

Serious Games Analytics: Integrating Blogs

Final Report for the Short Term Mobility of Maryam Elham Arabi

CNR Researcher: Mario Allegra

Institute: CNR-ITD UO di Palermo

Introduction

In this study, CNR-ITD and SIM University of Singapore involve in a collaborative research to explore the effectiveness of blogs and reflective Notes in a serious game developed by CNR. These reflection tools will provide learning analytics on students' learning for both the teacher and researchers.

The importance of reflective learning is known to all of us. Research has proven that learners learn better and faster through reflection and cognitively processing the information. Blogs are proven to be effective reflective tools which help learners through self-reflection, metacognition, and peer-to-peer collaboration [1]. Requiring learners to capture their personal reflections on their learning progress is valuable, and the coupling of personal thoughts in a specific context is a powerful combination [2].

Blogs offer the opportunity for powerful information sharing because of their ease of use and rapidity in deployment [3]. Boulos et al observe if blogs are effectively deployed, they could offer a way to enhance students' learning experiences and deepen their level of engagement and collaboration within digital learning environments. They further highlight that students of all ages learn best when immersed within a culturally and socially rich environment in which scaffolding of learning can be achieved. From a teaching and learning perspective, blogs have the capability to make student learning transparent and become a space where a greater understanding of student meaning making can be gained [4].

Integrating a blog into the game goes beyond simple interaction and moves toward collaborative constructivism as the students are deeply engaged in purposeful discourse to construct meaning and collaboratively share meaning and validate understanding [5]. Garrison et al. state that blogs provide a social presence in which participants connect with each other in a trusting environment and form personal relationships with other community members. They highlight that social presence is essential for the development of cognitive presence. Learning within the community and in a collaborative fashion is necessary for learners to maximize their critical thinking which leads to authentic learning. Further, blogs have many dimensions that are suited to students' unique voices, empowering and encouraging them to become more critically analytical in their thinking [6].

The greatest advantage of blogs is sharing and interaction [7]. The interactivity scope of blogs allows for a more contextualized space for information dissemination.

In this study, real life situations are simulated for the students to not only achieve the expected outcomes of the game but also gain the essential soft skills which will allow them to compete well with their competitors in real world.

The integration of Blogs and Notes within the game developed at ITD can allow students to share their strategies and tactics in decision-making, and allow teachers to review these and provide sufficient scaffolding where necessary to help the students build the expected skills in different stages of the game. In the PNPV game the students' reflection in the Notes must be viewed only by the teacher not by the other groups due to the nature of game and its competitiveness.

Besides, the students can share their reflections on their progress in the blog created by the teacher, so allowing the groups of students to view each other's reflections and learn from one another. This will

optimize learners' motivation in order to compete with other groups in a more real-based manner. Due to sensitivity of the nature of the game, clear guidelines on the information to be shared must be provided for the students. Specific measures have been taken into account to make this experience for the learners as authentic as possible, hence, the game has been made competitive yet collaborative. In a real market, start-up entrepreneurs develop their business by sharing some information and hiding some other from their rivals.

The Notes are set up to record the information, which is not to be shared with their rivals. On the other hand, the blog created by the teacher allows them to share some essential information, which helps them grow their business. It will contain different pages for each group. The groups will be able to view each other's posts and comment on them. This helps optimize learners' collaboration and sense of knowledge sharing as well as critical thinking.

The PNPV serious Game

The serious game targets the secondary and high school students who are expected to build their entrepreneurial skills. The context of the game centers on the management of a tourist resort in which the students are to play the role of managers in setting it up in a competitive market. Further, while the focus of the game is on building entrepreneurship skills, it also aims to foster team work and leadership skills in the students.

