across students' educational and non-educational worlds and create authentic learning situations in educational settings (Bransford, 2000; Collins & Halverson, 2010; Hull & Schultz, 2001; Lombardi, 2007; Sawyer, 2006; Shaffer & Resnick, 1999). However, it has also been argued that assuming that an activity, involving the use of technology, will provide authentic learning a priori is highly problematic (Petraglia, 1998a, 1998b). Hence, more studies of how activities informed by the pedagogical ideas under consideration are enacted and interpreted in educational settings are needed.

Employing a dialogical approach has enabled me to study the complexities of how teachers and students make meaning of such activities in educational practices. Since this approach stresses how meaning-making is highly dependent on interaction and context, it has enabled a detailed examination of how such activities are interpreted, negotiated, and recontextualized in the field of tension between participants' different interests, perspectives, and voices. First, a dialogical approach has contributed to expanding our understanding of how the pedagogical ideas under consideration can be realized in technology-enhanced learning. For instance, as seen in Article I, a dialogical approach enabled me to study and document how DST gave students the opportunity to encounter different perspectives on the Guernica incident. This approach enabled me to study the richness of a multimodal expression, such as a digital story, and how students themselves experience this activity.

Second, a dialogical approach has contributed to expanding our knowledge about how students need guidance and support from the teacher in interpreting activities that involve technology, and making them relevant for the students as learners. As seen in Article II, III and IV, the dialogical approach enabled me to study how tools offered in learning environments that involve GBL and DST are being interpreted by the students and their teachers in collaboration. In article II, a dialogical approach enabled me to study how students and teachers negotiate the relevance of different kinds of learning selves in a gaming context

at school. In Article III, a dialogical approach enabled me to study how the teacher manages to use the computer game as a resource for enabling a student to gain insight into the Israeli-Palestinian conflict. In Article IV, a dialogical approach enabled me to examine what kind of strategies teachers used to frame the work on DST, and how students and teachers handled accountability.

Third, a dialogical approach has contributed to expanding our knowledge about how the realization of pedagogical ideas is dependent on students' identity work and how students are constituted as learners in activities being informed by such ideas. In sociocultural theory, the close connection between learning and identity has been addressed in different ways (Gee, 1999; Lave & Wenger, 1991; Moje & Luke, 2009; Sinha, 1999; Wortham, 2006). According to Sinha (1999), in most theories of learning the learner, and the question of what it means to be a learner, is taken for granted. However, a dialogical approach has enabled me to deal with this question. In Article II, Arnseth and I develop an analytical approach to studying learning across contexts by drawing on a dialogical perspective. Here, we introduce the concept of learning selves as a way of addressing how people are constituted as learners in and across sites of participation. By drawing on a dialogical approach we develop an analytical framework (consisting of stories, categories and inscriptions) to study the constructions of learning selves. A seen in article IV, the dialogical approach enabled me to study how students and their teachers managed their identities or roles as learners and teachers when being engaged in the activity of DST. The dialogical approach enabled me to study how students and teachers used different discursive devices in order to manage accountability in different interactional episodes during the project, and enabled me to study how students' and teachers' identity work influenced the activity of DST.

Fourth, a dialogical approach has contributed to expanding our understanding of how the realization of pedagogical ideas is dependent on how students' experiences from their daily lives outside school are used as resources for guiding their participation at school. As seen in Article III, the dialogical approach enabled me to trace a student's learning trajectory in a school project which included GBL. Not only did this approach enable me to study how student-teacher interactions work as resources in the development of a student's learning trajectory, but also how the learning trajectory that were developed in the classroom were influenced and dependent on other learning trajectories that were started outside school.

Furthermore, this thesis demonstrates what is gained from studying activities taking place in classrooms in detail, as they are made meaning of in social interactions. Even though

I have argued for studying how activities are made meaning of in social interactions, I do not argue that important aspects of activities cannot be documented by other types of data. As seen in Article I, important insights into how students have been working with DST and insiders' perspectives on this activity were documented through a more general analysis based on video data and interviews. However, studying social interaction provides a more detailed and complex picture of the activities under consideration. Through detailed analysis, the institutional features that intervenes and, to some extent, structures meaning-making in activities can be made visible (Drew & Heritage, 1992).

Studying talk-in-interaction and how artifacts are used for managing activities (Jordan & Henderson, 1995) enabled me to make visible how different institutional features intervene in conversations between primary parties. In Article II, a detailed approach enabled me to grasp how students and teachers negotiate what kinds of learning selves should be seen as favorable in a gaming situation at school. In Article III, such a methodological approach revealed how students will not automatically discuss the curricular topic that is raised in a computer game and develop subtle understandings based on just gaming itself. Learning situations that contributed to developing subtle understandings were facilitated by the teacher's use of specific strategies, something that was revealed by a detailed account of the practice. In Article IV a detailed account revealed how the students needed help to interpret the genre of DST and how the assessment criteria became a structuring resource for the students' content-production.

