«Kahoot!» as a tool for adjusting teaching to match students' knowledge level and promoting active learning in a lecture setting

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1. Background

As a teacher I have always preferred an interactive teaching style, engaging the students in varied learning activities, including class discussion facilitated by the use of the blackboard, group reflections, and think-pair-share discussions – in other words strategies promoting active learning (Holmes, Tracy, Painter, Oestreich, & Park, 2015). January 2016 I started in a position as an associate professor at the Department of Clinical Psychology at the University of Bergen. Having studied to become a psychologist at the University of Oslo and completed my PhD at the University of Tromsø I had to familiarize myself with the construction and progress of the professional studies in psychology at the University of Bergen, so that I could adjust my teaching to the students' levels of knowledge.

Moreover, as of autumn 2016 there will be a substantial change of intake procedures to the professional studies in psychology at the University of Bergen, going from a model of 1+5 year program to an integrated 6 year program with intake directly from high school. As part of this transformation, the student group will increase from 40 to 90 students the first four semesters. Being responsible for two out of four preparatory clinical courses in the first four semesters I found myself searching for ways to maintain an interactive teaching style also in groups of 90 students.

2. Technical helping aids to promote active learning

Over the past years several technical aids promoting active learning have been developed, ranging from interactive learning platforms used to communicate with students, making assignments, making power point presentations and other learning material available (e.g. Fronter and Canvas) to aids applied directly in the teaching situation, that is, student response systems like clickers, Kahoot!, and Socrative. The use of student response systems has increased rapidly in higher education (Kay & LeSage, 2009), even though initially more so in the natural sciences than in the social sciences (Strømsø, 2014). This might relate to the types of questions and responses suited to the use of clickers. Research has further shown that students often report that they like the use of, for example, clickers (Krumsvik & Ludvigsen, 2012; Mayer et al., 2009). More importantly, studies indicate that clickers can help students learn more in lectures (Campbell & Mayer, 2009; Deslauriers, Schelew, & Wieman, 2011; Mayer et al., 2009).

While some research indicate that clickers might improve student learning, the literature of why this is so is scarce. Strømsø (2014) reviewed the literature attempting to suggest the learning theoretical background for the research findings suggesting that clickers promote student learning. Using questions as an integrated part of a lecture, might, for example promote learning and students' ability to transfer knowledge to new situations. Questions asking students to explain something might trigger students' "self-explanation", which again is associated with better learning. Strømsø (2014) concluded that the way questions are formulated, the type of feedback provided, and the use of small group discussion are critical elements in making clickers effective in promoting learning in a lecture setting.

It should be noted that the efficacy of lectures to promote learning has been on a more general basis (Hernes & Letrud, 2009). Lectures have, however, been at the core of teaching

in higher educations for centuries, and it seems they will continue to constitute a substantial part of teaching in higher education in the years to come. The question of how to increase the efficacy of lectures to promote student learning is therefore important. Ways to integrate active learning in a lecture setting with a large group of students is therefore an important one – and part of my current quest – and student response systems have been suggested to have this effect (Strømsø, 2014). I therefore decided to try out Kahoot! as a possible tool to for adjusting my teaching to match the students' knowledge level, and to promote active learning in a lecture setting.

3. Kahoot!

Kahoot! is a free game-based digital learning platform that is available online (https://getkahoot.com/). It is intuitive and engaging, and the teacher can design quizzes, surveys, etc. in advance. The students then get a game pin number to join a specific game, and they can use their mobiles or computers to log in. The questions and responses are shown immediately, and the results can be saved. Kahoot! is therefore an available, free, quick, and potentially fun way to assess students' knowledge level, and potentially a useful tool to increase interaction in a lecture setting.

Kahoot! has become increasingly popular in a variety of settings, ranging from primary school, bar quizzes, to lectures in higher education, and have been found to be engaging and motivation, thus promoting learning. There has been some concern whether this popularity will carry with it a wear off effect. Wang (2015) hence carried out a quasi-experimental design, comparing students who were exposed to Kahoot! in a single motivational lecture versus students where Kahoot! was used in every lecture for five months. Results indicated that the competitive nature of Kahoot! buffered against a wear off effect.

Kahoot! therefore seems like a promising tool to adjust teaching to students' levels of knowledge, and in promoting active learning in a lecture setting.

4. Giving it a try – experiences of using Kahoot! in a lecture settings

4.1 The task ahead

This spring I was going to teach in the psychopathology course at the first semester of the 5 year program of professional studies of psychology (that is, the old model of 1+5 years). The course is supposed to be an introduction to psychopathology and psychological treatment, and the students have 2 hour lectures covering the most common psychological disorders. The lecture was therefore relatively short (2 hours), and was supposed to cover the basics. The students (N=42) had, however, had some introduction to psychopathology as part of the one year program forming the foundation for their intake to the 5 year program. I was therefore very uncertain about their knowledge level. I therefore decided to use Kahoot! in this setting – to get a tool to help me adjust my teaching. Moreover, I wanted to try out Kahoot! as a tool for increasing student activity in a smaller group before applying it in the 90 student group this autumn.

