EXPLORING THE USE OF MOBILE TECHNOLOGIES IN CREATIVE AND COLLABORATIVE STORYTELLING

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Abstract. In the article we investigate innovative solutions to inspire, encourage and support creative collaborative learning, enhanced and supported by mobile digital storytelling.

Creativity and innovation as facilitators for learning and knowledge acquisition are fundamental skills that should be developed in school and beyond, however, creativity and innovation are not spontaneous processes and therefore need to be systematically promoted and endorsed by novel solutions. Storytelling on a general level is a widespread and well-known concept in many domains. The concept of digital storytelling allows combining personal experiences with creativity and collaboration. The creation process is mediated and supported by digital devices, thus providing opportunities to create an even stronger and more personal impact than a single mode message.

In the herein reported case study, we explore the use of iPads and iMovie as ways to cooperatively create a short documentary on a topic related with Estonian history. After an initial introduction to the details of storyboarding, media capturing, movie editing and post-production, 25 students from the 9th grade were challenged to team-up in groups of 3, assigning each other a specific role (producer, operator and reporter). Afterwards, each group selected the topic they would like to address, from the wider topic proposed by the group's teacher.

The students then visited a relevant museum where, upon viewing the available exhibitions, they sketched an initial storyboard, collected all sorts of media and interviewed museum educators. They cooperatively edited the collected media, adding in postproduction content such as voice over and texts. The final result was shared as a collection in Youtube so that peers, teachers and family could comment, eventually triggering individual and collective reflective processes.

This article ends presenting the data collected during the entire process through note taking, questionnaires and interviews, and slightly discussing the achieved results.

Keywords: Creative collaboration, Storytelling, Mobile digital technologies.

1. INTRODUCTION

The study whose findings are presented here was conducted in the frames of EU LLP project CoCreat, as a third iteration of the study in Estonia, following the initial two studies carried out at a local elementary school in the South of Sweden, and in Finland, which introduced mobile digital storytelling as a setting for the development of TEL through creative collaboration irrespective of context.

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2. STORYTELLING

Storytelling on a general level is a widespread and well-known concept in many domains.

The concept of digital storytelling allows combining personal experiences with creativity and collaboration. The creation process is mediated and supported by digital devices, thus providing opportunities to create an even stronger and more personal impact than a single mode message [1-3]. Mobile digital storytelling within a learning context is a relatively new field of research. Adding a mobile dimension when using storytelling for learning might provide added opportunities for establishing both a sense of context relevant learning and a sense of seamless learning as learners move between locations inside and outside the classroom [4] – compared to using a solution of a more stationary kind, i.e. computers or laptops.

Mobile technologies already are an integral and well-established component in children's daily lives, and bringing storytelling to a mobile platform could therefore offer unique affordances for learning and self-expression [4-7]. It would allow young users to participate, create and share their "digital voice" by using a familiar tool that they consider to be their personal tool and perhaps also their foremost means for communication, and that they also more or less always carry wherever they go [8-10].

3. THE CASE STUDY

The herein reported case study was carried out in Tallinn in the Museum of Occupations, involving children from the 9th grade of one school. During the preceding week, preparation took place. This consisted of one meeting with the children who were given time to look into iPads and the iMovie software. This preparation involved a hands-on demonstration of the iPad and iMovie and kids were inviting to take pictures, records video and sound clips, editing them later in iMovie. The participants were 23 children, all from the same 9th grade classes, and divided by themselves into groups, three children to a group in general, but two groups had four children. Each group of three spent up to 3.5 hours on story creation: the rest of the day was spent normally in class.

4. TOOLS FOR SUPPORTING THE LEARNING PROCESS

Storyboarding For story creation support, a storyboard template with room for images and main points were handed out.

Roles Within each group, each child was assigned a role in story creation: 1) producer (responsible for the overall time schedule and story script) 2) reporter (text editing and sound, interview and voiceover recording) and 3) operator (responsible for taking pictures, shooting video clips and editing the final movie).

