Journal of the Foundation Year Network, Volume 7 (2025), pp. 33-46

Gamification using Kahoot! to increase students' engagement in higher education

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There is a growing awareness in the Higher Education (HE) sector of the importance of adapting teaching methods to promote higher levels of student engagement. Gamification is an increasingly popular way to achieve this, with literature showing that digital games effectively increase student interaction and enjoyment. With digital quiz platforms being an easily accessible way to introduce learning through gamification into sessions, this article discusses the use and impact of the Kahoot! platform within Foundation Year Physics lectures. The advantages and disadvantages of the platform, as well as some of its different functionalities, and thus potential methods of use across the HE sector, are also discussed.

Rationale

The importance of adapting teaching methods within HE to promote higher levels of student engagement has been clearly proven, with increased engagement improving not just attainment but motivation and course completion rates (Sinatra et al., 2015; Manwaring et al., 2017; Montenegro-Rueda et al., 2023). Increased engagement has also been shown to promote positive emotional responses to learning (Kuh et al., 2008).

Robinson et al. (2008, p. 101) concluded that '[m]easures of student engagement offer valuable indicators of educational quality.' Kuh et al. (2007, p. 10) go as far as to include students' 'engagement in educationally purposeful activities' as a part of the definition of student success, in addition to academic achievement.

For effective learning, it is crucial that students interact with the subject content (Xiao, 2017); passive learning has negative consequences for both motivation and concentration (Alsswey and Malak, 2024). Gamification, defined as 'the practice of making activities more like games in order to make them more interesting or enjoyable'

(Cambridge Advanced Learner's Dictionary & Thesaurus, 2025) has been shown to be an effective method of achieving meaningful interaction, increasing students' enjoyment of their learning and hence increasing levels of interaction with the materials (Heilporn et al., 2022). Activities which have a competitive element are particularly effective; students' intrinsic competitive natures drive them to engage more fully than a more passive experience of simply completing questions with no gamification involved (Alsswey and Malak, 2024).

In response to this, when re-designing Foundation Year Physics lectures into seminars whilst implementing a flipped learning approach, the use of Kahoot! was incorporated into most sessions.

Kahoot! is a platform through which easy-interface quizzes and polls can be created and played online. In a live session, the session lead controls the quiz via an online account, whilst players log on via a mobile device which is essentially turned into an answer pad, showing several coloured buttons, each corresponding to an answer shown on the main screen. As an alternative means of delivery, the quizzes can also be assigned for completion outside of sessions.

Kahoot! is a free application, but access is limited to the more basic functionality. For use of more varied questions and polls, different levels of subscription are available.

Session leads can either create their own questions or select questions or whole quizzes that have been shared by other Kahoot! users. With the advent of AI, if subscribing to a more advanced membership, users can generate quizzes automatically by uploading Word documents or PowerPoints.

There were several reasons why the Kahoot! platform was chosen to support the flipped learning approach. Firstly, its simple interface allowed for weekly quizzes to be easily written. Secondly, it can be accessed quickly by participants without the need for students to have an account or to give any personal details. This enabled use without a GDPR agreement, avoiding extra complications and saving staff time.

Thirdly, the format facilitates teaching without simply lecturing on materials that the students would already have covered in the pre-session videos. Lecturers are able to choose quiz questions on areas of the topic that from experience they know students would struggle with, then to explain the correct answer after each question, having supplementary diagrams on a PowerPoint or completing working for mathematical questions. Often an eight-question quiz can take an hour to complete, because a large amount of teaching and discussion is built into the process, with student engagement high throughout as they see the activity as a game, not as a lecture.

