

Motivating students through gamification in nursing education: A qualitative research

Lemey, Juul^a and Hast, Evelien^a

^aArtevelde University College Ghent, Belgium

Abstract

The implementation of gamification in a course about eHealth organized in Belgium aims to create a powerful learning environment to motivate students to actively participate in learning activities, nudge them towards preparing lessons, let them accomplish tasks, enhance their planning skills, support them to reach the learning goals and to self-regulate their learning. A qualitative research was used to gather data on student's perception regarding these topics. The first results show that students feel motivated to engage in learning, prepare their lessons better, complete tasks they would not have completed without the gamification, see the training of planning skills and learning strategies as beneficial for further courses and confirm the game should be non-obligated so they can self-regulate their learning. However, some adjustments (for example more goal-oriented rewards) are desirable. Further research is necessary to make conclusive statements about learning benefits towards self-regulated learning in this course.

Keywords: *gamification; learning motivation; nursing education; self-regulated learning; large class*

1. Description of Teaching and Learning Context

In 2015 the Belgian government decided the undergraduate nursing programmes had to be reformed from a 3-year curriculum to a 4-year curriculum and that every programme had to shift their focus from educating specialized nurses to educating flexible, versatile professionals. In the undergraduate nursing programme of the Artevelde University College Ghent, the team decided to grab the opportunity to rewrite the vision and curriculum of the nursing programme. One of the key-elements of the new vision is creating motivating and powerful learning environments (Dochy et al., 2015) to empower nursing student's learning through eight learning paths. These paths are aligned with the programme specific learning results, which in turn were linked to the Flemish domain specific learning results (nvaio, 2017). One of those learning paths is 'the digitally aware nurse'. In the elementary course of the digitally aware nurse, the teacher team engaged in the challenge of creating a powerful digitally enhanced learning environment for the nursing students. Hence, the choice was made to make use of gamification in the course.

The game element in the course 'the digitally aware nurse' is called 'the most digitally skilled nursing student'. Both the gamification and the course were developed from scratch. A team of eight teachers, an educational expert and an expert in gamification co-created the game. One ICT-developer programmed a web-based application in about 16 hours. Each year every student that is registered for the course can take part in the game. In 2019 all of the 187 registered students voluntarily participated in the game. Throughout the course a student can earn several points by completing goal-oriented and commitment tasks. The student who has collected the most points at the end of the course wins the game. In total every individual can earn approximately 100.000 points. These points can be gained in two ways: scanning QR-codes or clicking on a link (1) and participating in online tests (2). During the course, several non-committal assignments for the students are organised. These assignments are meant to help them reaching the learning goals. All students who finish an assignment successfully receive a QR-code or link. Scanning the code or clicking the link will result in a rewarding message (for instance: 'Well done! You have earned 1000 points because you finished the task on online planning successfully!'). Also, there are activities where only one student can get points (for instance: creating the most useful 3D-print for the nursing profession). If this is the case, these tasks are rewarded with a greater number of points.

All the teachers involved in this course can organise digital knowledge tests during or after their lessons. For this they use the online software Kahoot!. Every correct answer is worth about 1000 points. Bonusses are rewarded for faster answers and streaks of correct answers. On the web-based application students can see their personal score and check how they achieved that score (for instance: 1000 points for activity A, 500 points for activity B and 4520 points for knowledge test A). There is also an online leader board available which

promotes the competitive feeling. The top ten is rewarded with a prize. Those prizes vary from an iPad for the winner to smaller prizes like digital carriers for the tenth. Every student who manages to collect 60% of the points receives a certificate, which is mentioning their achieved skills during the game. This can be used for their curriculum vitae or their development portfolio in our programme.

2. Literature Review

Gamification can be defined as “the use of design elements characteristic for games in a non-game context” to encourage a desired type of behaviour in a non-obligated way (Deterding, 2011). The use of gamification seems to be advantageous to increase engagement of students in large class settings (for instance: increased participation in discussions, more online course views, increased motivation and more course attendance). (Majuri, Koivisto & Hamari, 2018; Subhash & Cudney, 2018). It can also lead to higher test scores and increased enjoyment of the lessons (Subhash & Cudney, 2018). The goals of the gamification in this course about eHealth are: to motivate the students to actively participate in learning activities in and outside of the classroom (1); to nudge students towards preparing for the lessons (2), to let them accomplish given tasks (3); to enhance their planning skills and effective learning strategies (4) (Dunlosky et al., 2013; Pomerance et al., 2016), to support them to reach the learning goals (5) and to learn how to self-regulate their learning (6) (Zimmerman, 1989).

In fact, the main goal is to get them to a point that they self-regulate their learning processes to accomplish their goals. To make this happen, a game (connected specifically to this course) was developed. Although in first instance gamification may seem foremost linked to extrinsic motivation, the goal is to nudge students towards intrinsic motivation, so that the gamification, according to the self-determination theory, stimulates their autonomy, competence and relatedness. This will in its turn, foster intrinsic motivation and engagement for learning (Deci & Ryan, 2002; Neighbors et al., 2007; Niemiec & Ryan, 2009; Van Den Broeck et al., 2009).

