How can User Generated Content in Games Foster Enhanced Learning Outcome

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Abstract: Games used for learning purposes, also called «serious games» have been a focus for research for several years. However, the content is either developed by pedagogues or game designers. This paper is investigating if using a «dewanian» take on the content development can enhance the learning outcome. Assuming, like in a Socratic dialogue, that the answers lie within the learners themselves, there is no reason as to why the content, or to be more precise; the scenarios, could be developed by the learners. Given a game environment, like a city, a port, or other geographical representation, what is happening there can be based on the learners input. In this way it is also possible for faculty staff to keep on track with the students perception of relevance to a present or future worklife. At The Inland University of Applied Sciences, Campus Rena, we have tested out making the students come up with scenarios depicting different crisis scenarios. These scenarios are then given to the game master for the game environment and played. The class that has tested this, were divided in two groups. Most of the students, though not all, have a background within crisis management, and all attend the 6th semester of their BA in Crisis Management study. Both groups handed in a scenario to the game master. The game master developed the scenario in the game environment and then the group that «owned» the scenario was playing out different issues. The other group were the responding units. When both groups' scenarios were played, the groups met for an «after action review». The preliminary results show that this increased the realism in the gaming sessions. The paper will present an in-depth presentation of the course layout, and a complete review of the feedback from the students. The data is mainly qualitative and are based on observations and interviews with the students. Using games this way was indeed a ludic way of learning more about crisis. There were some issues that needed to be addressed, like the communication devices, but the total impression were positive. To be able to contribute with a scenario they had built on their own, they also found to be supportive of their learning process.

Keywords: student generated content, co-generation of knowledge, enhanced learning outcome, reflective practitioners

1. Introduction

When learning about crisis it is not enough to learn the theory on crisis management, crisis communication and crisis prevention. It is important to train and experience what is being taught. However, this is costly and time consuming. Hence, the introduction of games and simulation. At the Inland Norway University of Applied Sciences, Rena, Norway, a game based tool has been introduced in order to let the students practice in a safe environment that will still offer some augmented reality regarding the training aspect. The game is based on the platform by Bohemia Interactive Simulations (BohemiaInteractiveSimulations 2016). The game offers a platform that is possible to modify. A "game master" is able to program most situations that one sees a necessity of training for. For our gaming, a fictive town was constructed in the game and then it was possible to organize different "disasters" in this town that needed a rescue operation. Generally, the teachers has decided upon the scenario for the gaming. In this project, which is a part of a larger project called "Seed corn 2017" it was decided to let the student themselves develop the scenarios for playing. The class (of approximately 12 students) was divided into two groups, each making a scenario for the other group to play.

Even if the approach of using student generated content in assignments has had success within the frames of "Flipped Classroom" in previous courses in another study program at the University (Vold et al. 2016), we had no guaranties for success with regards to this undertaking. Hence, our turn to theory that would guide our process.

This paper thus presents the theoretical background for undertaking this venture, the project in more detail, the results from the preliminary research done and our conclusions so far.

2. Theoretical backdrop

The theory that has informed this study is much the same that has inspired working with "Flipped Classroom" which has been tested out at other study programs at the university (Vold 2014). The theory that we have drawn lessons from using "Flipped Classroom" is mainly about adult learning in order to adapt courses to the target audience, learning in organizations in order to make it as relevant and useful as possible and on how reflection processes can support the learning processes and support our students on their way to becoming reflective practitioners.

It is, however, also important to define the different kinds of *knowledge*. John Biggs (2003) distinguishes four types of knowledge; declarative, procedural, conditional and functioning. The procedural is knowledge on how to do something and connected to skills. The declarative is more the abstract understanding of something, knowing about "things" from research (not own experiences). Conditional knowledge is the combination of declarative and procedural knowledge in addition to knowing *why* and *when* to use it. Functioning knowledge is then about understanding and utilizing declarative knowledge to solve problems gaining experience and knowing how, why and when to utilize the knowledge (Biggs 2003).
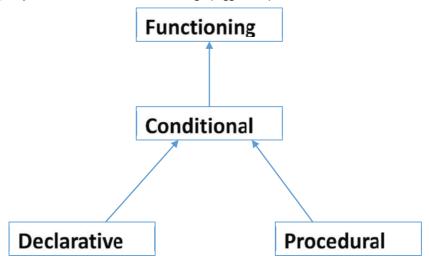

Figure 1: Relationships between different kinds of knowledge - from Biggs (2003)

There is also a distinction made between *professional knowledge* and *university knowledge* (Leinhardt et al. 1995). Professional knowledge is about executing applying and prioritizing. University knowledge is abstract and conceptual, and deals with elaborating and justifying, etc.

