

Gamification Badges and Ratings: Impact on an Academic Social Network

Fernando Bacelar, Lina Morgado, Vitor Rocio

Laboratório de Educação a Distância

Universidade Aberta

Portugal

fsaraiva@lead.uab.pt; linamorgado@uab.pt; vitor.rocio@uab.pt

Abstract—The Article describes the Impact of using Gamification Elements like Badges, Status Bar and a Rating System on the Interaction, Collaboration, Cooperation and the Presences of the Community of Inquiry Framework, inside an Academic Social Platform. We used a Design Base Research Methodology with Mixed Methods. We started by collecting opinions of users using semistructured interviews. The results from coding, informed on the construction of a *gamified* prototype, made with Elgg. Then Usability tests were conducted and the data helped refine the subsequent implementation. A Survey was deployed, Observations were made, and we gathered some *Analytics*. Results are presented congruent to the iterations and discussed. Some indications for the use of Badges and the implementation of Gamification are considered.

Keywords—Gamification; Design Based Research; elgg; Community of Inquiry;

I. INTRODUCTION

The Portuguese Open University, Universidade Aberta, recently launched “SOL”, a social platform shared by all the academic community, following the guidelines of the Pedagogical Virtual Model: promoting the social interaction between students and between students and the University. This Network is based on the Elgg social engine. Elgg is a good tool for promoting dialog between students, helping them build social relationships [12] and promoting students’ social presence. A Number of other Universities are also using Elgg to “offer facilities for building and sustaining networks of connections” [9]. Our scope of research is the implementation of Gamification in the “SOL” Network.

High levels of interaction, using digital technologies in education are always problematic to achieve [16]-19]. So we wanted to verify the influence of Gamification on the levels of Interaction, Collaboration and Cooperation, and on the Presences of a Community(s) of Inquiry.

A. Gamification

Gamification is being used to promote the engagement of the users in very different tasks and situations. [5]-[14]. Gamification is the use of Elements derived from games, in non-game contexts, to promote participation and engagement [7]. It Is not about building an entire game around some activity: It makes use of the Elements and strategies found in games to that make them work. This is, *when* and *how* to use

game Elements. We can exclude “serious games”, “productivity games” or “games with a purpose” from the Gamification definition [8]. Some common Elements of Gamification include: Points and Scoreboards; Leaderboards and Rankings; Ratings, Badges and Rewards; Levels and Challenges; Maps; Feedback system; and generally, Onboarding [25].

Common theories that can support the use of Gamification, to

foster engagement and motivation are:

- Fogg’s Behaviour Model [9]: The feedback people experience by doing one activity should be ideal. The activity must not be neither too difficult nor too easy, so the user is engaged, focused and absorbed, in a “state of flow”.
- Self Determination Theory [23]: The motivation for executing some tasks can vary from no-motivation, extrinsic motivation and intrinsic motivation. Extrinsic, is dependent of exterior rewards or punishments. Intrinsic motivation on the other hand, is self-motivated, and involves engagement and fun in the activity. The extrinsic motivation can evolve to intrinsic, by a process of self-regulation.
- Flow Theory [19]: The feedback people experience by doing one activity should be ideal. The activity must not be neither too difficult nor too easy, so the user is engaged, focused and absorbed, in a “state of flow...”

B. Community of Inquiry

A Community of Inquiry (COI) is capable of promoting and supporting the significative learning of its members. The COI states that significative learning happens inside a (online) Community of Inquiry through the interaction of three presences: Social Presence, Cognitive Presence and Teaching Presence [13].

Social Presence is when the actors of the community experience a feeling of belonging in a shared space of learning [13]. Even in a text only environment this can be achieved by the use of emoticons or other symbolic representations.

Cognitive Presence is related to the ability of students to reach a critical reflection about the contents [13].

Teaching Presence reflects the effort teachers make on the guidance, content structuring and support of the Community.

The afforded interaction between them is very important for all Presences but even more salient for Social Presence, that can be encouraged by Social Software [13] like Elgg.

II. METHODS

Our Research Design employs a Mixed-Methods approach with a Pragmatic world view [4]-[10]. This involves using qualitative and quantitative data collecting and analysing to complement the results of both methods [15].