4.2 The intervention

I decided to use Kahoot! in relation to the 2 hour lecture on affective disorders. At the end of lecture prior to the target lecture, students were asked to complete a Kahoot!-quiz about affective disorders. I used this as an indicator of the student level of knowledge, thus an aid in my planning of the lecture on affective disorders.

The students then got an element of flipped classroom, where they were asked to watch two short videos about depression and bipolar disorder at home, prior to the lecture on affective disorders.

Finally, at the end of the lecture on affective disorders students were asked to complete the same Kahoot!-quiz as earlier. This time students got feed-back on the correct answer to each question. I had also included a few questions evaluating the students' perceived learning outcome, and the role of Kahoot! in this.

4.3 The result

4.3.1 Kahoot! as an aid in adjusting teaching to match students' level of knowledge

Prior to the lecture on affective disorders none of the students knew the answers to all the questions in the quiz and 53% of the students reported having limited knowledge about depressive and bipolar disorders. 80% of the students reported scholarly literature as their primary source of knowledge. Based on this I decided to start with fairly fundamental knowledge, and use varied sources of information in my lecture, ranging from tapping and confirming the students' existing knowledge, conveying information through traditional power-point-supported lecture, and using videos as a starting point for group discussion and think-pair-share discussions.

At the end of the 2 hour lecture on affective disorders only 21.4% of the students reported having limited knowledge about depressive and bipolar disorders and 9 out of the 28 students participating in the quiz knew the answers to all the questions.

4.3.2 Kahoot! as a tool to promote active learning in a lecture setting

The first introduction of the Kahoot!-quiz led to an instant boost of energy in the class room, and students were clearly involved – standing up to properly see the questions and response alternatives, and there was laughter and a good atmosphere. The second time the element of novelty was gone, but still students were involved and there was a good atmosphere. As we saw above, the students' level of knowledge on the topic also increased as a result of

preparation to the lecture and attendance at the lecture. But did Kahoot! have anything to do with it?

Asking the students to which degree the quizzes motivated them to learn more, 64% of the students responded that this was the case, while only 10% disagreed.

5. Discussion

My starting point when deciding to try out Kahoot! in a university lecture setting was that I, as a teacher, was in a position where I was uncertain of the knowledge level of my students. I was going to have one shot at providing them with information and activity that resulted in them learning something about important psychological disorders. Moreover, I only had 2 hours (or in reality 90 minutes active working time) to provide them with this. The students had just started on their 5 year program in professional studies of psychology, and they had struggled to get in. Many of them had completed the one year preparatory course on which intake was decided several times. As a teacher, and a new associate professor at the university, I therefore had a strong motivation to provide the students with a good lecture that met their level of knowledge and could build and expand on this knowledge base. So how could I obtain this?

Using a Kahoot!-quiz at the end of the lecture prior to the target lecture was in theory a free, quick and easy way to tap students' knowledge base. In praxis Kahoot! also delivered. It was easy to construct the quiz in Kahoot!, and students did not have any problem accessing the game. It also engaged the students, so it did not seem that this way of accessing their base-line knowledge level put any strain on them.

From a teacher perspective having the results from the quiz was a very helpful tool in planning my lecture on affective disorders. From a student perspective, 64% of the students reported that the quizzes motivated them to learn more. Moreover, the results show that the

students in fact increased their understanding and knowledge on affective disorders from T1 to T2. This indicates at least a partial match between the lecture and students' knowledge level. Based on this, it seems Kahoot! might in fact be a useful tool for adjusting teaching to match students' knowledge level, and that students to find such quizzes useful.

As a teacher I found myself not completely satisfied, though. This related in large to the mismatch between the kind of knowledge and learning outcome I wanted to promote, and the types of questions suited for quizzes in student-response systems, like Kahoot!. As a psychologist I was keen to promote students' understanding of the phenomenology of affective disorders, how clients experience the symptoms, how significant others experience being close to someone struggling with affective disorders, as well as promoting students' reflection on the tension between the diagnostic categorization of symptoms and the phenomenology of mental disorders. As Strømsø (2014) point to, the type of questions asked is not irrelevant to the learning outcome for students, where questions promoting reflections and independent thinking are associated with better learning. It is, however, not easy to formulate multiple choice questions that promote and tap this type of knowledge – hence my dissatisfaction.