Regarding Crisis Management and Crisis Communication, we need our students to be able to execute and apply the knowledge we share and that they share amongst themselves. We need the knowledge to be understood and elaborated on, but also be executable.

Biggs (2003) also makes a distinction between *deep* and *surface* learning, and as we want our students to succeed and be able to bring the learning back into their own organization, we need to facilitate for deep learning.

Basing the new knowledge on previous knowledge can aid in the process of facilitating deep learning. John Dewey (1938) suggested using the students own background, experience and interest as a basis for learning. Learning by experiencing was also something he advocated. To facilitate for processes that both brings the students' own background, experiences and interests into an experiential learning process, the chances of obtaining functioning knowledge should be present.

David A. Kolb (1984) presented the experiential learning model in which he also points out the learning processes including reflective processes. Reflection and facilitating for reflective processes do, according to Donald Schön

(1987) support the learning process and also helps the student become a reflective practitioner. Reflecting in, on and during an action gives a deeper understanding of the subject matter. Reflecting before an action also support the learning process according to John Cowan (2006).

It is thus important to get the students to start the reflection early, and preferably before the action (gaming). Combining this with utilizing the students own backgrounds, interests and experiences, facilitating for a co-generation of scenarios should be contributing to a deep learning that prepare the grounds for functional knowledge.

3. Method of data collection

The data are from interviews and observations. The interviews are both as group interviews and personal interviews (Creswell 2003, Dalen 2011, Schensul et al. 1999). When observing, it has been important to be aware of our own biases (Guba and Lincoln 1989). As we believed we had the theoretical justification to proceed with our undertaking, we wanted this to work. We thus needed to be extra vigilant when taking notes and describing observations.

There were only approximately 12 students present. This is a low number of respondents, but it will give an indication of areas of improvement and for these 12 it is still important that the study program provide relevant and sufficient courses. We do however, need to test on a larger audience.

4. The project "student generated content"

The project is a part of a larger project called "Seed corn 2017" which is funded by internal research capital within the university. The main idea is that the different projects will contribute towards expanding and sharing the knowledge amongst teachers/lecturers on "best practices" regarding organizing, evaluating and lecturing courses in any study program.

This particular part of the "Seed corn 2017" has had multiple outcomes regarding research on teaching and learning forms. In this paper we have focused on a particular take on enhancing the learning outcome for the student utilizing student generated content in games for learning.

4.1 The game development

The courses that this simulation game was to support were Crisis Management and Crisis Communication. First, the students are offered lectures within the concrete topics that they were challenged to develop scenarios from. Then they are divided into two groups. Each group develop a scenario for practicing through gaming, something from the topic they have been lectured in. The groups are also allowed to bring in own experiences and interests into the development of the scenarios.

A game master then models the scenarios into simulation games. However, instead of "just" playing the scenarios as computer games, each team play staff in their own scenarios. This contributes to adding gaming elements that can increase the perception of reality. Team 1 are playing team 2's scenario using the screens and computer simulation game to illustrate how to deploy units and work on rescue or prevention. The game's "secret" game plan can be about weather conditions that will affect the execution, or developments of a disaster. Also, if the units are not deployed and the rescue or protection actions are not executed in time or in a way that would best serve the purpose, this may unleash more game elements.

The scenarios that were developed: team 1: development of a fire in a multi storey apartment building, and: team 2: landslide beside a factory that contain fuel tanks. Team 1 play game staff that can be relatives to possible affected people, reporters, etc., that will add pressure to the solving of the issue. The screen will indicate where they at all times move their vehicles and also show the weather conditions and developments. The students need to solve or handle the crisis within a certain time frame and within the ranges that are accepted in the game. TIME and that the units are deployed within the range of what would be accepted ways of solving a situation or preventing a situation to evolve, are the game elements that bring the competitive aspect into the gaming.

4.2 The gaming

The gaming session for team 1's fire in apartment building, did not go as intended, as team 2 were late on deploying their units. The fire evolved and the wind turned. This resulted in an evacuation of the hospital that were now threatened by the smoke from the apartment building.

The gaming session for team 2's landslide went somewhat better. However, the operational centre were placed too close to the scene of action and if the new landslide had been on a different side of the hillside, the operational centre would have been caught by the new landslide that was integrated in the gaming scenario. Team 1 managed to evacuate on time and thus prevented eventual disasters with the fuel tanks to evolve.

4.3 The game reviews

After ending the gaming sessions, the lecturer lead the review session which had two purposes; to get feedback on the development process and gaming, and to investigate the learning outcome from the sessions. The latter is similar to what Schön describes as "reflection upon action" (Schön 1987).