Lastly, and most importantly, the nature of the Foundation Physics cohort is such that it was important to choose a platform that was not just engaging and competitive but non-threatening, low stakes and confidence boosting. The cohort is very mixed, with roughly 50% of students having studied A-Level Physics and 50% not having studied Physics since GCSE. Of the students who have studied Physics to A-Level, some attained well and are taking the Foundation Year to make up for the lack of other subjects. These students need a more interesting approach to keep them engaged than simply being lectured on materials they have mastered in the past. The time-sensitive and competitive element of the questioning in Kahoot! keeps this part of the cohort engaged even if some of the questions would have appeared too easy to them if presented on a question sheet. For the students who have struggled with A-Level Physics or not studied it at all, the friendly, non-threatening format and the fact that Kahoot! only displays publicly the scores of the top three attaining players allows for engagement in a session where a more traditional discussion based approach would see their engagement plummet as they would not be confident enough to offer answers in the face of the more experienced students who dominate the discussion.

Discussion

Previously an entirely lecture-based module, with supplementary seminars, the foundation year 'Fundamentals of Physics' module was re-written to be delivered via a flipped learning method. This involved several short lecture videos posted at least a week in advance of the session, supported by pre-work, suggested pre-reading and practice question sheets. In the two-hour face-to-face session, a starter activity of a question based on the week's material was followed by a Kahoot! quiz of around 7-10 questions which usually lasted between 45 minutes and an hour. This was followed by one or two more example questions and the opportunity for students to ask for support with the weekly question sheets whilst others continued to complete them.

The aim of this change was to provide students with a more engaging learning experience, whilst having more opportunity to interact with peers and academics, with discussion and support with learning prioritised over didactic teaching.

Kahoot! was found to be a very versatile and user-friendly platform. From the perspective of ease of use during teaching sessions, the lecturer simply displays a code which the students input on the game login webpage and each student's device then becomes linked to the quiz. Any device with a screen and internet connectivity can be used, with each simply displaying a multiple-choice answer grid consisting of coloured answer buttons (each with a shape/symbol as well for accessibility).

Figure 1: Main Question Screen and Related Answer Screen (Kahoot! 2024)

As players use pin codes, they don't have to create profiles. This makes the start of the quiz very quick and simple, with no logging-in required, and, as mentioned before, negates the need for complicated GDPR agreements as no personal data is collected from the participants. Each student chooses a name to play under as they input the code. Students could choose inappropriate names, but as the names appear on the setup screen the lecturer can remove any that they deem inappropriate; the student is then required to choose another name to rejoin.

Question types include multiple choice, true or false, and completing a phrase or timeline by re-ordering components. If an upgrade to Kahoot! premium is purchased, typed answers, sliders and pin answer questions are also available. Further interest can be added by there being more than one correct answer or by an image appearing gradually (think 'Catchphrase'). The length of time participants have to answer each question can be chosen, ranging from 20 seconds up to four minutes.

What makes Kahoot! stand out from other quiz or polling platforms is the highly gamified, informal format. After each question a 'top three places' podium animation is shown, counting up from third to first place.

Figure 2: Main Podium Screen and Related Participant Screen (Kahoot! 2024)

There is often a real buzz in the room as the participants' names appear on the podium. A nice feature to add further to the competitive nature of the format is that the system does not just record that a student got the question right, but how quickly they gave the correct answer. Each student is assigned a score based on this time, which allows for greater differentiation on the scoreboard. Some literature indicates that this time-pressure element can lead to frustration due to getting answers wrong because of feeling the need to answer quickly, but this was only reported by a low proportion of students (Phelps and Moro, 2022).

Further to this, it has been observed in studies of gamification via quiz platforms that pressure caused by competitive gamification can lead to increased stress or nervousness (Głowacki et al., 2018). There has not been evidence of that within these sessions, or in verbal or written feedback. The majority of, if not all, students are engaged in the quizzes throughout. This lack of stress observed using Kahoot! specifically could be linked to the platform only showing the top three scoring participants, with lower ranked students not being displayed at any point, or potentially by the wording, level and overall time limits of the questions asked. Cooper et al. (2018) also wrote about the potential for anxiety linked to questioning via active learning. They found that, combined with the method of implementation of the activity, if the students' perception of the benefit of the activity is greater, the potential to cause anxiety is reduced, and the activity could even go as far as to lessen anxiety. They found this was not true for randomly selecting students to answer questions, which always increased anxiety.