Hardware By using one iPad Touch per group, the objective for the students was to collaboratively collect, create, edit and produce their own stories. There were 23 children with three to four children in each group.

Software For image capture and story creation, the children used mobile devices (iPad), and iMovie. The table below outlines the features of iMovie and compares them to the ones used in the previous CS1 studies.

Table 1. Previous studies used Storykit and StoryRobe software. In Study 3, all groups used iMovie.

Feature	StoryKit	StoryRobe	iMovie
Draw/paint in application	X	Not Available (NA)	NA
Use photos from unit	X	X	X
Take photos in application	X	X	X
Edit photos in application	crop, zoom, draw & paint	NA	NA
Use video from unit	NA	NA	X
Shoot video in application	NA	NA	X
Edit video in application	NA	NA	X
Use sounds from unit	NA	NA	X
Record sound or voiceover in application	X	X	X
Edit sound in application	X	NA	NA
Produce and edit text in application	X	NA	X
Share to developer's server	X	X	X
Share to own server	NA	NA	NA
Share directly to youtube	NA	X	X
Share via e-mail	X	X	NA
Export to HTML	NA	X	NA
Export to external film file	NA	X	X
Pricing	Free	SEK 7	EUR 4

5. DATA COLLECTION

Following the activity at the Museum of the Occupations, the researchers visited the school. Over the 1.5 hours allotted, they viewed all the outcomes and discussed the overall impressions with al participants. Further, the children answered the following question in an online survey:

1. How did you divide the roles in the group? What was your role in the group?
2. Did the roles ease your task or did it make the task harder? How?
3. Describe briefly the work process of your team. What did you start with and what were the next steps?
4. How did you decide what to do? Where there differences of opinion in the team? How did you solve these?
5. Are you satisfied with the work process that you chose for this task? Why? Would you do something differently next time?
6. What was your story about?
7. Why did you choose this topic?
8. How did you choose the topic? Was there a long discussion? Did you vote? Or was the chosen topic rather random?
9. Are you satisfied with the story?

10. Why are you satisfied/ not satisfied? Describe what you would do differently next time.
11. What did you learn from this project? Did it contribute to your studies or was it useless for learning about history?
12. Was it a fun way to learn? What did you like and what not?

The data made available for analysis to CoCreat researchers consists of answers provide through LimeSurvey. Answers were collected from 22 out of the 23 students. Further, the teacher was also interviewed in the pursuit of additional insight about the students' attitudes towards this study's activities.

Researchers also collected data about the complexity of the final storyboard (as edited in iMovie).

6. RESULTS OF THE SURVEY

CHILDREN'S PERCEPTION OF SUCCESS

When asked, are you satisfied with your story, four of the seven groups were solidly satisfied with the product:

T2 – the story was comprehensive, a good result for the first experience (c);

T4 – satisfied in general, some tiny aspects could have been better like adding a few finishing touches by including some special effects (a); the story was proper and had some funny aspects (c); satisfied because the process was fun and different form usual schoolwork (d).

T5 – satisfied because everything turned out as was planned and the group got a good grade for it (a); everything worked out as we planned initially (b).

T7 – satisfied, the result was very good (c); satisfied because it was different from other group's stories and therefore more interesting.

In two groups most members were satisfied, only one member answered inversely:

T3 – we did it well (a); we liked the result (b); would not change anything because it was good (c); not satisfied, the process was sloppy and the result too shallow and funny (d).

T6 – everything was wonderful (c); satisfied because the result was humorous but at the same time communicated relevant information (b); not satisfied, there wasn't enough time and iPad is not the best tool for such tasks (a).

Only one team was unanimously dissatisfied with the result:

T1 – expected a different result, would have liked to take pictures myself (a); would have done things differently (b); would have wanted to gather more material and make a better story about it (c).

