Journal of the Foundation Year Network, Volume 5 (2022), pp. 89-98

Co-creation, Gamification and Motivation

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Gamification and co-creation are increasingly popular pedagogies in undergraduate studies. Gamification works on the basis that learners engage more when they are having fun. However, much of this is controlled by the teacher, who designs and manages the experience – but what learning can be gained from handing over control to the students through co-creation? Throughout the academic year 2021-22, Business and Philosophy foundation year students studying on the International Foundation Programme at an English university were challenged to write and take part in recap quizzes using Kahoot! following asynchronous lectures. This paper discusses the use of this quizzing technology in the classroom and explores how empowering students to co-create has a motivational benefit, according to Self Determination Theory (SDT), as well as a deep learning benefit for students, and additionally enables teachers to check understanding.

Introduction

The connection between student motivation and learning has long been established. When students are motivated, they tend to be engaged and apply their knowledge more often and reach higher standards of academic achievement (Wang *et al*., 2019). Motivation to learn is essential to learning (Kim and Bennekin, 2013); mindful engagement in learning activities "leads to outcomes such as achievement" and "motivation underpins engagement" (Martin, 2012: p. 305).

Gamification has been linked to improving motivation, engagement and cognitive learning (Caponetto *et al*., 2014). Gamification is defined as the "use of game design elements within non-game contexts" (Deterding, Dixon, Khaled and Nacke, 2011: p. 1) for example using game design elements within the context of the classroom. Subhash and Cudney (2018) found that the use of game-based learning is growing and these interactive learning environments aim to bring the benefit of games into the classroom.

Co-creation capitalises on the constructivist learning paradigm of active student engagement, whereby students and educators work together to achieve learning outcomes. The concept of 'co-creation' is used to describe collaborative interactions whereby students as stakeholders are able to shape knowledge practices (Bovill *et al*., 2011). Bovill and Felten (2016: p. 197) describe co-creation as "students becoming more active participants in the learning process, constructing understanding and resources with academic staff." Hence education be-

comes a shared experience in which learning and teaching is done "with" and not "done to" students, emphasising learner empowerment which "challenge[s] learning relationships" (Ryan and Tilbury, 2013).

The growing popularity of co-creation in higher education is associated with its student-centredness and promotion of active learning (Lubicz-Nawrocka, 2018). This link between co-creation and "active" learning is important as co-creation "aims to move the student from adopting a passive role in learning to an active role involving interaction between teacher and students, and between student and students" (Bovill, 2020: p. 1033). McCulloch (2009) acknowledges that the engagement of students as active participants in their learning processes leads to successful learning; as students are actively involved in the development of material, they develop deeper learning and increase their engagement (Draper, 2009).

Gamification and co-creation both aim to increase the intrinsic and extrinsic motivation for completing activities which can enhance engagement and learning. According to Self Determination Theory (SDT) intrinsic motivation refers to an individual choosing to engage in an activity for its own sake, such as for interest, pleasure or satisfaction. Extrinsic motivation is where the performance of an activity is linked to an external outcome, for example, money or a reward/ prize. According to Ryan and Deci (2000: p.69), those who are intrinsically motivated have more "interest, excitement and confidence which in turn is manifest both as enhanced performance, persistence and creativity".

SDT suggests that intrinsic motivation is enhanced when the three psychological needs of autonomy, competence, and relatedness are achieved. Individuals, according to Ryan (2009), are more likely to engage and develop self-efficacy if there is choice involved with their learning and they engage with those who deliver it. This study looks at gamified learning that is co-created to identify the extent to which these elements can fulfill these psychological needs: competence through quizzing and demonstrating knowledge by writing questions; relatedness by creating questions together and playing as a group; and autonomy made possible by having choice, relying on oneself, and taking ownership for the co-created elements.

Intervention

This study took place over one academic year and across three different academic courses: Business, Social Science, and Arts and Humanities, within the University's International Foundation Programme. The majority of students were students for whom English is an additional language, with a minimum of IELTS 5.5. The academic courses consist of several modules, all of which are delivered via a one-hour lecture, which was pre-recorded. The aim of the lecture is to deliver the academic theory for that week. Each week students then attended three one-hour seminars, delivered mainly in person. The seminars aim to apply and discuss the theory delivered in the weekly lecture. A maximum of 15 students were present for each seminar.

