

## THE STORY MACHINE: TRANSMEDIA GAMES IN EDUCATION

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### **Abstract**

The paper reports on the design process of a transmedia game driven by narratives mixing fact with fiction. The aim of the game was to enhance student motivation, collaboration, multiliteracy and local history learning. A total of 378 students ages 14-16 from three municipalities in Sweden played the game in their local school, providing content, reflections and suggestions for this type of gamification in school; thus supporting the design. The game improved students' multiliteracy skills while physically visiting and exploring local historical sites. Working in groups to solve tasks improved collaboration skills. Being placed in a fictional setting supported engagement.

### **Introduction**

One of the core professional practices for teachers concerns student motivation and how to stimulate engagement to improve student learning. Numerous efforts in how to motivate and engage have been developed through practice and research. One such approach is linked to storytelling, and more recently computer games (Prensky, 2001). Computer games in education have attracted a lot of research attention. In an ambitious literature review of computer games in education Connolly, Boyle, MacArthur, Hainey and Boyle, (2012) show that while numerous publications talked about the potential of computer games for learning (they found 7,392 in their systematic literature review), only 129 provided empirical studies of computer games in educational practice. Therefore, research regarding games in education should be grounded in empirical investigation, preferably in close collaboration with schools. In order to authentically capture the situated practice and relevance of games in schools there is a need to investigate how games are experienced and used by students that have actually had a situated experience of gaming for learning in their own school setting. Situated practice in and with digital technologies in education expands its boundaries outside of the classroom due to network connection and other types of arrangements for gaming in school. One such expansive approach for gaming in schools for learning can be found in transmedia learning, combining storytelling techniques with multiple platforms to create a comprehensive learning situation with many and varying entry and exit points for learning and teaching (Gronstedt & Ramos, 2014; Thornburn & Jenkins, 2003).

### **Aim**

The aim of this paper is to identify motivation triggers for student engagement found in a story-driven transmedia game during its iterative and contextualized design process in order to further support multiliteracy development, collaboration and local history learning among secondary school students.

### **Previous Research on Mobile Technology and History Education**

Mobile devices have been discussed as potential tools for improved learning. Usually the role of the technology as a change agent has been addressed. The technology has been described as having potential to play a crucial role in empowering students to demonstrate authentic, meaningful learning (Schrum & Glassett, 2009). Mobile technology has also been presented as having the potential to transform classroom practice providing unique and innovative teaching and learning, for example, to develop 21st-century social interaction skills (Sung, Chang, & Liu, 2016). Still, these technology-centric ideas do not really capture the more complex issues of how to integrate mobile devices into the specific learning situation. According to Zimmerman and Howard (2013, p. 2), “mobile devices can situate and connect learners by supporting authentic, context-specific, immediate learning.” Integrating mobile technology enables educators to customize student learning by creating learning activities to engage students beyond schedules and physical classrooms (Hess & Gunter, 2013). These views enhance the need for more fine-grained and integrated approaches to learning when mobile technologies are used. Additionally, the situated practice mentioned by Zimmerman and Howard and Hess and Gunter is not only linked to the classroom but also to surrounding contexts where learning can take place, whether online or offline. Still, good intentions and technological potential need to be put in action (Connolly et al., 2012) and specifically linked to curricula in educational settings.

The transmedia game developed and reported on in this paper was oriented towards local history learning, aligned with curriculum for secondary school students in Sweden. Recent research shows that the subject of history is often one of the least favorite subjects among students (Turan, 2010). Many students find history irrelevant and boring (Turan, 2010), but studies have found that the use of ICT increases students’ active participation, recall rate and achievement (Haydn, 2001; Turan, 2010). Different studies show that the use of technologies in teaching history has a positive effect on students’ historical and critical thinking and their understanding of various historical subjects (Brown, 2001; Taylor, 2003). However, problematic issues have been identified such as finding out how to improve history education when using ICT (Haydn, 2001). These difficulties are related to planning for and using suitable ICT tools to support rather than distract student learning and goal achievement in history (Hofer & Swan, 2008; Lipscomb, 2002) as well as to enhance rather than decrease motivation to learn history, since ICT in itself is not enough to trigger motivation (Huizenga, Admiraal, Akkerman, & ten Dam, 2008). Taking previous research into consideration, it becomes clear that we need practice-based studies of such situated practices incorporating

mobile technologies in specific ways to further identify and systematize when such arrangements serve their purpose and clarify what obstacles such customized learning situations need to address to provide the intended learning effect.

