

## **Kahoot! for Game-Based Learning in Undergraduate Course Review Settings**

The classroom can be a great venue for undergraduate students interested in similar subjects to develop connections. We were interested in using a game-based learning approach in a course content review setting, because we thought it would motivate students to learn the concepts at a deeper level. Rather than passively listening to a lecture or answering questions individually in a seminar format, students would all be required to assess their knowledge on a question-by-question basis. Many researchers have identified a positive effect of competitive gaming on students' knowledge retention. Described below is how this technique can be used in undergraduate, science-based curricula.

Game-based learning platforms such as Kahoot! (Kahoot.it, Oslo Norway) can be used to create and administer the review game. Kahoot! offers both free and optional paid subscriptions for users to use different question types. A downloadable Excel (Microsoft Corporation, Redmond, WA) spreadsheet template is provided by Kahoot! to create a game and can save a teacher considerable time in formatting questions. The review game creator can change question type, time limit, as well as even the music that students will hear during the competition. An example of the quiz question in Kahoot! is shown in Fig. 1 below. When administering the game, it is essential for teachers to budget time after review game questions to reinforce concepts by asking students to explain their answers to each question in the review game. For example, after each question, the instructor should ask the winners of that round to explain why they chose the correct answer. Without this step, there may not be an opportunity for students to correct their association with the concept tested. There is also the option to anonymize students so that they do not know who is winning in the game, though this may lead to less active participation. Students' learning can be evaluated using a pre-and post-test with a same set of questions testing students' understanding of the topics covered in the review game.

When using this technique in a soilless crop production undergraduate course, students were excited to interact with one another in the review game and indicated through informal conversations that they enjoyed this type of class format. Students enjoyed their experience with the review game and were fully immersed because many used their cell phones to play the game. These students could not have been using their phones for non-academic work because Kahoot! records which students respond to questions. This fact, on top of the competitive nature of the game, incentivizes active participation in the review game. Additionally, students were eager to explain their knowledge if they answered correctly and reacted passionately when the answers were revealed. This Kahoot! review game provided for an entertaining and effective learning experience.

Additionally, in the post-pandemic classroom, there may be more opportunities for web-based learning. Kahoot! games are web-based by nature and could make for meaningful review, especially for students that cannot attend class physically. Remote learning can also be used for students that miss a review game, because Kahoot! games can be assigned to individuals and students can even play against a computer opponent. Students could also be assigned Kahoot! games periodically and could be incorporated by teachers into their lesson plans to focus on the key concepts of an examination or a particularly nuanced topic at specific times over the course of a semester.

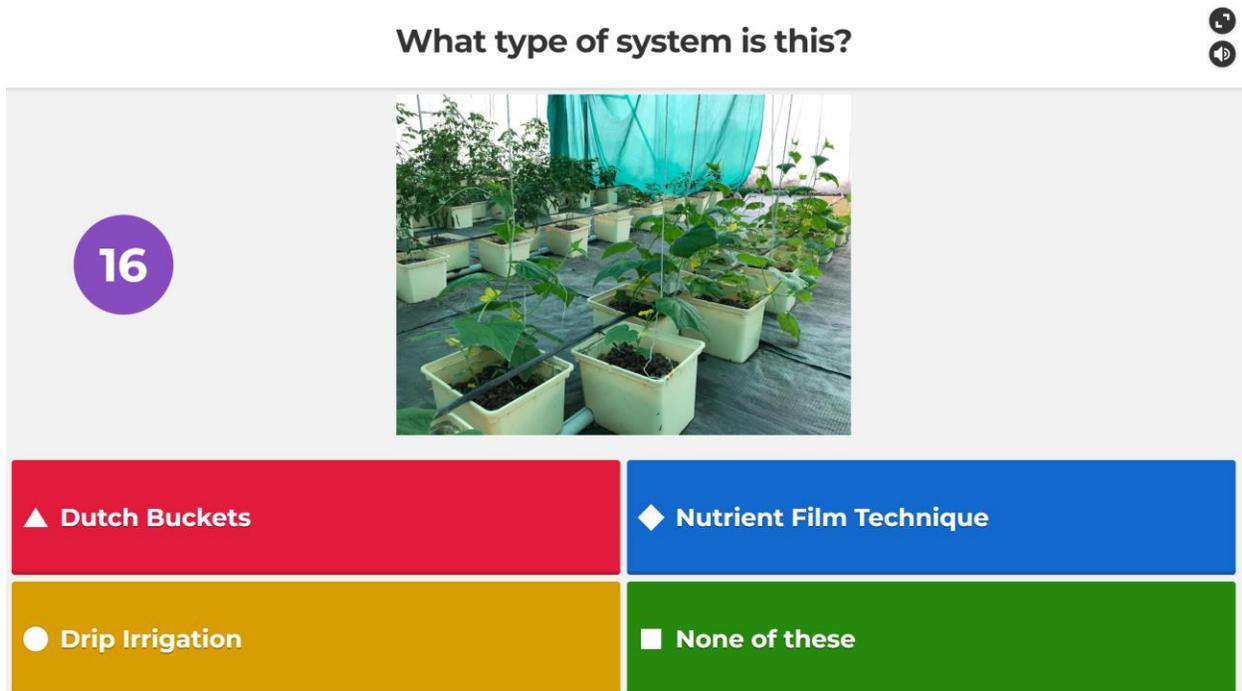


Fig. 1. Screenshot of a quiz question on Kahoot!.

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