3. Findings

The potential of the game was mainly evaluated through a qualitative research. A three-year loop of evaluating and improving the game is scheduled. At the moment we have evaluated version 1.0 of the game and are processing the adjustments which will result in version 2.0. A focus group was used to gain insights in the experiences of the students with the game. The selection of the participants was organised by an independent researcher at our university college and was embedded in the evaluation of the entire course. This means the

game was not the only discussion topic during the focus group. All students were informed about the evaluation through e-mail. All of them who were willing to participate were included (n=8).

One researcher led the discussion in the group while a second took notes during the session. The entire focus group was recorded digitally. A semi-structured interview guide was used to lead the discussion. Additionally, all involved teachers were asked to share their experiences about the game and how they linked the game to the learning goals. The data was analysed in three phases. In the first phase the recordings were independently re-listened by two researchers. Subsequently they wrote down every piece of information about the game. The text fragments were compared with the notes of the second researcher and if possible merged. In a third phase this raw data was used to formulate improvements for the game and to list positive and negative experiences with the game. The results from the interview with the students in the focus group, the experiences of all the teachers in the course and some quantitative data are presented according to the intended goals of the gamification in the course.

3.1. Actively participating in learning activities in and outside the classroom

In the focus-group, students noticed that (n=8) they truly experienced ‘the most digitally skilled nurse’ as a game that motivates them to earn points and so it motivates them to participate in the activities in and outside the classroom.

3.2. Students prepare themselves for the lessons

The students did not mention anything on this topic in the focus group. However, several members of the teacher team had the feeling that students attended the lessons more prepared in comparison with other courses.

3.3. Students accomplish given tasks

Of all students enrolled in the course, 73% fulfilled the non-obligated tasks. Students indicated (n=2) that they were triggered by the game to make these assignments. They mentioned that if it wasn’t for the game, they might not have engaged in this non-obligated task.

3.4. Students enhance their planning skills and effective learning strategies

Students were given the option to follow a video-training on planning skills. If they wanted, they could send their plan to the study-coach of the programme. Everyone who made this effort and did it in a ‘correct’ way got a QR-code which granted access to points. The students (n= 8) made it clear that they found this interesting because they saw two benefits: the earning of the points for the game and they also saw a personal added value for

themselves by engaging in this learning activity that will help them to plan and study their courses in the future.

3.5. Supporting students to reach the learning goals

The students (n=8) hoped that the team would make the game more 'serious'. The gamification should be linked even more to the learning goals of the course and focus less on 'coincidence' of finding a QR-code in the course (for instance: hiding a QR-code at the end of the study book). They also indicated that only scanning QR-codes when being present in a lesson does not mean you are a digitally skilled nurse. They liked the fact that they were learning in 'another way' than they were used to.

3.2. Students accomplish given tasks

Of all students enrolled in the course, 73% fulfilled the non-obligated tasks. Students indicated (n=2) that they were triggered by the game to make these assignments. They mentioned that if it wasn't for the game, they might not have engaged in this non-obligated task.

3.2. Students self-regulate their learning

The students (n=8) indicated that they like the fact that they were not obliged to participate in the game. It is optional to take part in it and they would like to keep it that way. The game stimulated them to engage in non-obligated tasks more than they would have without it.

4. Conclusions and Implications

As the development and the testing of the game is a three-year project this report only contains preliminary results of the testing of version 1.0. The participants in this study were not selected through purposive sampling and all were motivated to give their opinion about the game. Therefore, it is not possible to make conclusive statements about the impact and the usability of this gamification. Nevertheless, the participants in this study experienced mainly positive effects on their motivation, ability to their planning skills and learning strategies and saw the benefits of accomplished tasks they wouldn't have completed without the gamification. These results were also found in similar studies where gamification was tested in higher education (Attali, 2014; Iosup & Epema, 2014).

Students indicated the benefits of being able to choose whether or not to participate in the game as it is non-obligated. Deterding (2011) also confirmed the importance of this non-obligatory character of gamification. In version 2.0 of the game, students will be able to earn points with their final exam of the course. The hypothesis is that this will result in better scores for the course as the students will be motivated to perform well during the

final evaluation of the course in order to win the game and accomplish the learning goals of the course.

Scores must be online as soon as possible to keep the game alive and 'hyped'. This was not always the case in the first version. The assumption rises that instant gratification makes students compete among themselves even more. This implicates that students need to be able to earn points every day during the course, the element of surprise must be taken in account to realize this. The team of the course is aware that rewarding the students with an actual prize is an extrinsic motivation to participate in the game. It should be tested if the participation in the game would also be so successful without those prizes.

A mixed method research would also strengthen the consolidation of making conclusive statements in the future. Additional quantitative research will be added in the study design to better measure the defined goals of the gamification. Indicators will be developed to compare the different versions of the game (for instance: the amount of students participating in the game, an overall satisfaction score and quantified motivation scores).