Both researchers had used various different types of gamifications within their seminars. Whilst these appeared to work well, it raised a number of questions:

- Were students learning from this activity?
- Do students get gamification fatigue?
- Were all students motivated in joining in? If not, why not?
- To what extent do these quizzes engage all learners?
- Why were some users anonymous? Were they "saving face"?

This led to the introduction of an intervention combining co-creation and gamification, with the aim of empowering students to become more active and responsible for their own learning whilst also developing a greater understanding of the academic content.

The process

At the start of the first seminar each week, students were invited to write either a multiple-choice question or a true or false question, with answers, based on the lecture for that week. Students were encouraged to develop challenging questions, with the application of concepts rather than memory recall style questions. The teachers collected these questions at the end of the seminar and then typed them up into an interactive quiz to be played by the students at the start of their third seminar. This activity as shown in Figure 1 below:

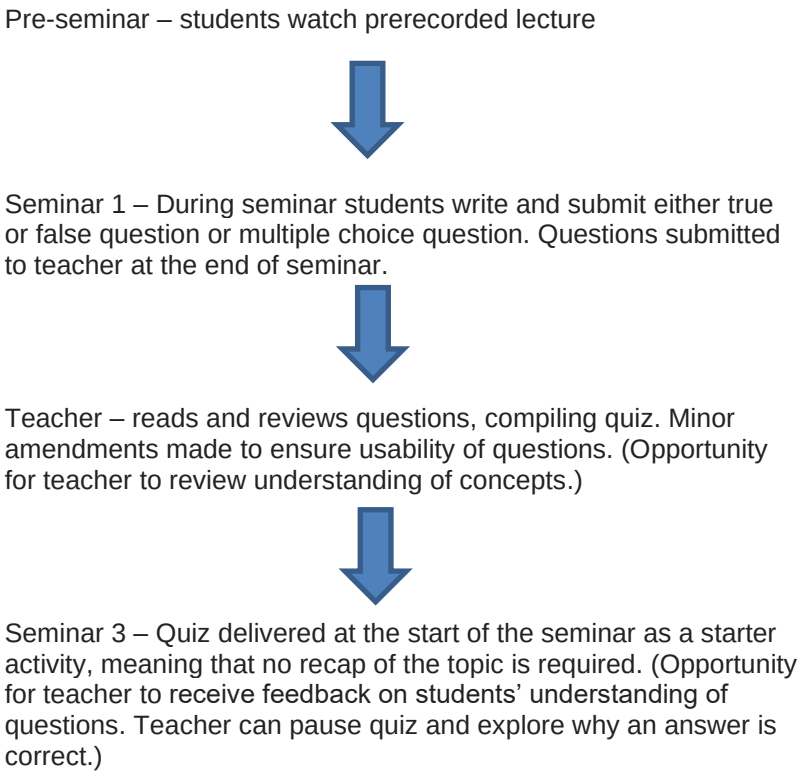

Figure 1: Flowchart outlining the intervention.

Although other platforms, for example Vevox and Microsoft Forms, were trialled, students preferred the use of Kahoot!, which is a popular online gaming platform containing numerous pre-prepared quizzes with true or false questions or multiple choice questions. Kahoot! also has the option for teachers to develop their own quizzes.

The teacher launches the game, with students accessing it either online or via the app, using a pin number provided. Players are asked to give themselves names that are displayed on the screen. The length of the game will depend on the number of questions, the time set for each question and any explanations or discussions the teacher chooses to give during the game. Once the game begins, questions appear on the main screen, followed by up to four possible answers, which are colour (and shape) coded, as shown in figure 2.

