

## Increasing Student Engagement Through Co-created Gamification

**Amy Stickels and Anna Tranter**

Assistant Professors  
University of Warwick

### **Abstract**

*Gamification is a popular way to increase student engagement within the classroom. However, much of this is normally controlled and managed by the teacher. This case study discusses the use of quizzing technology and identifies the learning that took place when we challenged students to co-create and take part in their own games on a weekly basis.*

*Evaluation of the impact of this initiative demonstrated that not only did students engage more in the classroom, feel more motivated and inspired by the creation of quiz questions and answers which were validated by their peers and teachers, but they also felt a greater sense of belonging within the classroom. Students' ability to write more application based and complex questions also developed over time. Teachers benefitted from being able to see the knowledge acquired for question formation, as well as the class's knowledge in answering the questions, which in turn informs seminar planning.*

Keywords: Co-creation, Gamification, Student Engagement, Quiz

### **Summary**

This case study introduces a small-scale research project focusing on using gamification and co-creation to enhance student motivation. The project was undertaken with international foundation year students at the University of Warwick following Arts & Humanities, Social Science and Business pathways, however the outcomes are applicable to all groups of students.

The intervention capitalised on research into gamification and co-creation, with gamification typically defined as using “game design elements within non-game contexts” (Deterding et al, 2011, p. 1). Research into gamification in education suggests it can lead to more effective learning as students are more motivated (de Marcos et al, 2017). Gamification is also a form of active learning, defined by Bonwell and Eison (1991, p.3) as “... activities involving students in doing things”. Active learning strategies have been linked to increases in student performance (Eddy & Hogan, 2014; Haak et al., 2011; Theobald et al., 2020) and engaging students as active participants in their learning also helps develop deeper learning (Draper, 2009). As a result, students were tasked with co-creating quiz questions based on

their learning from pre-recorded lectures. These questions were uploaded to Kahoot! quiz platform for the students to challenge themselves and each other.

## **Project Background**

The project developed in two stages. Initially it grew out of teaching during COVID restrictions, which limited the amount of face-to-face teaching, requiring a blended learning approach to teaching. Our students were required to watch pre-recorded lectures ahead of their in-person seminar classes. This posed some challenges:

- How did we know that students had understood the lectures?
- How can we prevent ourselves from repeating learning already delivered in lectures but also identify what further input was needed?
- How can we increase student engagement?
- How can we enable more active learning in a socially restricted classroom?

Gamification offered a way to address these questions. This led us to a quiz intervention using Kahoot! as a method to deliver more gamified approaches, in which teachers developed the quiz for the students to undertake following a lecture. Whilst it was engaging for students, we felt there was something more that could be done, leading to the second phase of the project.

Becoming increasingly aware of co-creation in education, defined by Bovill and Felton (2016, p.197) as, “students becoming more active participants in the learning process”, led us to re-evaluate our approach to the quizzes. We moved away from a teacher-controlled activity towards student co-created quizzes as a way to increase student engagement and for students to build their confidence and independence.

## **Discussion**

Students were asked to watch asynchronous lectures accessed via the Virtual Learning Environment. In seminars, students wrote quiz questions based on the lecture learning. This required students to reflect on and engage with key elements of the knowledge from the lecture, as well as having a degree of mastery of the materials to be able to write suitable questions and suggest possible (and plausible) answers. Students typically developed questions ranging from true/false questions of key words to multiple choice questions. Over time researchers noted that the question types became more complex – moving from recall of key terms to concept application questions, indicative of deeper learning. For example, a simple true or false question at the start of the intervention was “Is contract law an example of public law?” or a definition question such as, “What does a priori mean?”, whereas

towards the end of the academic year, questions developed required application of the materials, for example, “McGowan v Radio Buxton (2001) can be used to support which area of contract law?” or “In x circumstance what would a utilitarian suggest that you do?”

The teacher collected these questions and entered them into a Kahoot! quiz. Minimal changes were made to the questions to ensure that students were able to recognise their own questions. This was important as the students in our project are international students for whom English is not their dominant language but also to not undermine the co-created nature of the quiz. The quiz was played by students at the start of the next seminar using their own devices (including mobile phones, laptops and tablets).