### **The Game**

The learning situation studied here is a three-day participation in a transmedia game designed for educational purposes with contextual connection to local historical sites within the municipality where the participating schools are. A transmedia game, or alternate reality game, uses the real world as its game world and blurs the lines between fiction and reality. It is played on social media, dedicated websites and in real-world locations. This type of game has been around for some time (Klopfer & Squire, 2008), but in our project, *The Story Machine*, we are using this type of game mechanism as an educational tool to enhance multiliteracy skills, collaboration and local history learning. The difference between a transmedia game and a video game is that a traditional video game is played on a screen, within a virtual world, and exists only within that space. As the game uses mobile devices and social media, the students are supposed to enact all sorts of literacy activities as they both document their progress during the game sessions through blog texts, photos, films, podcasts and other media, and have to interpret the often mysterious texts and character interactions they encounter. They have to be active in the digital world, but also visit places in the real world, taking education outside of the classroom but still connected to local historical sites found in their municipalities. These predetermined game elements were driven by the insight of situated practice to contextualize the learning situations for students integrated with details in the game (Collonay et al., 2012). The predetermined game design and game element was also closely aligned with the curriculum, in this case local history, but also generic skill enhancement in the Swedish curriculum such as multiliteracy and collaboration.

### **Design Process**

The design process was originally driven by the game designer who also had the role of game master when students played the game in school. During the ongoing design process the school developer, business developer, game designer and researcher increasingly collaborated, combining diverse competences with unique expertise and points of reference. Together with student comments and post-session reflections, the game was iteratively adjusted to incorporate game elements to enhance motivation and engagement among students with a continuous focus on intended learning outcomes such as multiliteracy, collaboration and learning local history. In that sense, we claim that the design process can be associated with what recently has been described as bounded creativity in design science research in information systems (Baskerville, Kaul, Pries-Heje, Storey, & Kristiansen, 2016). This perspective enhances how a design process can be informed by both rigorous processes from scientific approaches and at the same time have creative elements that drive innovation connected to relevant issues for the challenge at hand that the design intends to tackle during its cyclic work process (Majgaard, Misfeldt, & Nielsen, 2011).

### Three Cycles in the Design Process

In this game design process, three cycles of situated practice in combination with cross-competence analysis among the diverse group of expertise were involved. The game was played by students in schools during regular school hours with support to participate from their schools and teachers. During each session, a researcher shadowed students while playing, taking field notes that were later analyzed. After each session, the game was evaluated and discussed by students. Their thoughts and comments were then analyzed and led to the incorporation of adjustments to the game and different elements in it. Details regarding lessons learned and implemented changes will be presented below. After each session, the blogs and the interactions between the game master and students playing were analyzed in order to find out specific problems and derive solutions from these identified problems.

Three different municipalities from the south of Sweden were involved in this project. During the first design phase, it was played in Botkyrka municipality (east coast). In the second phase, it was played in the city of Mölndal (west coast), and in the third it was played in Lund (far south of Sweden).

In this paper, we focus on the lessons learned regarding identified triggers for motivation and engagement to support multiliteracy development, collaboration and local history learning. The continuous design of the story-driven transmedia game was in particular inspired by the students' actual use of the game. In the section below we will describe each game session at each location and some typical remarks from students that informed the change in the story-driven design.