Three of seven groups referred to their satisfaction with the way they had worked:

T2 – I liked our topic and my teammates, the task was a pleasant experience (c);

T4 – satisfied with the story because everyone's ideas were included (b); it seamed that all team members felt included in the process, everyone's opinion mattered (c); I am satisfied because it was nice to work as a team and be more creative and tell a story, compared to the usual schoolwork (d).

T5 – our teamwork was enjoyable (b).

When asked more directly about the collaboration five out of the seven groups stated unanimously that their group work had gone well:

T2 – pleased because our technique worked well (a); I am pleased with our teamwork, everyone was included and could do things that they found more interesting, although I would like to do a similar task more thoroughly next time (b); I am satisfied with our teamwork, everything functioned and it was an exciting experience (c).

T4 – I am pleased with our teamwork, could have planned the time use better though, we had to rush in the end (a); I am satisfied with our teamwork, everyone participated actively and the story was successfully composed (c).

T5 – I am pleased, everyone fulfilled their task that they were most competent in and the grade was good in the end (a); Everything was good and we all worked together (b).

T6 – pleased, because we completed the task and the result was not bad, although would think things trough more next time (b); I am satisfied; everyone did good (c).

T7 – yes, I am pleased – everything was smooth and the different roles suited all members well (a); I am pleased because everyone got to play a role that suited them and that they were good at. I would not change anything next time about this (b); I am satisfied because our cooperation was very pleasant and I really liked my role as the cameraman (c).

Some members of two groups were not satisfied with their teamwork:

T1 – I am pleased because we completed the task in the end, but we had some difficulties with ideas (a); I am not satisfied with our teamwork because the result was not what I wished for. I would have liked a calmer process and to write all things down, not to do everything simultaneously that created a mess and we didn't know in the end which material was about which topic anymore (b); I am not satisfied because the teamwork didn't go well, next time I would prepare more carefully and think about the topic before doing the task (c).

T3 – I am satisfied with the teamwork, we did everything as we wanted and had no conflicts. Maybe I would do something different in a different museum next time but I would not change anything about this story (c); I was not particularly pleased, I felt that the guys were not as hard-working and I had to think about everything alone, despite the fact that I am usually not good at such tasks. The teammates did not get along very well and one of them (c) left before the task was completed. Next time I would prepare more and think about the story more carefully in the beginning of the process (d).

Discussion: Many groups described their satisfaction in terms of the quality of the group work, and nearly all groups said that they were happy with the collaboration. In one group (T1) collaboration had evidently not gone well. They could not agree on how to cover the initial topic. Chose a very broad topic that as plan B in the end. Another group (T3) had four members (3 boys, 1 girl). The only girl felt that the other members did not care about the task as much as she did and was not satisfied with the cooperation. Some members of both teams left the museum before the task was completed.

CHILDREN'S ACCOUNTS OF WHAT THEY HAD LEARNED

When asked what they learned from this project, quite many of the answers referred to new knowledge about history or remembering material learned in the history class and relating it to actual artefacts in the museum:

T1 – I remembered about history (a); I learned new things about how people lived in the past (b).

T2 – This task helped me to remember history. For example before I studied the dates from the history book but forgot about them shortly after, now I remember the years of the

occupation by heart (b); I understood the topic better and finally remembered some things (c).

T3 – I learned about the resistance movement (a);

T5 – I found out new information about the resistance movement, how they lived and which uniforms the soldiers wore (a); I found out quite many interesting facts about history (b).

T6 – I learned more about the occupations (b).

There were contradicting opinions as well:

T4 – I cannot say that I learned anything about history from this experience, everything was clear about this topic from the history lessons already (c).

T6 – We have talked about this topic profoundly in the history lessons, so I did not learn any new information (a).

A number of students however pointed out that the task contributed to the learning process:

T1 – Such a project is a very good thing for learning history, we should do it more often (c).

T3 - It was much more useful to learn this way than to stare at the textbook at home or in school (c); It was a good change to usual schoolwork, more interesting, maybe a bit more challenging (d).

T4 – It was a very good way to study history (a); I learned new things about history, this task contributed to learning (c).