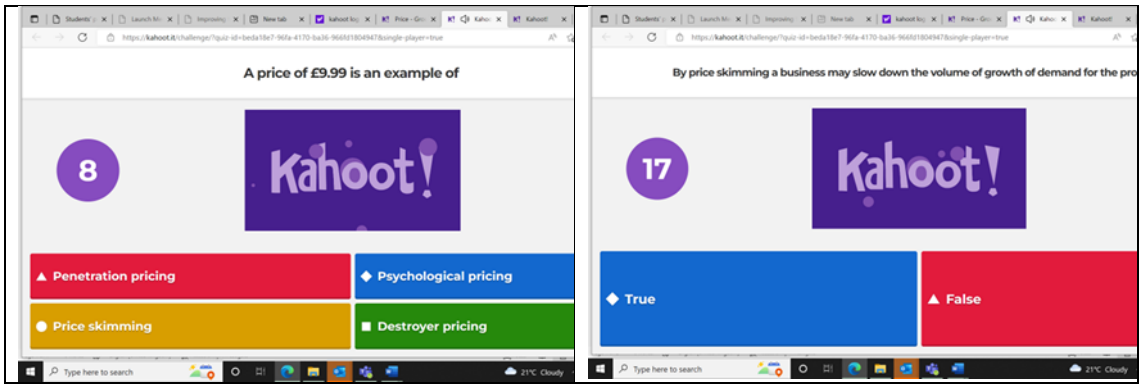

Figure 2: Screenshot of Kahoot! playing screen from the student perspective.

Players use their devices to answer the questions by selecting the colour which corresponds to their answer within an allocated time. Points are awarded for the correct answer and for the speed of answering correctly. A leaderboard is presented between the questions, so players can see their progress and movement up and down the leaderboard. At the end of the quiz, the first three players are placed on a podium in first, second and third place. The next two players are confirmed as runners up, as shown in figure 3. There are no results available for the players who are lower than this on the leaderboard.

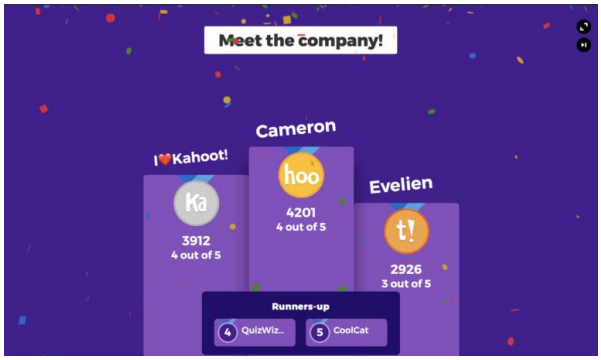

Figure 3: Kahoot! leaderboard

Evaluation of the intervention

To evaluate the outcome of the co-created gamification, the views of the 34 international foundation students were sought initially through an anonymous Microsoft evaluation form, which received a response rate of 79%. All students were then invited to participate in a focus group discussion, in which nine students took part. The students' responses were analysed through the lens of SDT and the psychological needs of competence, relatedness and autonomy to understand the degree to which this intervention could be considered motivational.

Competence

Competence relates to our achievement capacity. It is supported by providing people with opportunities to demonstrate what they can do and encouraging people to try out new things. Gamification provides environments in which people feel a sense of achievement and in Kahoot!

this is found in students answering questions and being rewarded with points and places on a leaderboard. In our research, students, when asked what they liked about Kahoot!, referred to both intrinsic and extrinsic motivators linked to competence. For the majority it linked to measuring their own achievement: "you can test your knowledge" and "it (Kahoot!) is also useful to remind [me of] the information I've learned."

In challenging students to co-create writing the questions, students also gain a sense of competence that they find motivating – the teacher is validating their question by including it in the quiz. Furthermore, by doing so students recognised the shift in power dynamics, as discussed in the literature around co-creation. 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," indicating that it added to the perception of fun.

Gamified learning is distinct from other teaching approaches in the deliberate use of competition as a means to motivate (Nicholson, 2012). Ranking systems, like leaderboards, serve as intrinsic motivators because players can see instantly how they are performing. Students made reference to this when they explained that they enjoyed Kahoot! because of "competition". Another wrote, "I still want to be on the podium, even if not first", with another claiming "it is fun to win." However, research shows that care has to be taken when using leaderboards, because they can be demotivating for the players at the bottom (Werbach and Hunter, 2012). Although extrinsic competence rewards like being top of a leaderboard can detract from internal motivation leading to an effect called "the undermining effect of rewards" (Deci *et al*., 1991), Kahoot! does not reveal this information. One student, though, when asked what they dislike about these quizzes, reported, "It can get competitive" and another, "sometimes I cannot get all the questions right and fall behind my classmates and this makes me nervous." Whilst these comments were from a minority of students (11%), it demonstrates that anonymous quizzes can challenge a student's sense of competence.

The feeling of effectiveness as a result of mastering a task and perceiving yourself to be competent is another key aspect. For some students this is intrinsically motivating as they want to prove to themselves that they have understood the information. One student said, "even though I know it's just a game, I still want to prove to myself that I can do better." For others there is an extrinsic motivation for taking part in quizzes, "I want my teachers to see my progress!" In both cases the measure of progress over time, according to the quiz results, adds to a feeling of mastery.