The game aims to help young students develop skills and knowledge that are crucial for the development of a more general entrepreneurial mindset [8]. Experiential learning is the major approach applied in the design of the game in order to provide a learning space in which the learners can apply their knowledge by staged experience. Sufficient guidance is provided to ensure they achieve the expected objectives and maintain interest and confidence throughout the game. While the teacher is the main source of support, specific measures have been taken to ensure the student-centeredness of this experience. Hence, the game contains essential learning content and a learning agent that introduces each level to the learners, provides information and suggestions. To maximize the support given to the learners, they can view their status in visually presented graphs and seek help from their peers in the blog. In this study, we tend to focus on learner autonomy and help them see the teacher as a facilitator rather than the sole source of support.

A blended approach is applied for the course, i.e., the information is provided within the game coupled with the teacher's scaffolding and support in class. Furthermore, the learners interact with each other in the blog outside the class setting. They play the game in class in groups of three or four within forty minutes allocated for each level. There are seven levels in terms of difficulty planned to play each week. In the first week, the students personalize the game and do the initial setting. Each level introduces new challenges to the students and its level of difficulty increases. This helps maintain the learners' interest and motivation throughout the game.

The teacher monitors the groups in a dashboard and provides feedback whenever necessary. She/he also evaluates each group based on their choices at the end of each level and sends the results to the students. A debriefing is then held with the class to share the lessons learned based on the strategies they chose, highlighting the impact of their choices on the market [9] in order to help them do better in the next level. Apart from this, the students are able to view the budget trend based on their choices in graphs any time throughout the game. The debriefing will gradually be eliminated in order to shift the students' focus from the teacher presence towards peer collaboration.

Another element of the game is a quiz which the students do to test their knowledge and understanding of each level. Explanatory feedback will be provided for their answers to the quiz in order to help them rely on themselves rather than the teacher.

Though the overall aspects of the game are real-based, the students are allowed to modify their choices if they notice they are not doing well or losing money. This is to maintain their motivation and engagement into the final levels of the game.

Integration of a Blog and Note in the Serious Game

In this serious game, students are to start up and manage a tourist resort in the simulated village assigned to each group of them. The game provides an authentic environment in which the group of students compete with each other in order to do well in their business; in essence, the individual group members cooperate with each other to compete with the other groups. The pedagogical aspects of integration of the blog and Note tool are to maximize the collaboration, self-reflection, and learning enhancement of the students. To achieve these educational purposes they are assigned to record their strategies and tactics for the business development of the tourist resort in the Notes embedded in the serious game and share them with their teacher in order to receive feedback on their progress. The Notes also serve as a reflection tool for the groups to ponder on their choices and discuss with each other. The teacher will provide scaffolding to help each group with their choices as this will have an impact on their decision-making at the later stages of the game. The reflection Notes serve as direct interaction between the students and the teacher due to competitiveness and authenticity of the game. They need to learn that certain type of information should not be shared with the other groups in order to do well in the market. For instance, the target audience, such as VIPs, Middle Class Families, or Young Families that they aim for, will have an impact on their success in the market at the later levels of the game. Also, the budget allocated for each target audience to start up the resort will lead to their success or failure. Thus, this type of information cannot be shared with the other groups. Students will have a chance to discuss their choices prior to recording them in the Notes, which will optimize their metacognition; for the teacher is important to know the reasons of their choices to evaluate their comprehension of the topic. Feedback given by the teacher will also enhance their learning and help build the expected skills to be gained through the game.

The students are required to share their progress with the other groups and review each other's posts. This will allow the students to learn from one another in order to achieve the expected learning outcomes. Each group will select a name for themselves and this will represent them in the common blog page allocated for them. They will be able to view each other's results in the leaderboard or graph and they would be encouraged to find out how their peers did better than them. In the blog, they can only share certain strategies they took to do well. An example of information to be shared is their marketing approach, which could vary from each other, and this could lead to their success or loss. They can share their approach and find out the factors leading to their success. This will certainly be helpful for the groups who are not doing well and need to boost their results. For example, during the game sessions concerning the use of communication channels, students can have an idea of the communication strategies adopted by the other groups by means of an image posted automatically in the blog, and this will provide them a visual idea about the comparison of investment in advertisement, or several communication channels used by the other groups, etc.