T6 - It contributed to the learning because it was more fun and easy to do it in this way (b).

T7 – the learning was different from usual exercises, more creative (a); The task was interesting and made learning history more fun because we could tell a story to others about something that was interesting for us in history (b); I believe this task helped us to learn (c).

Seven students also pointed out learning about teamwork:

T2 – This task broadened the horizons and I learned how to handle teamwork (a); This task developed cooperating skills (b); I got an experience about teamwork (c).

T3 – I learned a little about teamwork, it is good when teammates get along, otherwise there will many conflicts (d).

T4 – I learned how to plan time and cooperate with others. Also how to create a whole story by binding different small parts (a).

T5 – It was a good way to practice teamwork (b).

T7 – I learned about teamwork and that every member of the team is important (c).

Only four students out of 22 referred to gaining new knowledge about they technology used:

T3 – We learned about filming and acting (b).

T4 – I learned about using technology (c); I learned how to use iPad applications (d).

T6 – I learned how to use iMovie (c).

When asked if the task helped them to understand history better, most of the students (12) agreed:

T1 – Possible, it helped to remember things (a); It certainly helped to understand. In addition to the schoolbook knowledge we saw what it actually looked like (b).

T2 – Seeing the artefacts in the museum helped to understand the past and the occupation period, I gained a lot of new information (b).

T3 – It helped to understand, we got a better overview of the topic (a); Yes, it helped (b); Yes, it helped, I am a bit smarter now and have a better notion about the resistance movement now (c).

T4 – It helped to remember history (a); It helped to understand because for example we could listen from the TV-s how people involved in the past events talked about it, this made things more clear for me (c).

T5 – It helped to understand, namely it helped to remember things from the lessons and fastened the knowledge.

T6 – It helped to learn because we could do our own story about the topic (b); Yes it helped (c).

T7 – It helped to understand history better because in the museum everything was explained very well and I got a better notion of the past events when we looked at the artefacts (b); It helped because I got to concentrate on the topic more thoroughly (c).

5 students disagreed:

T1 – I think it did not help this time because we had no good ideas and we weren't in the mood to solve the task because of this (c).

T3 – It did not help in particular to understand (d).

T4 – It didn't help to understand history better because I have obtained all the necessary knowledge from the lessons already (b).

T6 – It did not help because these topics have been discussed in school before already (a).

T7 – I would not say that it helped a lot to understand, it rather gave a lot of new details and information (a).

All of the students said that they had learned something. Most of them referred to new knowledge about history and teamwork skills. They emphasized that the task was beneficial to the learning process. It is interesting that only four students referred to gaining knowledge about the technological means used for the digital storytelling task. Although none of the students had used iMovie before this task, it was quite intuitive for them and most of them did not have any difficulties operating the iPads.

CHILDREN'S PERCEPTION OF THE LEARNING PROCESS AND CREATIVITY

When asked if the task was a fun way to learn and why, a number of students emphasized the role of the technological means used:

T1 – It was fun, I liked the iPad (a); I liked that we could use something different besides the textbook and outside of the school environment (b);

T5 – I liked that we could use technology (a).

T6 – It was fun, I liked that we could make a movie and use new technology (b).

T7 – I liked that we could use the iPad and do some reporter work (b).

Many students underlined that it was the different than usual learning process that made the task fun:

T2 – It was fun because we could do it in groups and all this taking pictures/movie clips and looking for material was interesting (a); It was a fun and useful way to learn, different from usual schoolwork (b).

T3 – I liked to be in the museum and to solve a practical task (d); It was fun, we could move around and look at things etc (c).

T4 – It was a good change to the usual routine lessons (a); It was fun, I liked the filming process and we got to know each other better (b); I liked that we could express ourselves trough telling the story and had a good time doing the teamwork (c); I liked the teamwork, we had much fun. I didn't like that it took so much time (d).

T5 – It was fun because I could communicate with my friends during the exercise (b).

T7 – It was a good change (a); It was fun, I liked that I could express my creative side (c).