Students felt that they were learning as a result of the intervention. Ranking themselves on a scale of 1-5 (where 1 = learn very little and 5 is learn a lot), students gave a mean and mode score of 4 to the use of this technology. The reasons for this included that "it helps me to understand the topic more", "I can consolidate the knowledge from the lectures" and "we learn by making mistakes." This indicated that taking part in the quizzes enabled students to clarify their knowledge and for one student it "makes me feel good". SDT argues that giving people positive feedback increases their positive motivation as it affirms a sense of competence and achievement. However, it ought to be noted that studies exploring the effect of fun, pleasure and excitement found that there is a direct impact on perceived usefulness (Saber Chtourou and Souiden, 2010) and so the perceived positive feelings may skew the perception of the real learning from the quiz.

The learning from quizzing and co-creating the questions comes in different forms. In playing Kahoot!, the student learns through the teacher asking follow up questions or dispelling misconceptions; as one student pointed out, "sometimes, the teacher gives us a piece of new knowledge about this topic". As a teacher there is a formative benefit of being able to identify areas of misunderstanding through the responses in the quiz and the questions themselves and thus being able to review elements with the students. In writing the questions, students arguably demonstrate higher order thinking skills of application and creation; as one pointed

out in the focus group, "we are creating and not just learning". It also requires a deeper level of understanding of the topic to identify potential multiple-choice answers and thus the learning gains could be greater.

Alongside the knowledge and understanding gains from the use of co-created quizzes, there were English language gains for some of the students. The vast majority of students on the International Foundation Year Programme are second language learners. In writing quizzes, it was noted by the researchers that the students were a) developing their subject-specific vocabulary more readily (some of the questions they were writing were about specific vocabulary) and b) developing their ability to ask questions in English (this was seen in the reduction in the number of questions that the researchers needed to reword as time went on). This is partly supported by Mateo-Gallego and Ruiz Yepes' (2018) study which showed that using Kahoot! in an English course helped students decrease their language errors.

Relatedness

Relatedness is the need to feel connected and part of a community. This sense of belonging occurs through displays of peer support and empathy within the classroom, which contribute to students feeling supported and important. Materialism and other extrinsic goals such as fame or image have been shown to be incidental to feelings of relatedness (Kasser and Ryan, 1996); however, goals such as intimate relationships, personal growth, or contributing to your own community contribute to satisfaction (Ryan, 2009).

Within the focus group discussion, students were enthusiastic about the sense of belonging and sense of community that the Kahoot! quizzes had created within the class. They liked seeing their own and their peers' questions on the screen and being able to guess who wrote which question, as well as the identity of anonymous players. They commented that they liked the level of rivalry, and so it did not undermine the sense of relatedness. In fact, one student reported that, "my classmates are too quiet and games are the best chances to have conversation and interaction". According to Licorish *et al.* (2018), one of the advantages of Kahoot! was that it not only increased student engagement, but also improved the dynamics and atmosphere within the classroom. Students also felt that a quiz "makes learning a less lonely experience" as "I can see I am not the only one to get it wrong." This supports the claim from Zarzycka-Piskorz (2016) that games can help students overcome the fear of making mistakes that can lead them not to participate. Another wrote, "I really like the feeling of testing myself while competing with others."

One of the assumptions at the start of the research was that one of the barriers to students' engagement was their English language ability. However, the data showed that there was no difference in engagement relating to students' English language attainment and thus no barriers to their participation in the community.

Although there was competition and a sense of rivalry in the class, there was a strong sense of community, with students supporting each other. Licorish *et al*. (2018) identified that Kahoot! also creates increased interaction between the teacher and the students, which could contribute to students feeling increased belonging to the learning community within the classroom.

Autonomy

Autonomy is the feeling that one has choice and the ability to endorse one's own behaviour. Teachers who support autonomy facilitate their students' greater intrinsic motivation, curiosity, and desire for challenge (Flink *et al*., 1990). Students taught in a more controlling manner are

likely to lose initiative and learn less effectively (Ryan and Deci, 2000). Autonomy within our study is demonstrated through anonymity, the co-creation of quizzes and the willingness of students to participate.