In this case, the platform has been reviewed based on its uses in teaching Physics. This leads to quite a variety of questions, as some can be factual, explanations or definitions, and some are mathematical calculations. Questions that tend to work best on the platform are short, fact-based questions with answers that can be described simply and have reasonable distractor answers available. Examples that have worked well would be:

Single Select – Including a simple diagram makes a question much clearer and saves words in the question text. This question generated a lot of discussion as the diagram was presented in a different plane to the equivalent the students had already seen, enabling not just consolidation but supplementary teaching.

Q - Which one of the following would induce an emf in the coil below?

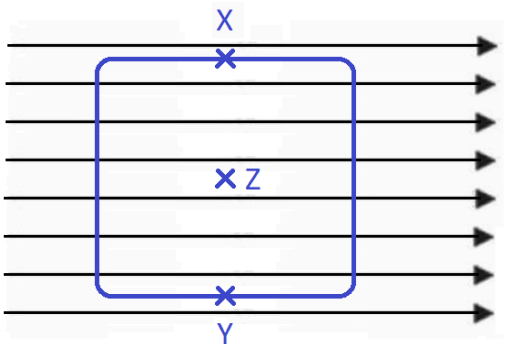

Figure 3: Diagram from single select example question

A - movement of the coil slightly to the left

movement of the coil slightly downwards

rotation of the coil about an axis through XY ☑

coil rotates in the plane of the coil about Z

Puzzle – Reorder to create the correct sentence, answer order is randomised when playing. This question was chosen to be presented in this way as a stepped response to answering this question and aids in recall and understanding the process.

Q - The process of a cyclotron accelerating a particle is...

A - the particle enters in the centre and is accelerated

across the gap between the Ds by the electric field. Its path is curved

because of the magnetic field and so moves in a circle. The radius increases

each time it crosses the gap as it is accelerated more each time

Multi Select – The students do not know how many answers are correct, leading to a higher level of thinking than just selecting one. In this case, a diagram of the relevant equation which was gradually revealed was also used to support weaker learners.

Q - Which units could correctly be used for magnetic flux density?

A - $N.A^{-1}.m^{-1}$ ☑

$kg.A^{-1}.s^{-2}$ ☑

T ☑

Wb

Mathematical questions can also be set, with a selection of different answers. A drawback is that these questions require a longer time limit, sometimes up to the four-minute maximum, which means that students that answer faster are not able to move on and need to wait for all students to answer. Also, when teaching higher level Physics, a time limit of four minutes would not be enough to tackle a mathematical question, restricting the platform to assessing more simple questions.

One of the main benefits found whilst using Kahoot!, aside from increased student engagement, is being able to gain live feedback on the cohort's understanding of the material being covered. Hanus and Fox (2015) discuss how gamification allows for real-time feedback on student understanding, providing immediate identification of areas where additional lecturer input is needed. This has been true of Kahoot!; the platform displays the cohort's answers (A-D for example) as a bar chart, so the lecturer can see not only the number of students who answered correctly, but how many chose each of the distractor answers.

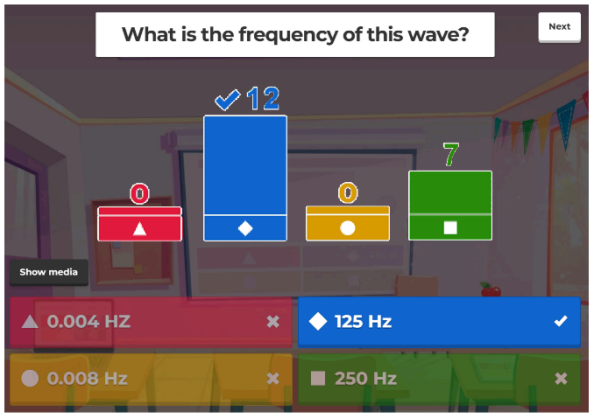

Figure 4: Result Screen (Kahoot! 2024)