Finally, a detailed study of how GBL and DST are made meaning of in social interactions has enabled me to examine how multiple contexts for learning can become connected (Article II and III). By drawing on the ideas from dialogical theory I have been able to analyze what becomes a resource for meaning-making and learning, and from where such resources come. As demonstrated in Article II, stories, categories and inscriptions are valuable analytical tools for analyzing how resources travel between settings and are picked up for the purpose of negotiating what it means to be a learner in a particular setting. As seen in Article III, the detailed approach to analyzing social interaction has enabled me to grasp how students' learning trajectories that starts outside school can intersect and be made relevant in students' learning trajectories that develops in the educational practice. Detailed studies of student-teacher interactions, from a dialogical approach, enable a fine-grained analysis of how resources for meaning-making and learning, which are always in flux between the different practices that learners traverse, are recruited and made relevant for students' participation in educational practices.

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6.3 Final comment

Technological tools do have the potential of contributing to the creation of learning environments, in which ideas from progressive pedagogy can be realized. However, such a potential has to be considered in the light of how learners, contexts and resources for learning are constructed collaboratively by students and teachers in pedagogical practices.

Future research on technology-enhanced learning should aim to investigate how learners, contexts and resources for learning are constructed during longer periods of time. Still, it is also important that the design of such longitudinal studies includes detailed analysis of meaning-making. If longitudinal studies in addition to this include a focus on how resources are used and made meaning of across contexts, for instance home and school, such studies could provide even richer descriptions of technology-enhanced learning.

Hopefully, this thesis will contribute to expand our knowledge about technology-enhanced learning in educational practices. Moreover, I hope that it will contribute to refining our understanding of context and interaction as guiding concepts for studying how activities in school, which involves the use of technology, are made meaning of, and how a dialogical approach enables us to study the complexities of how resources are interpreted and made use of in technology-rich learning environments.

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Appendices

Appendix 1: Transcription conventions

Sign	Explanation
(.)	Pause that lasts less than half a second
(..)	Pause that lasts between half a second and one and a half seconds
(…)	Pause that lasts longer than one and a half seconds
-	Interruption
(overlapping)	Overlapping talk
"---"	Garbled words or expressions
×	Words that cannot be deciphered at all
Caps Lock	Emphasizing words and expressions
Ye-e-e-s	Words or sounds that are held
(laughing, coughs)	Indicates other bodily sounds
Italics	Reading from the computer screen

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Appendix 2: Interview guide for students regarding DST

Opening questions

- How do you enjoy school?
- What do you like best about going to school?
- What is the worst thing about going to school?
- How is lower secondary different from elementary school?
- Do you live in the nearby area?
- Do you spend time with students from other schools in your spare time?
- What are your parents' occupations?
- How would you describe yourself?
- What leisure interests do you have?
- Are you a member of any associations or organizations outside of school?
- Do you get to use your out-of-school interests in school?

Use of computers in school

- Do you often use computers in school?
  - Do you use them enough, or should you use them more or less?
  - Do you think there are enough computers?
- How do you use the Internet in school?
  - Have you uploaded anything to the Internet?
- What do you think should be different regarding the use of computers at school?
- What do you think about the way teachers use computers?

DST

- Can you explain to me what DST is in your own words?
- What do you think about working with DST?
- Could you have achieved the same by writing and adding images by hand?
- What is the most usual form of teaching at this school?
- How is the work on DST different from regular teaching?
- Would you say that DST is more fun than other presentation tools, such as power point, and written assignments?
  - What is different?

After addressing the questions listed above, I replayed the digital stories and discussed different aspects of them and the process of making them with the students. Then, I asked the questions listed below.

- What was it like showing the digital stories to the other students?
- What are your thoughts on the comments that you received?
- Lene often says that a digital story should be personal. In what way would you say that this story is personal?
- If you had made a digital story at home, would you have done it in the same way?

Media use in general

- What types of media do you use at home?
  - How often do you use them?
- Do you use the computer at home?
  - What do you use it for?
- Do you use media or computers together with your parents and/or siblings?
- Do you have a mobile phone?
  - What do you use it for?
- Do you have a digital camera at home?
- Do you play computer games?
- Do you write blogs?
- Do you make movies at home?
- Do you upload anything to the Internet?
- Do you use social networking sites?

The relationship between the use of technology at school and at home

- What have you learned from using digital storytelling?
- Have you learned anything about using the technical equipment when working with your digital story?
- Do you use DST in your spare time?
- Do you think you will use DST in your spare time in the future?
- Do you tell stories at home by using new technology?
- How is the way you use the computer at home different from the way you use the computer at school?