We chose to use Kahoot!, having tried other platforms e.g. Vevox and MS Forms, as Kahoot! has more gamified elements that appealed to the students. Gamification elements are an important aspect as it is linked to increasing student motivation and engagement, making learning more effective (de Marcos et al, 2017). Kahoot! uses leader boards, has a timer for questions and is easy to use on all devices. It glorifies the top three students who are presented on podiums and then lists the two runners up. An important element is that it does not give data on the lower half of the leader board, so there is no “naming and shaming” of students who have not done so well. It also does not require students to download an app nor does it store any student data. One drawback of this is that, as a teacher, you may not know the scores for each individual student as Kahoot! enables students to choose to play using their own names or to remain anonymous by providing a pseudonym. However, it does provide instantaneous feedback for both students and staff. The interim results inform the players and teacher how many got the question correct, which gave opportunities to pause the quiz and for the teacher to unpick any of the questions and clarify a particular answer if necessary.

Following the intervention, we surveyed 34 students via an online questionnaire (79% response rate) and held a focus group of 9 students.

## **Outcomes and Impact**

A number of themes emerged when we reviewed the student evaluation:

### Student engagement

One of our earlier assumptions had been that there could be barriers to students participating, however we found that this was not the case. All students reported that they always or almost always joined in with the quizzes in the seminars. Students irrespective of language ability, learning needs or gender were engaging in the activity telling us that it was fun, engaging and that they saw the quizzes as a game. When asked what they liked about the interaction they highlighted the interactivity

“I’m not a gamer but this motivates me”, the competitiveness “I don’t want to lose” and the use of the leader boards, commenting “I want to see my name”. Students stated that they felt more engaged in the lessons and made comments such as “when a game begins, my brain becomes more active”.

#### Changes to the study pattern

One of the concerns at the start of the study was that students may become “game fatigued” with the regularity and type of quiz being used. However, students liked the routine of the weekly quizzes. They liked that it changed the study pattern of their day and commented that “if I know there is a quiz – I concentrate more” and “I’m excited – I like the routine of doing the quiz”.

#### Re-enforced knowledge and understanding

Students felt that they were learning and understanding more by co-creating the quizzes. Students commented that the act of writing the questions, made them revisit their notes and this reinforced their memory. They also stated that their classmates’ questions might cover material that they did not know or could not remember. They liked the fact that the teacher was able to explain when and why students got the question wrong stating “it really helped me understand more” and they also stated that “they learn from making mistakes” and “it reminds me what I need to improve”.

Students rated their learning from the intervention as an average of 4 out of 5. For some students it was more than just learning though, as one commented, “we are creating not just learning”.

#### Use of leader boards

Contrary to some research (Majuri et al, 2018) students reported they enjoyed the competition and the use of leader boards, rather than finding them demoralising. It was noticeable that different students were being placed on the leader board each week. As students were writing their own questions, it ensured that they were pitched at the correct level and using relevant language, giving all students an opportunity to answer and win.

#### Anonymity

Students were given the option of using their own name or a pseudonym when they logged on to play the game. 50% of students usually chose to use their real names as they stated they wanted the teachers to see how well they had done, and they wanted their efforts to be recognised. 17% stated they liked keeping their identity a secret, with some stating that they wanted to save face whilst other took pride in revealing themselves as a winner at the end of the quiz. One of the noticeable discussions during the focus group was allowing the students this freedom of choice, “I like the flexibility of using my own name or choosing another – we are all different!”

#### Feeling valued

Students reported that they felt valued as teachers were not only allowing them to write the questions, but the questions were not altered by the teacher. This boosted their confidence and enthusiasm for the subject, as they were creating content and sharing this with the rest of the class. Students commented that, “in the past writing class material was for the teacher and now the power is being shared with us”. One student from China commented that, “it’s more quiz like if we write our own questions, otherwise it’s like a test particularly with my educational background.”