The gaming elements (time and changing conditions) were perceived as relevant and offered due pressure in order to execute. Also the gaming staff added the extra stress and push to add to realism. To develop the scenarios themselves were perceived as relevant and useful.

5.   Results and discussion

The students claim to have learned a lot from the different processes. The scenario development turned out to be what we hoped for; a reflection over previous experiences and peer's experiences. This is similar to what Cowan (2006) calls "reflection before action" as it is not only about past experiences, but also about how to utilize this in a new setting and for learning purposes.

The gaming sessions turned out to be quite interesting. One of the groups were to put out a fire in a multi-storey building with extensions on both ends. The fire escalated faster than the gaming group managed to handle the fire and the smoke from the fire then threatened to pollute the air for the air vent for the local hospital. They then needed to evacuate more and more "people" and make a plan for evacuating the hospital. During the gaming several stops were made in order to reflect upon the ongoing situation. This is similar to what Schön calls "reflection in action on action" (Schön 1987). This requires that the facilitator can read the situation enough to make a break without breaking *flow* (Csikszentmihalyi 1990). Breaking *flow* may obstruct the learning process (Kember et al. 1999). However, the reflections may be needed as the playing group may also be lead to solve a problem differently and more correct when they can reflect upon the situation instead of being in the middle of the action.

The reflection after the gaming session, which can be regarded as similar to the military's "After Action Review" (von der Oelsnitz and Busch 2006), where they are not only debriefing, but also discussing possible other solutions and how to adjust for any future similar situations. The students were quite tired at this point and even if they did reflect some and they claim this reflection to be supporting their learning process, a second reflection later may have had even more to add to the learning outcome. The reflection after the gaming is also known as "reflection on action" (Schön 1987, Schön 1991). However, to organize several reflective processes after an action has also proved to be supporting the learning outcome. In a previous project (in 2010) we managed to organize a meeting several months after an exercise. This meeting turned out to reveal more learning opportunities than the meeting organized just after the exercise (Hafting et al. 2006, Vold 2011).

This reflection can also be utilized to improve on the scenario. This scenario can then later be played by others and can thus be a part of the database of scenarios that either students in a study program or other course participants can enjoy.

Developing the scenarios themselves allowed the students to utilize their own backgrounds and ideas. They claim this to support and develop them as practitioners. This is in line with what Dewey also claim to be important for the learning outcome (Dewey 1938). It also coheres with Kolbs's experiential learning cycle (Kolb 1984) and allows for the necessary reflective activities in order to learn from previous and coming experiences.

The aim is also to bring the students' knowledge level from a procedural and/or declarative level through to a functioning level where they can make the best decisions within the constraints given in a live situation (accident, terror strike, natural disaster, etc.). Both training them to handle and prevent crisis through practice and reflective activities will aid the process. In the feedback they provide, they claim to have developed as practitioners in their respective fields as they now also get insight in their colleagues "workday" and routines. The students are practitioners that may cooperate in a future incident, and the improved understanding they claim will support the cooperation needed on the scene of an incident.

All in all, the student activity of developing scenarios that were the new take on using simulations, did prove to be successful, but needs to be investigated further with a larger number of students. Also it can be interesting to see if other courses can benefit from this approach. A study program called "Knowledge Management" utilizes student input as the lecturers facilitates development of tasks and assignments based on both theory in the curriculum AND the students own experiences and interests (Vold et al. 2016, Vold 2014).

6. Conclusion

The students claim to have learned a lot from both the gaming AND the scenario building. All though it was a different approach to learning for them, they report on it being interesting and useful to develop scenarios. They also claim that they needed to reflect upon own experiences and take part in the other students' shared experience. This contributed to increased knowledge.

Some of the technical appliances did not work as expected. Even if they managed to keep playing, these are issues that easily can distract and thus disturb the learning process.

All in all the undertaking was successful and definitely worth expanding on. It "kick-starts" the reflection processes and the utilization of the students own background, experiences and interests are in focus. Supported by what we know about adult learning and from learning in organizations, the involvement and inclusion in the development of learning material, will contribute towards motivation and learning. It is also a matter of empowering the students so that they are able to contribute. An introduction where the expectations were displayed proved to be important. The process needs to be facilitated, and it is important that all of the students are able to contribute with input.

6.1 Further research

Having the students produce scenarios for playing and simulating different issues from the curriculum needs to be tested out further and on more classes. More extensive investigations into the learning outcome is also needed. For example will it be interesting to continue following the students back in their organizational life to see if they are able to utilize what they have learned, and if so, how much can be traced to the opportunity of co-construct learning material.

Firstly, more classes will be a subject to producing scenarios for gaming sessions. The students will then be interviewed and encouraged to work with learning journals that can be shared with us.

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