**Game Session I: Botkyrka.** The first game was made in 2015 and played by 180 students. The original rationale for the game development was that this particular municipality struggles with low motivation among large groups of students. This municipality has a high unemployment rate and low student scores in standardized tests and grades. The idea was then to use drama pedagogy as a trigger for motivation (Jaquet, 2011). In drama-driven pedagogy, students are invited into an imaginary situation where the teacher leads the learning and literacy activities from within as a part of the imagined context (Heathcote & Bolton, 1995; O'Neil, 1995). In such a pedagogical approach, imagination becomes an important part of learning. To further trigger engagement, visiting local historical sites for authentic learning and leaving the classroom were part of the original game design. Additionally, using mobile technology and social media would create a possibility to develop multiliteracy also among low achievers, as it was argued that being able to document and share pictures and not just written text could facilitate participation from a larger group of students, thus including them in literacy schoolwork (Jaquet, 2011). Several literacy studies find that only some students have the opportunity to integrate their literacy experiences in school, while others, often students whose literacy deviates from the school norm, need to leave their literacy experiences behind (Fast, 2007; Gee, 2003).

In order to use the drama-driven mechanism of getting into an “as if” mode while learning (Huber, Dinham, & Chalik, 2015), the game had a story inspired by Swedish crime genre. By collecting clues that were physically left in various places in the municipality by the game master, and solving riddles online on Twitter, the students’ goal was to stop a pyromaniac from burning down historical buildings in their community. To do that they had to do research about local history, solve the pyromaniac’s riddles that led to a certain place or building, and get there before him.

The students actually met the characters in the game as real actors in the original game design. At one point the pyromaniac (the game designer himself) stalked the students during a mission. In the last game session, actors were present at the location, portraying both the helpful characters and the pyromaniac, whom they could arrest and interrogate at the end of the game.

After the game, students were interviewed about their experience. They typically liked the game features and the drama setting, saying things like: *“I thought it was fun and a little bit exciting to learn who the pyromaniac was. It was also fun to find the ‘fire mark’ and to find different places.”*

However, they also shared some suggestions to improve the game regarding game content and game organizations: *“Do more tasks and don’t let everyone get the same tasks in order to prevent groups from asking others for answers.”*

Comments like that were interpreted as indications that the narrative in the game was rewarding, that the tasks were considered as meaningful and that students really wanted to have a “fair game” that supported problem-solving for all and not copying each other to get the right answer. Therefore, the design of the game was continuously worked upon to address the students’ thoughts and suggestions.

**Game Session II: Mölndal.** The second round of games in the Story Machine project was played in Mölndal, a community with a rich history and folklore that also became the theme of the game. This municipality has a low unemployment rate and students score well on standardized tests. This time, rather than hunting down a criminal, they explored supernatural beings from local legends to stop an ancient conspiracy. This game was made in collaboration with the local museum knowledgeable in the area of local folk tales and myths. The rationale for changing the narrative was that the rich stock of local folk tales and history lent itself to this theme.

In September 2016, 84 students from two local schools had to investigate strange disappearances that had happened in Mölndal throughout the centuries. The game in Mölndal was the first time where the interaction between the players and the characters portrayed happened only online, in contrast to Botkyrka when they also interacted with real actors. The online interaction was to see if the game could be interesting without physical artifacts and take the first steps towards creating an automatic transmedia

game where no trained game master is necessary, thus allowing for teachers in schools to drive the game.

The students worked in groups to find locations and solve tasks as well as try to come up with a plausible narrative regarding the strange disappearances. The fact and fiction division in this game was linked to actual places and historical events but also fictional stories and myths. This time, the student tasks were distributed to the groups in a system that made them start with different tasks to avoid crowding, as in the Botkyrka game session. This time, the game used a blog tool in combination with Twitter to allow students to expand thoughts and ideas while documenting their tasks and their own narratives. The Twitter text restriction was considered too limiting for the game intention of providing multimedia content together with textual narratives for the missions; however, it functioned well for sending out tasks and chat interactions between groups and game master. The game master monitored various Twitter accounts and blogs while also playing different characters in the game.