Owing to the way the platform has been used, with a large part of the sessions built around the quiz, lecturers have not only been able to observe live feedback but have been able to act upon it immediately. After a question which is answered poorly by a significant proportion of students, a run-through of that question is delivered, including a thorough discussion of the theory and, if appropriate, full mathematical working out. The system allows for any diagrams displayed with the question to be re-shown for discussion, and there is no time limit before progressing to the next question so discussing as a group can continue until there are no more student queries.

A tangible pedagogical benefit of this approach has been that the most useful content to deliver in the session can be judged on the spot depending on student responses to the questions; the better the success rate of the question the less time is spent on it in discussion. This has a very positive impact on student engagement, as the content is tailored directly to what they need to spend time on, and they feel greater relevance and hence benefit from the time spent in sessions. In addition, observation of which distractors students choose can allow for identification of and discussion around misconceptions. These misconceptions can be much harder to pick up in general discussion, as often only students who are confident in their answer offer to contribute, so misconceptions are not always voiced. When all students need to choose an answer, and it is anonymous, it gives a much clearer picture of how many students are making common misconceptions.

In addition to this, the platform creates a report after the completion of the quiz. This provides information on the overall average number of questions answered correctly and which questions it deems more difficult, alongside the percentage of students scoring correctly on them. This allows for specific consolidation in a future session targeted directly at areas of weakness; the system itself has the functionality to create a new Kahoot! quiz including only these more difficult questions if direct repetition would be useful. The report also lists students it recognises as needing support, based on their overall percentage score, as well as a list of students who did not finish the quiz. The only barrier to utilising this information is that with student-chosen display names, it is not always obvious which student the report refers to.

One drawback of the platform is the character limit when writing both questions and answers. A way around this can be to upload the text of the question as an image, but this cannot be done for the answers. When approaching the maximum character limit for the answers it can also lead to the font size decreasing to a point where students towards the back of the room find it difficult to read.

Impact

Feedback from our student cohort via anonymous module questionnaire demonstrates the positive impact that the use of Kahoot! and 'entertaining aspects' in general had on student engagement and learning, with several responses demonstrating a level of self-reflection and awareness of the benefits of the gamification approach:

> 'The resources used to help us learn… with kahoot to put our new knowledge to use to reinforce the lecture'

> 'I liked kahoot it helped me learn'

> ‘Kahoot is good’
>
> ‘Kahoot: The explanations after each question are very helpful and kahoot is an entertaining format that grabs my attention’
>
> ‘Tutors included entertaining aspects to the teaching in order to maintain concentration.’

These comments were made in response to the question: ‘Things I enjoyed about this module and why…’ rather than a direct question about whether they found Kahoot! enjoyable. Students have justified their enjoyment in relation to its benefits for their learning, content reinforcement, attention and concentration.

A word cloud generated based on all module evaluation responses (Figure 5) indicates how strongly Kahoot! was referenced in the overall feedback:

Figure 5: Word cloud based on all module evaluation responses.

In addition to the comments, when mid-module ‘Keep, Stop, Start’ surveys were taken, eight of 21 responses directly requested more Kahoot! (with another three alluding to it), with only one ‘stop’ response for it.

One ‘Keep, Stop, Start’ comment illustrates the value that the students gave to the Kahoot quizzes:

> ‘[Start] - Posting the kahoot questions and answers on blackboard at the end of the seminar’

The students were keen to have access to the questions after the session to further consolidate their learning. In response a PDF version of the quiz was uploaded onto the module virtual learning environment site for the students’ reference. This is easy to do, by selecting to print the quiz directly from the website and then saving as a PDF.