The Pragmatic approach is concerned with the production of knowledge that is useful and oriented for problem solving in real contexts [4]. We used a Design Based Research (DBR) methodology, often used in educational research. DBR is focused on the systematic study of the instructional design, its implementation, development and assessment [6]-[21]. In this way, Pragmatism is useful because we want to develop knowledge that is action-oriented [24]. Also, DBR is best adequate for problems where there is no or few validated principles that can support design and implementation of educational activities [6].

The Design-Based-Collective [6] lists four main areas for the methodology: Explore new technologies and new learning environments; develop new instructional and learning theories in context; contribute to the knowledge concerning the design of educational implementations; boost innovation in education.

Our research design was inspired by the configuration proposed by Creswell [4] for Mixed-Methods, the "Sequencial" type (pp 206-210). The first phase is qualitative and informs on the design of the Gamification implementation. After, the assessment of the implementation is made via quantitative data collection and analysis. Then all the data were integrated and discussed.

We Wanted to observe the impact of the implementation of Gamification in an Academic Social Network on the Interaction, Cooperation and Collaboration of its Members; and on the Presences of a Community of Inquiry, inside that Network.

First we made a literature review, with respect to our context, and our research topics and questions.

Then we conduct Semi-structured Interviews (n=6) with the aim of identifying patterns of acceptance and use of the Network, by its current users. We used a coding technique derived from Grounded Theory for the Interviews. The analysis informed on the construction of a *Gamified* prototype of the Network.

After, Usability Tests were conducted with some users (n=11) including students of undergradutae and graduate level and one tutor and one professor professor; We gathered data by Observing the interaction, Timing the performance of the activities and by conducting Usability interviews. With the results of the Usability Tests we developed a new structure of Gamification Elements to be used in the "SOL".

After the implementation , data was gathered using Observation, the Analytics of the Elgg platform (via the AU

Analytics Plugin) and a Survey was deployed, using GoogleForms with closed and open-ended questions (n=54), including students from two courses, at undergraduate and graduate level.

III. RESULTS

On our analysis of the first interviews, we used coding technics derived from Grounded Theory, as proposed by Charmaz [2] to structure our qualitative data: Initial Coding, Focused Coding and Axial Coding. We use the WebQDA Software¹ to compile and code the data.

Initial Coding, refers to coding freely and profusely, with the codes very related with data, trying as many codes as possible. In our case we used paragraph as the unit of analysis. We obtained 64 codes, then reduced to 54.

With Axial coding we organised the codes into major (Axial) categories inn an iterative process of revising and structuring the 54 codes.

On Focused Coding we reviewed, regrouped and rejected some of the initial codes.. We ended up with 3 Axial Categories: Critical Success Factors; Current Inhibitors of Use; Current Boosters of use. Inside, 6, 7, and 5 Indicators or Sub-categories respectively. The categories and indicators led to the construction of a prototype with Elements of Gamification: Badges and levels, a Status Bar and a Rating System.

We conducted Usability Tests to see the interaction of the users with the *gamified* platform and the quality and feedback of that interaction, around the proposed Elements. Also, the way they can help foster the interaction and inform on the interactions they are imbedded with [18].

The performance (timing) of the activities, varied from 14s to 1m 18s, with some differences of performance being related to: difficulty in finding a way to use the functionality (2 cases) and care taken with selection and edition of content (4 cases). We used a 4 item Likert scale to get opinions about the facility of use of all activities and the usefulness of the new activities (not in use in the original "Network"). Almost all students considered the activities "Very easy" and "Easy" and "Very Useful" and "Useful". We also asked students about the graphic design, appropriateness and information capacity of the Badges (4 item Likert scale). General opinions varied between "Easy to understand" and "Very appropriate".

The opinions and results from the Tests were considered and we proposed a new structure for the final implementation around three components:

- Badges: Badges were given for completion of the activities of the courses, but also for extra activities. There were 2 kinds of Badges: *Status* (giving clues to others of all the achievements of the user), and *Experience* badges, directly linked to the activities completed. A Leaderboard showed the situation of all Members concerning Badges earned. *Experience* Badges were also of two kinds "Simple" (for

¹ <http://webqda.com>

completion of one or more of the same activity) and “Challenges” for a group of aggregated and different activities.