Students that were able to follow the game and had well-functioning groups said things like: *“I thought it was really fun since all the group members participated and contributed ideas. I came up with about four ideas! I did not really enjoy walking that much all the time, but all the rest was fun.”*

*“I did not like the first mission just searching for facts at Gunnebo. But then, walking around in Kvarnbyn, it became 100 times more fun since then you needed to be like a detective. The mission about Fleskepetter in particular gave me the creeps! It was also more fun to interact with the supernatural guy than the journalist [characters in the game managed by the game master].”*

This time, field observations, i.e., shadowing students as they played by walking and running with them during the full game session taking field notes, was added to the investigation of the function of the game while playing. The method allowed for more insightful understanding and there were various results regarding whether the game was motivating and collaborative or not. Some groups worked well, but others struggled, not only with the tasks but also with group dynamics, literacy issues and being able to enter into an imaginary game mode while playing in the factual situation (Spante, Jaquet, & Lindquist, 2017). During the game students also commented that the response time from the game master was too slow. They became somewhat demotivated by the waiting time for new tasks when they had accomplished one and wanted to move on to the next.

Analyzing both the game process and the blog contributions in combination with the chat interaction between groups and game master, showed that the more mysterious story with no clear main objective or antagonist in the beginning of the game, became too hard for the students. Some of the student groups appreciated it a lot, but because of the more obscure theme, some thought it was too unclear and gave up.

This was a valuable lesson: participating in this kind of game is a novel situation in itself and confusing to start with, so the stories should be kept simpler, or at least be more self-explanatory than the Mölndal game turned out to be. However, the combination of a blog tool and Twitter functioned well in supporting multiliteracy development among students.

**Game Session III: Lund.** After the lessons learned in Mölndal, the game narrative returned to the “Purified by fire” story used in Botkyrka, with the pyromaniac, but this time played in the city of Lund in south Sweden during November 2016. This municipality has a low unemployment rate and students score well on standardized tests. This game was played by 150 students from one school.

In Lund, we also used a new system to hand out tasks to the players. Instead of manually sending out tasks by direct messages on Twitter, the game designer built a puzzle chain for each group. By submitting the right password on a custom-built webpage the groups could progress in the story at their own pace and get automated feedback. The game master could therefore more intensively focus on the social interaction between the students and the characters, proven to be highly motivating for students and a trigger for engagement (Spante et al., 2017). The game element of puzzle chains was also to take a step towards a more automatic transmedia game. This is a goal we are aiming for to make one version of the game less dependent on a skilled game master and easier to access and play for any teacher without previous game master experience.

In combination with digital footprints on the groups’ blogs as well as in chats with the characters in the game, we made field observations following different groups during the game. In the field observations, it was evident that engagement varied within groups, but these variations were invisible in the group blogs. Had only blogs been analyzed, such student behavior would have been overlooked, as it was in the first game session in Botkyrka where only Twitter feeds were analyzed in combination with student interviews after the sessions. Here we can see that the combination of research methods and bounded creativity in design processes made a valuable contribution to the continuous improvement of the game (Baskerville et al., 2016). However, despite the varying levels of engagement, students typically liked the game sessions, saying things like: *“that the game was different from normal lectures and that you used the tablet/mobiles and that we were outdoors”* or *“we were free from lectures. We had to find places that were unfamiliar to me”* as well as *“I really enjoyed chatting with the editorial office in order to get information. It felt more real than getting instructions on paper. I appreciated the theme of the game, and that we were supposed to visit different places and not just stay in a classroom.”*

The students’ comments and feedback, both during and after the game sessions, based on their actual experiences was one of the most important triggers for game development and re-design.