Purposive sampling is needed to incorporate different types of students. It is necessary to discover if variables like initial motivation, competitiveness and ease to study have an impact on the ability of gamification to motivate students. One of the future goals is to measure if students can be enhanced in reaching the learning goals because of participation in the game. Therefore, an analysis will be made if participating in the game leads to higher scores on the exam of this course. The hypothesis is that this will be the case, as a significant positive correlation between the scores in the game and in the exam ($r = 0,46$) has already been found in version 1.0. Similar results were found in a study of Knautz et al. (2014).

During the development and testing of the game some interesting insights were gained which might help teachers with the development of their first serious game or the implementation of gamification in large class settings. It is necessary to start with defining the objectives of the game (Baldeón et al, 2016; Azouz & Lefdaoui, 2018). This should be the target behaviour of your students. Otherwise the game can end up without a clear purpose which makes it more likely that students will not be eager to participate. It is also important to describe the players which enables you to adapt the game to their needs. Subsequently it's possible to start with integrating fun activities within your learning activities. It is not obligated to use software for this (Baldeón et al., 2016). However, it can be useful to control the game in large class settings and to reach all of the students (for instance: the use of an online leaderboard) (Subhash & Cudney, 2018). It is also advised to evaluate the first versions of your game (Mora, et al., 2017). Take enough time to adjust the game where necessary. Developing the gamification element and a new course at the same time might lead to a better integration of both. Be aware that when teachers are not eager to

change their original course during the creation of a serious game or gamification the integration is often lacking.

References

- Attali, Y., & Arieli-Attali, M. (2015). Gamification in assessment: Do points affect test performance? *Computers & Education*, 83, 57–63.
<https://doi.org/10.1016/j.compedu.2014.12.012>
- Azouz, O., & Lefdaoui, Y. (2018). Gamification design framework: A systematic map and review, *International Journal Of Advances In Electronics And Computer Science*, 5(5), 16-24.
- Baldeón, J., Rodríguez, I., & Puig, A. (2016). LEGA: A Learner-centered Gamification Design Framework (p. 45). Presented at the Proceedings of the XVII International Conference on Human Computer Interaction, ACM.
<https://doi.org/10.1145/2998626.2998673>
- Deterding, S., (2011). Situated motivational affordances of game elements: A conceptual model, in: *Gamification: Using Game Design Elements in Non-Gaming Contexts*, a workshop at CHI 2011. Retrieved June 13, 2019 from <http://gamification-research.org/wp-content/uploads/2011/04/09-Deterding.pdf>.
- Dochy, F., Berghmans, I, Koenen, A. K. (2015). *Bouwstenen voor High Impact Learning: Het leren van de toekomst in onderwijs en organisaties*. Utrecht: Lemma/Boom.
- Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest*, 14, 4-58.
- Iosup, A., & Epema, D. (2014). *An experience report on using gamification in technical higher education*. In Proceedings of the 45th ACM Technical Symposium on Computer Science Education (pp. 27–32). New York, NY, USA: ACM.
<https://doi.org/10.1145/2538862.2538899>
- Knautz, K., Wintermeyer, A., Orszullok, L., & Soubusta, S. (2014). From know that to know how : Providing new learning strategies for information literacy instruction. In S. Kurbanoğlu, S. Špiranec, E. Grassian, D. Mizrachi, & R. Catts (Red.), *Information Literacy. Lifelong Learning and Digital Citizenship in the 21st Century* (pp. 417–426). Springer International Publishing.
- Majuri, J., Koivisto, J., & Hamari, J. (2018). *Gamification of education and learning: A review of empirical literature*. Proceedings of the 2nd International GamiFIN Conference, 11-19.
- Mora, A., Riera, D., González, C., & Arnedo-Moreno, J. (2017). Gamification: a systematic review of design frameworks. *Journal of Computing in Higher Education*, 29(3), 516–548. <https://doi.org/10.1007/s12528-017-9150-4>
- Neighbors, C., Lewis, M. A., Fossos, N., & Grossbard, J. R. (2007). Motivation and risk behaviors: A self-determination perspective. In L. V. Brown (Ed.), *Psychology of motivation* (pp. 99-113). Hauppauge, NY: Nova Science Publishers, Inc.

Motivating students through gamification in nursing education: A qualitative research

- Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *School Field*, 7(2), 133-144. nva0. (2017, july). Domeinspecifiek leerresultatenkader: bachelor in de verpleegkunde. Retrieved on 30 January, 2019 from https://www.nva0.net/sites/default/files/documents/DLR%20Bachelor%20in%20de%20verpleegkunde_0.pdf
- Pomerance, L., Greenberg, J., & Walsh, K. (2016, January). Learning about learning: What every teacher needs to know. Retrieved on 30 January 2019 from http://www.nctq.org/dmsView/Learning_About_Learning_Report
- Subhash, S., & Cudney, E. A. (2018). Gamified learning in higher education: A systematic review of the literature. *Computers in Human Behavior*, 87, 192–206. <https://doi.org/10.1016/j.chb.2018.05.028>
- Van den Broeck, A., Vansteenkiste, M., De Witte, H., Lens, W., & Andriessen, M. (2009). Self-determination theory: about the quality of work motivation. *Gedrag & Organisatie*, 22(4), 316–335.
- Zimmerman B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology*, 81, 329–339.