- Ratings: To give view of the contributions of all users, to raise motivation and to give visibility of the content produced [3] we use a Rating system with a scale of five stars showing the average results for a contribution and the number of votes (based on Elgg Stars Plugin).
- Status Bar and progress bars: To give information about what is happening on the Network, the activities of other Members (“Friends” and “Others”) and the situation of particular Badges (progress bar of activities completed and/or needed to gain a badge) we incorporated information on a sidebar including all users online, all friends online and all friends and their status in the platform.

After the final implementation, we deployed a Survey (41 questions before revision with peers, then reduced to 24) and gathered 53 valid questionnaires. Age of participants varied from 23 to 54. Students profile: 40 undergraduate, 9 graduate, 3 from isolated curricular units and 1 from a MOOC. We then focused on use of the activities and the communication between members, content production/sharing and content visibility [1]. Our dimensions included Interaction, Cooperation, Collaboration and the COI Presences.

Opinions of students were gathered via a 5 item Likert Scale, (from “1 Totally Agree” to “5 Totally Disagree”).

A. Interaction

Example:

“... Gamification made me take the initiative of sharing content”: Mode 1, STD 1,148.

“...take the initiative to contact with other Members”: Mode 1, STD 1,02.

“...Make new Friends”: Mode 1, STD 1,10.

- Elements with more impact on the Interaction according to students: Badges. (32%), Status Bar (24,5%), Ratings (24,5%) and “other” (18,9).
- Median of responses between 1 and 2: 71,55%, STD 5,83.

B. Collaboration

- Median of responses between 1 and 2: 69,8%, STD 5,43.

C. Cooperation

- Median of responses between 1 and 2: 69,8%, STD 7,90.

D. COI

- Social Presence: Median of responses between 1 and 2: 67,9%, STD 4,50.
- Teaching Presence: Median of responses between 1 and 2: 62%, STD 5,06.

- Cognitive Presence: 67,9% of responses between 1 and 2.

IV.

DISCUSSION

From the coding of the first interviews, we saw that the students felt “there is no one there”, due to the form of the feedback design of the original platform. Also, Facebook could be seen as a major threat (Inhibitor of Use) as students prefer Facebook over “Network” for non-academic matters. On the other hand the privacy achieved by “Network” being a “closed” environment is well appreciated by students. Also, the presence of all academic members in one space is well received, contrasting with the more “course-oriented” Moodle environment (also used by students).

The Prototype tried to solve this feeling of loneliness, with the implementation of a Status Bar with indication of Members’ activities and of Members currently online. We also build a set of Badges and a Rating system. From the perceptions and performance of users of a Prototype, we then proposed a new implementation, a “Network2”.

The results from the Survey show that the Gamification had a positive impact in the Interaction, Collaboration and Cooperation of the Members.

From Observation, we saw that the students used all activities, and shared a lot of content and opinions in and between courses. Students were also very interested in earning Badges, and complimented and commented on each other Badges. Signs of Collaboration were evident inside curricular spaces, for mandatory and non-mandatory activities (like adding extra content for students from other units). Cooperation was visible when students gathered around a theme they created, proposing a new name for the “Network”. Students also said that the Badges made them more visible in the Network and help them learn with each other. This is an indication of social learning [22].

The impact on Social Presence was perceived as moderately high. In open-ended questions students stated that “the interaction was very good and made us know more other students” (in reference to the Status Bar).

The impact on the Cognitive Presence was perceived as moderately high. From open-ended questions students said that Gamification had “an impact on the construction of knowledge”.

The impact on the teaching Presence was perceived as moderately high, but less than that of the other presences.

Final Thoughts

Gamification is being used in social networks with a positive impact on the engagement of students [17]. From our work, we can conclude that the use of Gamification had a positive impact on the Interaction of the students of a social platform and had a positive impact on the Collaboration/ Cooperation, and on the three Presences of the COI Framework. The impact however was lower for the Teaching Presence.

The Badges helped give visibility of actions and activities, and recognition of goals achieved. The Status Bar made students more aware of each others’ activities. The Rating

mechanism gave visibility and weight to the contributions of Members.