### General Evaluation from Students

In general, the transmedia game experience made students reflect upon their own activities and estimated contributions. A total of 378 students ages 14-16 from three municipalities in Sweden have participated, providing content, reflections and suggestions for this type of gamification in school. Of course, such measures are difficult to take as robust evidence for the benefit of transmedia games. However, they signal that these students as a group were generally in favor of this type of educational practice. The students also appreciated how the game made them work together and stimulated purposeful use of digital tools, social media platforms and supported multiliteracy skill development. See Figures 1-3.

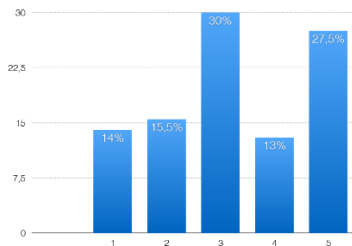


Figure 1. I have discovered and can use more digital tools than before I played the game (1 disagree, 5 totally agree).

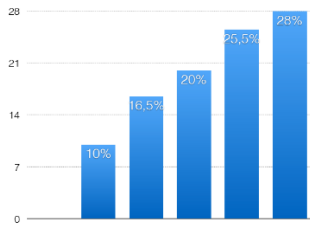


Figure 2. I have learned more about my local history (1 disagree, 5 totally agree).

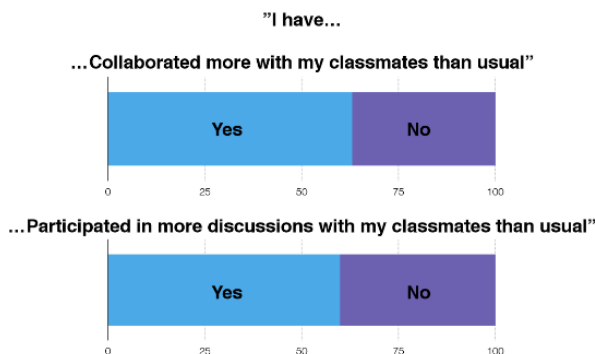


Figure 3. Collaboration and communication.

Student participation, contributions and reflections made us motivated to continue with the design work in order to further improve the design of the game as well as script suggestions on how to involve teachers in the game sessions. Such developments are currently in the making so we do not yet have actual data on these further initiatives in the Story Machine project.



## Discussion

In the Story Machine, transmedia games as a socio-technical assemblage (e.g., Cecez-Kecmanovic, Galliers, Henfridsson, Newell, & Vidgen, 2014; Orlikowski, 2009), where social interaction among peers and with the game master as characters in the game, combining interaction with digital artifacts having a narrative to work alongside with while visiting local historical places, becomes a motivating situation for students, despite varying levels of engagement. Rather than viewing the digital artifact as something seamlessly implemented in the game experience, the use of the digital artifact was regarded as something important in itself despite the fact that it was highly integrated into the whole game experience. This positioning of the digital artifact in the story-driven game design shares similarities with what has been framed as “seamful” interaction where the artifact becomes intertwined with the overall experience (Chalmers, Dieberger, Höök, & Rudström, 2004). This view is important since the thoughtful integration of ICT for gamification in school has been called for (Connolly et al., 2012; Huizenga et al., 2008).

In order to enable further support for students that do not readily get involved for various reasons, there is a need for an engaged teacher that can guide students while gaming. This is important since despite its merits, the game itself is not a stand-alone education structure detached from pedagogical professional practice. Still, the transmedia game becomes a supportive dynamic structure and arrangement for enhanced motivation and learning also outside of the classroom walls attached to local historical places supporting learning about history while developing multiliteracy skills. For authentic local history learning, a transmedia game design seems fruitful as a means to both integrate ICT in the subject matter as a support rather than a distraction for the intended learning as discussed in previous research (Huizenga et al., 2008). In sum, it seems that the story-driven game design did make students engage in a range of literacy skills while visiting and exploring local historical sites. Working in groups with tasks aligned with the game narrative supported collaboration among students and written interaction with the editorial office (i.e., the game master) was highly appreciated by students. Next step for game improvements is to design for teacher participation during the game to facilitate teacher involvements.

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