There is always the concern that over-use of gamified quizzes, especially on a single platform, can lead to a lessening of student engagement. Yabuno (2019) found that students recommend the use of Kahoot! on no more than a weekly basis.

In this module students were directed to sign in to Kahoot! at the start of the activity, but no checks were made to ensure all had done so. Due to some joining in pairs comparisons of session attendance to numbers participating in the quiz do not directly match up. Visual inspection of the cohort and student engagement in the discussions surrounding the questions showed that the vast majority of the students present were engaged throughout the activity. The sign-in data also indicated that using Kahoot! once a week led to no decline in engagement with the system. Over the first seven weeks, the number of students signing up at the start of the game fluctuated but remained similar as shown in Table 1.

Week Number	Number of Students
1	38
2	30
3	33
4	37
5	32
6	33
7	35

Table 1: The number of students signing up at the start of each Kahoot! game over the first seven teaching weeks, academic year 2022-23

Although on occasion a student might stop engaging with the quiz before the end of the session, this was rare. The system indicates continued participation as it gives a live total of how many students have answered each question, and when all students have answered it will move on to the result of that question even if the time limit has not expired.

The module evaluation feedback discussed above also supports the conclusion that the majority of students were happy to be using the platform weekly without loss of engagement.

Reviewing the success of the introduction of Kahoot! more holistically, in conjunction with the introduction of the flipped learning approach, it was clear that the most popular part of the change was the use of Kahoot!. Student engagement with watching lecture videos before the sessions was low; although the students who used the videos praised the content and clarity, they tended to watch them later as consolidation, or as

a part of their revision, and some students chose not to watch them at all. In addition, in seminars where Kahoot! was not used and the main focus of the session was to answer question sheets in a supported environment, student engagement was noticeably lower, with some students using their phones rather than answering questions and some leaving the session entirely.

Wider Uses

Although this article has focused on one specific use of Kahoot!, as a quiz platform for individual student participation within teaching sessions, the platform has a variety of other ways in which it can be used.

Firstly, it has the functionality for the quizzes to be assigned, rather than completed live within sessions. This allows for a similar experience but without the competitive nature if the question timer is still applied, but also for a slower completion if the option to remove the question time limit is selected. Used in this way Kahoot! essentially becomes a digital question platform.

As the platform is free and simple to use, a common way to utilise it is to assign students the task of writing quizzes for their peers. Literature demonstrates the efficacy of student creation of quizzes; in Patenaude and Scott's (2022) study 81% of student participants thought that 'the writing of questions and course structure improved their educational experience' (p. 1). Blankenship (2024, p. 1) found that students 'reported a deeper understanding' after group creation of questions which were then collated into a Kahoot! quiz for the whole cohort.

Kahoot! can also be used for creating polls, for example allowing students to select which topics from a provided list they would like to cover in a revision session. One example of Kahoot! being used in this way explored its use in hybrid-delivered courses and concluded that it improved engagement and enhanced learning for both face-to-face and distance learners (Phelps and Moro, 2022).

Another system feature is the option to run the quiz in 'team mode'. This requires several players to use a single device between them and to collaborate on the answers. It is advisable to assign longer timeframes for each question to allow time for discussion when playing in teams. Encouraging students to work together in this way increases collaboration between students, forming relationships which extend beyond the gamified activity, enhancing collaboration in other aspects of their studies (Alsswey and Malak, 2024).

Conclusion

Well designed and implemented Kahoot! quizzes have been shown to increase student engagement with learning activities. Student feedback supports the use of the platform, with students reporting finding the quizzes enjoyable and recognising the benefits of both increased concentration and understanding of the material covered. Although overuse of the same platform can begin to negatively impact engagement, weekly use of Kahoot! has been shown to still hold students' interest. Potential increased student anxiety due to the competitive nature and time limitations in gamified quizzes seems to be limited when using Kahoot!.