The freedom that was given for solving this task was important to 4 students:

T1 – I liked the freedom to search for material and do something by ourselves (c).

T2 – It was fun, I liked that we were given a lot of freedom and we could be creative (c).

T5 – It was fun because we had a lot of freedom and the task was not too difficult. I liked that we got to choose the topic by ourselves, it was not determined beforehand too specifically (a).

T7 – I liked that we were given a lot of freedom to choose the topic (a)

When asked what they did not like about the task, following answers were given:

T3 – I wasn't satisfied with my teammates (d).

T4 - I didn't like the primitive application that we had to use for storytelling (b); I did not like that it took so much time (d).

T6 – Doing this after school hours was exhausting. You should have chosen a better time (a).

When asked if they could be more creative than usual 11 students agreed, only one disagreed:

T1 – Of course this task was more creative than sitting in the classroom (b).

T2 – I liked that we could play around and be creative (a); I am usually very creative outside of school, but this task made the study process definitely more creative (b); I think that I got to me a little more creative (c).

T3 – Yes (d).

T4 – It helped to promote creativity (b); We could be more creative by solving this task for sure, partly because of the freedom that was given for choosing the topics to tell the story about (c); Of course we could be more creative (d).

T5 – I could not be more creative than usual because I am usually a creative person (a); Maybe a little, because I could make suggestions about how to make the story more interesting while editing it (b).

T6- Yes, I could be more creative (b).

T7 – I believe I could be more creative than usual (b); I could be more creative than usual (c).

Discussion: The aim of the project is to investigate digital storytelling as a catalyst for encouraging creative collaborative learning. The results presented suggest that the students were conscious about the importance of the collaboration process to the result. There was little mention of the storytelling process, it was referred to as the task, exercise or a movie.

STRUCTURING THE ACTIVITY: THE VALUE OF ROLES

A pedagogic device, the allocation of roles, was provided to support group collaboration during this creative task. The students were told that they could divide the roles in the group as follows:

1)   producer (responsible for the overall time schedule and story script)
2)   reporter (text editing and sound, interview and voiceover recording) and
3)   operator (responsible for taking pictures, shooting video clips and editing the final movie).

It was emphasized that this division is not mandatory and they can organize their work in any other way they would like.

The groups were invited to reflect on this. They were asked how they divided the roles. Below is a short overview of the roles in each team:

T1 - Uneven distribution of tasks, one member (a) did most of the work. (a) - collecting information, movie editing, voiceover; (b) - says that they did not distribute roles, everyone was doing everything (actually left the museum before the task was complete); (c) - composing the text for voiceover.

T2 - Composed the narrative together. (a) – filming; (b) – voiceover; (c) - editing.

T3 – (a) and (d) - composed the narrative; (b) - filming, editing; (c) – reporter.

T4 - Roles divided during the work process naturally. Two people composed the story and two looked for matching material in museum. (a) - film editing, collecting material; (b) - composing texts, voiceover; (c) - composing texts; (d) - collecting material.

T5 – (a) – voiceover; (b) and (c) - filming, editing.

T6 – (a) and (b) - story content; (c) - using iPad to record and edit the story.

T7 - Roles were divided exactly according to the task-script. (a) – producer; (b) – reporter; (c) – operator.

The students were asked if the role distribution made working easier or harder and how? 4 teams agreed unanimously that the division made the work process easier:

T3 – It was easier, everyone knew what to do (a, b); Everyone played their part voluntarily, the division was not mandatory (c); Yes it was easier, for example I am glad that I did not have to operate the iPad because I would not have known how to (d).

T5 – It helped because everyone could concentrate on his task (a); Yes, it helped because everyone was responsible of a different thing and the process was faster (b).

T6 – It made working easier because everyone had a specific task (a, b, c).

T7 – It made working easier, everyone had a specific task and there was no confusion or conflict (a); It was easier because everyone knew what to do and it was organized and faster (b, c).