Appendix 3: Interview guide for the teacher regarding DST

- Tell us about your teaching background?
- How would you characterize your view on the student?
- What are the best ways to enhance student learning in today's schools?
  - What are the greatest challenges?
- How do you take care of differentiation?
- Can you tell us about your work with DST?
- What made you interested in DST?
- Why is it important for students to learn to use DST?
- In what ways is DST different from other ways of telling stories?
- Do you think that DST can improve student's self-expression skills?
- How does DST make students more active in the learning process?
- Do students react differently to DST?
- Do they manage to make their own expressions?
- What are the connections between DST and the curricular content?
- How would you characterize your role as a teacher in working with DST?
- Do you collaborate with other teachers in this work?
- How can one best take advantage of students' digital competences that are developed outside school in this work?
- Do students often use images and stories from their own lives in the digital stories?
- Even if digital stories are personal, do you have any thoughts about how they also are social?
- Do the students use skills developed in DST outside of school?
- Do you have any thoughts about whether the work with DST can lead students to take a more active part in your community?

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Appendix 4: Interview guide for students regarding GBL

Opening questions

- How do you enjoy school?
- What do you like best about going to school?
- What is the worst thing about going to school?
- How is upper secondary different from lower secondary?
- Do you live in the nearby area?
- Do you two spend time together after school?
- Do you spend time with students from other schools in your spare time?
- What are your parents' occupations?
- What leisure interests do you have?
- Are you a member of any associations or organizations outside of school?
- Do you get to use your out-of-school interests in school?
- Do you read books in your spare time?
- Do you read comics or magazines in your spare time?
- What do you think of social studies?

Use of computers in school

- Do you often use computers at school?
  - Do you use them enough, or should you use them more or less?
- How do you use Internet at school?
  - Have you uploaded anything to the Internet?
  - Do you know anyone who has?
- Do you often play computer games at school?
- What do you think should be different regarding the use of computers at school?

Media use in general

- What types of media do you use at home?
- Do you have a digital camera?
- Do you play computer games?
- Do you upload anything to the Internet?
- Do you use social networking sites?

GC: P

- Can you explain to me what GC: P is about in your own words?
- What are your thoughts about playing the game?
- Did you wish that something was different?

- Did you know much about the Israeli-Palestinian conflict before this project?
- How is playing games different from regular teaching?

<u>Watching documentaries</u>

- You did watch a couple of documentaries about the conflict. Do you remember what these were about?
- What did you think about these documentaries?
- How were these documentaries related to the game?
- How is watching a movie about the conflict different from playing a game about the conflict?

After addressing the questions listed above, I replayed selected episodes of classroom interaction from the video data and discussed them with the students. Then, I asked the questions listed below.

<u>The test</u>

- What are your thoughts about the test?
- Why didn't you play the game during the test?
- Have you learned anything from playing this game?
- Do you know more about the conflict now compared to before playing the game?

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Appendix 5: Interview guide for the teacher regarding GBL

- Tell me about your teaching background?
- How would you characterize your view on the student?
- What are the best ways to enhance student learning in today's schools?
  - What are the greatest challenges?
- How do you take care of differentiation?
- Can you tell me about your work with GC: P?
- What made you interested in GC: P?
- Why do you use GC: P in your teaching?
- How would you characterize your role as a teacher in working with GC: P?
- Do you collaborate with other teachers in this work?
- What are the differences between teaching based on GC: P and teaching based on the textbook?
  - What are the advantages of using the game?
  - What are the disadvantages of using the game?
- Do you have any thoughts about how one can take advantage of student's digital competences developed outside school in this type of teaching?
- How do you use technology outside of school?
- Have you uploaded anything to the Internet?
- How did you think the teaching plan went this time?
  - What worked?
  - What didn't work?
- What are the connections between the game and the curricular content?

After addressing the questions listed above, I replayed selected episodes of classroom interaction from the video data and discussed these episodes with the teacher. Then, I asked the questions that are listed below.

- Do you have any thoughts about the test?
- The students were allowed to listen to music during the class. Why?
- Only one student played the game during the test.
  - What are your thoughts on that?
  - How did this student perform?
- In retrospect, is there anything you would have done differently?
- Will you continue to use GC: P in your teaching?

PART II:
THE ARTICLES

Article I

Silseth, K. & Erstad, O. (2012). Mirroring the surfaces of the self: Exploring literacy practices of digital storytelling. In S. Østerud, B. Gentikow & E. G. Skogseth (Eds.), *Literacy practices in late modernity: Mastering technological and cultural convergences* (pp. 225-244). New York: Hampton Press.

Article II

Silseth, K. & Arnseth, H. C. (2011). Learning and identity construction across sites: A dialogical approach to analysing the construction of learning selves. *Culture & Psychology*, 17(1), 65-80.

Article III

Silseth, K. (2012). The multivoicedness of game play: Exploring the unfolding of a student's learning trajectory in a gaming context at school. *International Journal of Computer-Supported Collaborative Learning*, 7(1), 63–84.

Article IV

Silseth, K. (submitted). Surviving the impossible: Studying students' constructions of digital stories on World War II.