In this lecture on affective disorders, my style of teaching was interactive. I drew from many different sources of information, and students were involved in varied learning activities, ranging from tapping and confirming the students' existing knowledge, conveying information through traditional power-point-supported lecture, and using videos as a starting point for group discussion and think-pair-share discussions – aiming at promoting more awareness and reflection on the more phenomenological aspects of affective disorders. However, Kahoot! did not play a role in these attempts at promoting active learning. This partly related to the above discussed difficulties in tapping and promoting the type of

knowledge I wanted within the possibilities of multiple choice, partly that the group of students was small enough to ensure interactivity without the aid of student response systems.

Part of my reason to try Kahoot! in a university lecture setting was, however, the planned increase in student group size. Facing the task of teaching 90 students in a large auditorium, my traditional use of blackboard and involving students with questions and response will not be sufficient to ensure interactivity and active learning among all students. I was therefore still searching for a student response system that could enable me to carry on my style of teaching even in a large auditorium.

As Strømsø (2014) shows in his overview of existing literature, the use of small group discussions coupled with questions promoting students' ability reflection, and appropriate response are important elements to promote student learning in a lecture setting – and student response systems can be a useful tool for this. I therefore found myself looking for a student response system that would allow me to use the questions I found most useful, while still being able to use small group work and provide students with feedback – and Kahoot! was not it. I could continue to use think-pair-share discussions in a large auditorium with 90 students. Without a student response system I would, however, struggle having all groups contributing to the discussion, so that I could provide feedback and involve as many students as possible in the discussions and reflections.

My search led me to Socrative (http://www.socrative.com/). Similar to Kahoot! it is a game-based digital learning platform, in many ways very similar to Kahoot!. Socrative has, however, a function that will allow me to uphold an interactive teaching style also in a large auditorium-based lecture. Through the function "short answer" I can ask small groups to sit together, solving a problem then writing their answer into Socrative. All the groups' answers will then display on the teacher's screen. If linked to a projector, then all students will see all the groups' answers. So far so good. The make or break lies in the possibility to then make a

poll based on the groups' answers. In this way interaction and response is ensured, as well as the ability to work in small groups and a wider range of questions types. I have therefore decided to test Socrative as a possible tool to promote active learning in a large lecture setting when I teach the new students this autumn.

Conclusion

Kahoot! is an available, intuitive, engaging and free tool that is largely helpful in planning teaching because it allow you to quickly tap the students' knowledge level in a way that students find motivating. There is, however, some limitations to the types of questions suited for Kahoot! games. Moreover, Kahoot! is a less useful tool in promoting active learning in a large lecture setting, particularly relating to the possibility to provide feedback on more complex, reflection based questions. Socrative, a similar student response system, seems promising in fulfilling important elements in promoting active learning in a large lecture setting in clinical psychology – particularly through the function "short answers". This autumn I will test Socrative as a possible tool to uphold an interactive teaching style in a large group of students.

6. References

Campbell, J., & Mayer, R. E. (2009). Questioning as an instructional method: Does it affect learning from lectures? *Applied Cognitive Psychology, 23*(6), 747-759. doi:10.1002/acp.1513

Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved Learning in a Large-Enrollment Physics Class. *Science, 332*(6031), 862-864. doi:10.1126/science.1201783

Hernes, S., & Letrud, K. (2009). Læringspyramiden – en undersøkelse av opphav, utbredelse og gyldighet. *Uniped, 32*(2), 30-43.

Holmes, M. R., Tracy, E. M., Painter, L. L., Oestreich, T., & Park, H. (2015). Moving from Flipcharts to the Flipped Classroom: Using Technology Driven Teaching Methods to Promote Active Learning in Foundation and Advanced Masters Social Work Courses. *Clinical Social Work Journal, 43*(2), 215-224. doi:10.1007/s10615-015-0521-x

Kay, R. H., & LeSage, A. (2009). Examining the benefits and challenges of using audience response systems: A review of the literature. *Computers & Education, 53*(3), 819-827. doi:http://dx.doi.org/10.1016/j.compedu.2009.05.001

Krumsvik, R. J., & Ludvigsen, K. (2012). Formative E-Assessment in Plenary Lectures. *Nordic Journal of Digital Literacy, 7*(1), 36-54.

Mayer, R. E., Stull, A., DeLeeuw, K., Almeroth, K., Bimber, B., Chun, D., . . . Zhang, H. (2009). Clickers in college classrooms: Fostering learning with questioning methods in large lecture classes. *Contemporary Educational Psychology, 34*(1), 51-57. doi:http://dx.doi.org/10.1016/j.cedpsych.2008.04.002

Strømsø, H. I. (2014). «Klikkere» i forelesningen: Bidrar det til læring eller er det bare morsomt? *2014, 37*(2). doi:10.3402/uniped.v37.22465

Wang, A. I. (2015). The wear out effect of a game-based student response system. *Computers & Education, 82*, 217-227. doi:10.1016/j.compedu.2014.11.004