In three teams there was no consent about the role division - some members agreed that the division of roles was beneficial to the work process, however some members said that there was no division of roles and the task solving process functioned better in this manner:

T1 – It made the process easier, otherwise no one would have known what their tasks were and everything would be too confusing (a); It made the teamwork easier because it took less time, it would have been difficult to do it alone (c).

T2 – We managed to complete the task faster thanks to this (a); Since the roles were not divided very strictly everyone could contribute to the whole storytelling process. Dividing the roles would not have made the process easier (b); We didn't divide the roles and we liked this way of working (c).

T4 – It helped, it was less confusing (a); It helped, I did not have to deal with the technical side (b); We did not divide roles (c); There was no point to divide the roles, everyone did everything and helped each other out (d).

The explanations of 4 groups indicate that roles were found useful because responsibilities were determined without difficulty and each knew what to do and what the others would do.

SUPPORT FOR THE PROCESS: STUDENT'S RECEPTION OF THEIR TEAMWORK ARRANGEMENTS

The students were asked to describe the principles of their work arrangement – what did you start with and what were the next steps? Each student received a script with a proposed schedule and step-by-step instructions for solving the task.

Most of the teams followed the proposed script and used a storyboard to prepare their story: T2, T4, T5, T6, T7.

Teams T1 and T3 did not follow the proposed script and faced some difficulties organizing their teamwork:

T1 – We started from making notes and then putting the story together (a); We took pictures and investigated about these and wrote it down (b); We started to take pictures and then composed the text.

T3 – One person talked and we filmed, than we took some pictures and recorded some additional information (a); We made a video where a reporter introduced our topic (b); First we talked about the resistance movement, than we went to this exhibition object and I talked about what was what and how they used to use these things (c); First we went around and looked for a topic, then took pictures and filmed. I composed a text wit the help of the history textbook and the information from the museum. Then we edited everything together and did voiceover (d).

Discussion: As mentioned above, the aim of the project is to investigate digital storytelling as a catalyst for encouraging creative collaborative learning. The results of the questionnaire begin to suggest the children were drawing links between the roles and the storyboard as tools that supported the creative aspect of the process. The answers also suggest that the children did not fully understand the need for story planning.

7. TECHNOLOGICAL SUPPORT: THE UTILITY OF HANDHELD MOBILE DEVICES

THE AFFORDANCES OF HARDWARE

The iPads' revealed to be reliable, long-lasting and easy to use. The touch screen of the iPad has extended human-computer interaction in a way that mimics human gestures. The iPad touch screen enables intuitive touch to interact with computers, bypassing mouse-click and PC learning requirements, and getting straight into the action. While adults with ingrained technology habits consider the lack of keyboard a problem, youngsters pick-up the iPad's interface with remarkable speed.

THE AFFORDANCES OF SOFTWARE

All groups used iMovie for the production of stories of 3 to 5 minutes duration. iMovie's drag-and-drop interface makes the process of producing a project relatively straightforward once all of the elements (images, audio clips, music, video clips, etc.) have been collected. Most of the stories produced included video although some only used images, text and sound.

SUMMARY OF FINDINGS

In this study, pedagogic structuring was done by several means as follows:
- the division of children into groups of three (by the teacher)
- the allocation of roles amongst the children themselves
- the storyboard (and instructions about the task of using the storyboard)

The construction of the stories involved using the features of the iPad (photography, audio recording) and the features of the application used (combination of video, text, audio and photographs) as well as the storyboard.

The interviews indicate that the students believed that the quality of the collaborative process was important. Their contributions suggest that they perceived a relationship between the harmony or disharmony of the process and working to the roles described to them and which they had been asked to allocate amongst the group. Interestingly, discussions of team work did not refer to the technology as a device that had to be shared between three people, or a device on which three different types of input had to be co-ordinated. It is possible that the need to co-ordinate the use and sharing of the device and its functionality between the various members might have had a bearing on group collaboration.

The interview includes questions, which ask children what they learned, and thus some account of what was learned is given by the children, but the nature and extent of learning is not further probed.

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