Moreover, through the blog, some automatic updates based on their customers' feedback will be shared. The system built in the game will generate these automatic customer feedback to allow all the groups learn about their customer decline or increase. The system can also generate updates about the quality of services in the different resorts. Through the analysis of these updates in the blog, the groups of students can understand the right or poor choices in their own or others resorts. These new features, which will be

integrated in the game before the next experimentation at school, can solve the problems highlighted in the previous testing phases concerning the sharing of information among the groups and simulate some information exchange and knowledge sharing about the whole market. This will make the whole experience much closer to reality. In other words, in a real life situation, all the businesses learn about their rivals' customer feedback through media or the web as well as some strategies that they took to sell well or poorly.

Overall, the Note and blog integration in the game cater for more constructive interaction, communication, and knowledge sharing among the groups of this study.

Self-Directed Learning

In this section, the process of integrating the blog in the serious game and strategies leading to self-directed learning is described in detail. As mentioned earlier, the purpose of this study is to foster authentic learning and learner autonomy through two main tools and specific strategies. The game provides a simulated real-based environment for the learners to build their entrepreneurship knowledge along with other essential skills such as communication, leadership, and team work.

On the first session of the course, an orientation with hands-on training on using the game and blog will be held for the class. To build motivation in the students, rationale of the design of the game and their collaboration in the blog will be shared with them. While being graded for their blog posts, they will learn the effectiveness of their participation and the role it plays in real life as entrepreneurs.

Yet another strategy to build self-directed learning is providing a sample post in the LMS for the students to refer to whenever they need. Further, a guide on how to play the game will be placed in the LMS to cater for students of all levels. Furthermore, the evaluation rubric for the blog will be shared with the students to maintain their concentration on the quality of the posts and interaction with each other. This also enhances their critical thinking in a more systematic way.

To facilitate the usability of the blog for both the teacher and class one blog with different pages for each group will be created. This will help make the task simpler and less demanding for the teacher and students. All the students of each group are required to participate in the blog posts each taking turn in posting their reflection and commenting on other groups' posts. However, they are asked to discuss their thoughts with their group members before doing so in order to create a sense of team work and collaboration among them.

Another factor involved in building self-directed learning in the students is providing explanatory feedback as hints or clues to the choices they make in the quiz. The formative quiz allows them to monitor their leaning progress throughout all the game levels. The feedback loop provided in the game and the quiz also enhances their knowledge of the subject matter.

Lastly, a leaderboard is built in the game to allow the students monitor their performance in a more structured way and view the other groups' results they compete with. While conforming to a standard leaderboard of a game, some customizations will be carried out to suit the class and learning outcomes in this study.

Conclusion

The game provides an opportunity for the learners to practice the acquired knowledge on entrepreneurship in a real-based environment. Authentic learning in this exercise helps the learners to experience decision-making, critical thinking, and team work in a real-life simulated environment. The key element in helping them build their expected skills is the self-reflection on their learning process in the game through the Notes

and Blog. The students will develop the competence both in the subject matter and the soft skills through the collaboration with each other and self-directed learning. The teacher plays the role of a facilitator to guide the learners achieve the expected learning outcomes in a more autonomous manner; the communication tools that will be integrated within the game will make the game closer to the reality and will allow teachers to monitor in a more effective way the learning paths of the students and to guide them in the comprehension of the complex aspects of the enterprise management.

Activity during Short Term Mobility

The short term mobility of Maryam Elham Arabi started on October 13 with discussion with CNR-ITD team about research activities focused on serious games. Then, the group started with the literature review about the use of blogs and notes for educational aims followed by the main purpose of our study as elaborate in this report. In particular, some games developed at ITD were analyzed and the team decided to focus on the serious game of the PNPV European project, very suitable for the integration of blogs and notes. Furthermore, we explored more ideas in enhancing the game through blogs and other possible features which could improve the current game design and help us achieve the pedagogical goals in mind. Revision and enhancing the report was done on a daily basis. The results of the activities carried out during the STM and the design of the communication and cooperation features, will bring to the development of a new version of the serious game, with the integration of blog and notes. This new version will be experimented at school to evaluate its educational effectiveness.

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