To increase autonomy, students could choose to use their own name or a pseudonym in order to remain anonymous. 50% of students in our study (see Figure 5) said they chose to use their own name and the reasons for this were both intrinsically and extrinsically motivated, with students stating, "I take it seriously – that's why I use my name" and "I want my teachers to see my progress! Leaving my name also gives me certain pressure to answer questions which I think is a good thing because with pressure, I can do better". These views are contrary to one of the main challenges of using technology identified by Kay and LeSage (2009), whereby students were reluctant to participate due to the fear of being monitored.

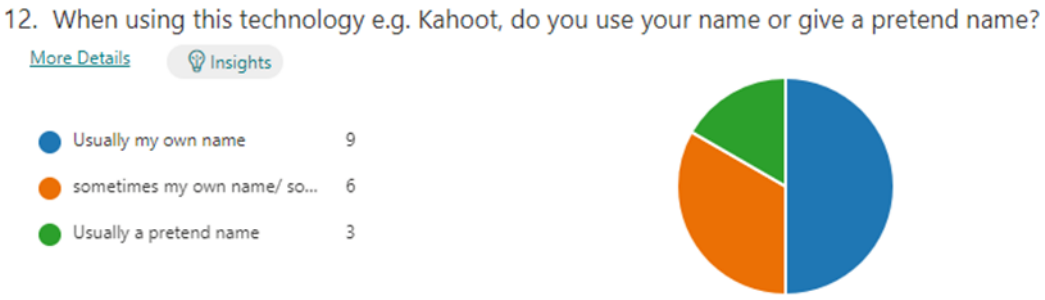

Figure 5: Data from questionnaire on the whether students use their real name or pretend name.

A small minority (17%) of students choose to use a pseudonym because "I don't want anyone to know if I make a mistake". For others, it added to the fun of the gamification. They reported, "it's fun to use another name" and they liked "to guess who is who" and that "if I win, I can reveal myself (like the masked singer)!" It was clear from the focus group discussion that students liked the autonomy of being able to choose to either use their own name or not. Some stated that it depended on their mood on the day, but they liked the fact that they were allowed to choose nevertheless.

Autonomy enables students to act in ways that align with their values and interests, which also has intrinsic motivation for them. Engagement with the quizzes was motivated in different ways. When asked why they took part in the quizzes, 80% of the respondents indicated that it aligned with their interests, with students typically commenting that "it is fun", "I love games" and "it is interesting".

Conclusion

The use of quizzes within seminars has some benefit but when administered by the teacher it is often seen by students as a test. However, the empowering of students to co-create quizzes has been found to have a number of motivational benefits for both students and teachers.

The co-creation of game-based learning develops students' extrinsic motivation, in that they like to be seen to be achieving by their peers and teachers, and like seeing their name on the leaderboard. Co-creation also develops students' intrinsic motivation, fulfilling the three psychological needs of competence, relatedness and autonomy. To enable co-creation of the quizzes, students must have developed a degree of mastery of the subject to be able to write a suitable question and provide possible answers. Students reported that not only were they more actively engaged within the seminar, but they also felt they had learnt more because of their

desire to co-create or as one student said, “we are creating not just learning”. The act of co-creation and gamification developed a real feeling of community and relatedness within the classroom. Students reported they liked the change in class dynamics the quiz brought and the chance to engage with their peers. Although there was an element of competition, it was largely felt that this was ‘safe’, as they were amongst their peers. The act of co-creation also developed a greater bond between the teacher and the class, which supported the feelings of belonging within the group. In terms of autonomy, students enjoyed the fact that they could choose to write a question and had ownership of that question. They also liked being able to choose to use their own name or a pseudonym. The element of choice was vital.

Teachers were also positive about the co-creation gamification. The fact that they could see the questions and answers prior to the quiz acted as a check on understanding and quality assurance measure. Teachers used their discretion when editing these questions but tried to keep this minimal, to ensure that students were able to recognise their own questions. The quiz itself gave teachers an opportunity to receive formative feedback and check for any misunderstanding, and on occasions they did pause the quiz to ensure that answers were fully explained, and students had a good understanding of why a question was correct.

Overall, the integration of gamification through quiz technologies is motivational for students, both intrinsically and extrinsically. The added use of co-creation for the Kahoot! questions only enhanced the motivation and supported the psychological needs of competence, relatedness and autonomy that SDT emphasizes as required for an activity to be intrinsically motivational.

Acknowledgments

We would like to thank the foundation year students for providing both feedback to the questionnaire and their time in giving invaluable insights in the focus group.

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