References

Alsswey, A. and Malak, M.Z. (2024) Effect of using gamification of "Kahoot!" as a learning method on stress symptoms, anxiety symptoms, self-efficacy, and academic achievement among university students. *Learning and Motivation*, 87.

Blankenship, J.K. (2024) Student-created practice quizzes: a teaching strategy to engage learners in critical thinking. *Teaching and Learning in Nursing*, 19(1) e242.

Cambridge Advanced Learner's Dictionary & Thesaurus (2025) *Meaning of gamification in English.* Cambridge: Cambridge University Press. Available from https://dictionary.cambridge.org/dictionary/english/gamification [accessed 27 February 2025].

Cooper, K.M., Downing, V.R. and Brownell, S.E. (2018) The influence of active learning practices on student anxiety in large-enrollment college science classrooms. *International Journal of STEM Education*, 5(1).

Głowacki, J., Kriukova, Y. and Avshenyuk, N. (2018) Gamification in higher education: experience of Poland and Ukraine. *Advanced Education*, 5(10), 105–110.

Hanus, M.H. and Fox, J.F. (2015) Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education*, 80, 152-161.

Heilporn, G., Lakhal, S. and Bélisle, M. (2022) Examining effects of instructional strategies on student engagement in blended online courses. *Journal of computer assisted learning*, 38(6), 1657-1673.

Kahoot! *Example Screenshots* (2024). Available at: https://play.kahoot.it/v2/?quizId=23bad45d-ddd2-408e-a2f9-60d1b6ed63ae&hostId=a57d06ac-5f21-4b4d-9d5d-04da7e0106f2ot! [accessed: 9 October 2024].

Kuh, G.D., Kinzie, J. and Buckley, J.A. (2007) Piecing Together the Student Success Puzzle: Research, Propositions, and Recommendations. *ASHE Higher Education Report,* 32(5) 1–182.

Kuh, G.D., Cruce, T. M., Shoup, R., Kinzie, J., Gonyea, R. M. (2008) Unmasking the Effects of Student Engagement on First-Year College Grades and Persistence. *The Journal of Higher Education,* 79(5), 540–563.

Manwaring, K.C., Larsen, R., Graham, C.R., Henrie, C.R. and Halverson, L.R. (2017) Investigating student engagement in blended learning settings using experience sampling and structural equation modelling. *The Internet and Higher Education*, 35, 21-33.

Montenegro-Rueda, M., Fernández-Cerero, J., Mena-Guacas, A.F. and Reyes-Rebollo M.M. (2023) Impact of Gamified Teaching on University Student Learning. *Education Sciences*, 13(5) 470.

Patenaude, B. and Scott, J. (2022) Student created quizzes to reinforce critical information and highlight deficits for both the students and instructor. *The FASEB Journal,* 36.

Phelps, C. and Moro, C. (2022) Using live interactive polling to enable hands-on learning for both face-to-face and online students within hybrid-delivered courses. *Journal of University Teaching & Learning Practice*, 19(3).

Robinson, C. C. and Hullinger, H. (2008) New Benchmarks in Higher Education: Student Engagement in Online Learning. *Journal of Education for Business*, 84(2), 101–109.

Sinatra, G. M., Heddy, B. C. and Lombardi, D. (2015) The Challenges of Defining and Measuring Student Engagement in Science. *Educational Psychologist,* 50(1), 1–13.

Xiao, J. (2017) Learner-content interaction in distance education: The weakest link in interaction research. *Distance Educ.* 38, 123–135.

Yabuno, K., Luong, E., and Shaffer, J. F. (2019) Comparison of traditional and gamified student response systems in an undergraduate human anatomy course. *HAPS Educator*, 23(1), 29.

Acknowledgements

I would like to thank the University of Lincoln Science Foundation Year staff for their continuous collegiality and support, as well as the Foundation Year Physics students for engaging so well with the Kahoot! platform and making the sessions both productive and enjoyable to run.

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