We hope the project can give guidelines on how to make an educational Gamification implementation, and serve as a starting point to better see its impact on social networks and social platforms, and on learning achievements.

In a way, Badges can serve as an indicator of skills and perseverance. More than reflecting a set of skills, they make visible the path to develop such skills as we confirmed from comments about Status Badges earned. So, Badges are always dependent of a context and this must be taken into account when creating “Open Badges” or a universal system for Badges. They must reflect the “End” as well the “Path”.

Another salient aspect of the implementation was that the students were aware of the privacy filters available and made use of them only for very little content, wanting the most part of their contributions seen by the Public.

REFERENCES

1. Anderson, T. (2010). Theories for learning with emerging technologies. *Emerging technologies in distance education*, 23-40.
2. Charmaz, K. (2014). *Constructing grounded theory*. Sage.
3. Cheng, R., & Vassileva, J. (2005). Adaptive reward mechanism for sustainable online learning community. *Proceedings of the 2005 conference on Artificial Intelligence in Education Supporting Learning through Intelligent and Socially Informed Technology*, 152-159.
4. Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
5. de-Marcos, L., Domínguez, A., Saenz-de-Navarrete, J., & Pagés, C. (2014). An empirical study comparing gamification and social networking on e-learning. *Computers & Education*, 75, 82-91. doi: 10.1016/j.compedu.2014.01.012
6. Design-Based Research Collective, The. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher*, 5-8.
7. Deterding, S. (2011). Gamification : Toward a Definition. *Design*, 12-15. Retrieved from <http://gamification-research.org/wp-content/uploads/2011/04/02-Deterding-Khaled-Nacke-Dixon.pdf>
8. Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (pp. 9-15). ACM.
9. Dron, J., & Anderson, T. (2014). *Teaching crowds: Learning and social media*. Athabasca University Press. Entertainment Software Association. (2014).
10. Feilzer, M. Y. (2010). Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of mixed methods research*, 4(1), 6-16.
11. Fogg, B. J. (2009, April). A behavior model for persuasive design. In *Proceedings of the 4th international Conference on Persuasive Technology* (p. 40). ACM.
12. Garrett, N., Thoms, B., Soffer, M., & Ryan, T. (2007). Extending the Elgg social networking system to enhance the campus conversation. *Second Annual Design Research in Information Systems (DESRIST), Pasadena, California*, 14-15.
13. Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The internet and higher education*, 2(2), 87-105.
14. Huotari, K., & Hamari, J. (2011, May). Gamification” from the perspective of service marketing. In *Proc. CHI 2011 Workshop Gamification*.
15. Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, 33(7), 14-26.
16. Levy, Y. (2007). Comparing dropouts and persistence in e-learning courses. *Computers & education*, 48(2), 185-204.
17. Li, Cen, Zhijiang Dong, Roland H. Untch, and Michael Chasteen. "Engaging computer science students through gamification in an online social network based collaborative learning environment." *International Journal of Information and Education Technology* 3, no. 1 (2013): 72.
18. Marache-Francisco, C., & Brangier, E. (2013, July). Perception of gamification: Between graphical design and persuasive design. In *International Conference of Design, User Experience, and Usability* (pp. 558-567). Springer Berlin Heidelberg.
19. Nakamura, J., & Csikszentmihalyi, M. (2002). The concept of flow. *Handbook of positive psychology*, 89-105.
20. Njenga, J. K., & Fourie, L. C. H. (2010). The myths about e-learning in higher education. *British Journal of Educational Technology*, 41(2), 199-212.
21. Plomp, T. (2007). Educational Design Research: an Introduction. In *An introduction to educational design research* (pp. 9-34).
22. Rendell, L., Fogarty, L., Hoppitt, W. J., Morgan, T. J., Webster, M. M., & Laland, K. N. (2011). Cognitive culture: theoretical and empirical insights into social learning strategies. *Trends in cognitive sciences*, 15(2), 68-76.
23. Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, 55(1), 68.
24. Van den Akker, J., Gravemeijer, K., McKenney, S., & Nieveen, N. (Eds.). (2006). *Educational design research*. Routledge.
25. Zichermann, G., & Cunningham, C. (2011). *Gamification by design: Implementing game mechanics in web and mobile apps*. " O'Reilly Media, Inc."