### Building a community

An unexpected outcome of the intervention was the way the intervention developed a sense of community within the classroom. They told us that it, “...makes me feel part of the lesson.” Students enjoyed the comradery of writing the questions and were observed helping each other with this. A student commented that his peers were patient in helping him write the questions and added that this removed the distrust that sometimes exists between students and teachers and between peers, enhancing communication. Taking part in the quizzes generated friendly competition within the class, with students guessing who had written each question.

### **Conclusion**

Teacher created gamification is valuable but is often seen by students as a test. If we are able to empower students to co-create their own quizzes, then this has many additional benefits for both students and teachers.

Students reported they felt more actively engaged and motivated, as they feel they are seen as achieving by their peers and teachers, which is confirmed by seeing their name on the leader board. The co-creation adds to the students’ motivation. They were able to demonstrate their competence and mastery in writing the questions, which reinforced their self-confidence. Their sense of belonging within the classroom increased and they developed independence in writing their own questions and choosing whether to use their real name or a pseudonym. Students felt empowered and valued as they were helping create material for their own seminars.

Teachers reported that the intervention gave them more opportunities for formative feedback. The writing of the questions and collation into a quiz, gave staff opportunities to identify any misunderstanding and plan seminars to build upon this. During the playing of the quizzes, teachers could gauge the understanding of students and were able to pause the quiz and review the learning.

Overall, this intervention is simple yet effective. It requires little time on behalf of the teacher to collate the questions into a Kahoot! quiz in preparation for the lesson but is beneficial to all. This could be developed further to inspire student engagement, with students generating their own summative questions for use in multiple choice examinations, through the course of a module. Students could, as part of an

assessment, be tasked with writing relevant quizzes (for which they would receive their mark) which are used by students in subsequent cohorts as part of their formative assessments. Once established, this approach could also help to prepare students to move towards co-writing essay questions for formative and summative assessment.

## References

- Bonwell, C.C. & Eisen, J.A. (1991) *Active Learning: Creating Excitement in the Classroom*. School of Education and Human Development, George Washington University: Washington DC, 3
- Bovill, C., & Felten, P. (2016) Cultivating student–staff partnerships through research and practice. *International Journal for Academic Development*, 21(1), 1–3 ,197
- Deterding, S., Dixon,D., Khaled,R., Nacke, L., (2011) From game design elements to gamefulness: Defining “gamification”. In: *MindTrek 2011 proceedings of the 15th international academic MindTrek conference: Envisioning future media environments*, 28 – 10 September, Tampere, Finland. Available from ACM pp 9 –15  
<https://doi.org/10.1145/2181037.2181040>
- de Marcos, L. et al (2016) “Social Network Analysis of a Gamified e-Learning Course: Small-world Phenomenon and Network Metrics as Predictors of Academic Performance”, *Computers in Human Behaviour*, Vol 60, 312- 321.
- Draper, S. W. (2009) Catalytic assessment: understanding how MCQs and EVS can foster deep learning. *British Journal of Educational Technology*, 40(2), 285-293.
- Eddy, S.L. and Hogan, K.A., (2014) Getting Under the Hood: How and for Whom Does Increasing Course Structure Work? *Cell Biology Education* 13, pp 453–468
- Haak, D.C., HilleRisLambers, J., Pitre, E., and Freeman, S. (2011) Increased structure and active learning reduce the achievement gap in introductory biology. *Science* 332, 1213–1216.
- Majuri, J., Koivisto, J. and Hamari, J., (2018) Gamification of education and learning: A review of empirical literature. In *Proceedings of the 2nd international GamiFIN conference, GamiFIN 2018*. CEUR-WS.
- Theobald, E. J., Hill, M. J., Tran, E., Agrawal, S., Arroyo, E. N., Behling, S., Chambwe, N., Cintrón, D. L., Cooper, J. D., Dunster, G., Grummer, J. A., Hennessey, K., Hsiao, J., Iranon, N., Jones, L., Jordt, H., Keller, M., Lacey, M. E., Littlefield, C. E., (2020) Active learning narrows achievement gaps for underrepresented students in

undergraduate science, technology, engineering, and math. *Proceedings of the National Academy of Sciences*, 117(12), 6476–6483.