Evaluating the Effectiveness of Learning Technologies in Improving Student Engagement and Learning

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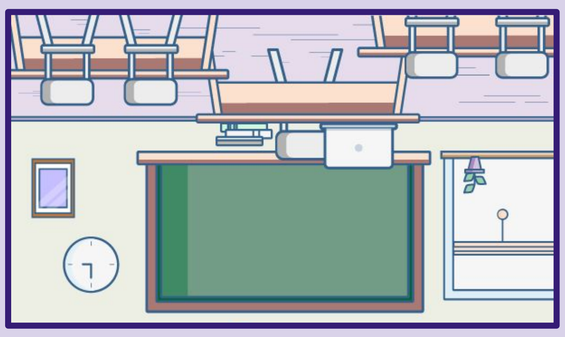
Abstract

This study presents lesson- and course-level evidence for the effectiveness of learning technologies in enhancing student engagement and learning. E-learning tools such as Google Classroom, Google Slides, Kahoot!, and Edpuzzle were used to design and facilitate blended learning and flipped classroom activities in four undergraduate marketing courses. In each activity, information such as participation rates and on-time submissions were collected to illustrate the level of engagement of the students. In addition, an analysis of the students' performance in flipped classroom activities showed that watching a particular flipped video before class had a small to medium positive effect on the performance of students in a related in-class e-learning activity. At the course level, qualitative data for engagement and performance were collected using focus groups at the end of one course. In these focus groups, the informants mentioned that they found the teaching and learning activities to be convenient and that they felt it allowed them to have more meaningful interactions and to learn more effectively. These findings were supported by how students used words such as "interactive," "encourage," "interesting," and "better understanding" in the teaching evaluation questionnaire to describe their level of engagement and learning in the course. Finally, analyzing the teaching evaluation scores in items related to engagement and learning were found to be significantly higher (and with effect sizes between medium and high) for the cohort that extensively used learning technologies compared to the the previous cohort that did not use these tools.

Teaching Methodologies

- **Blended Learning**
  - "The thoughtful integration of classroom face-to-face learning experiences with online learning experiences." (Garrison & Kanuka, 2004)

- **Flipped Classroom**
  - "Inverting the classroom means that events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa." (Lage et al., 2000)



Learning Technologies

Google Classroom

Kahoot!

edpuzzle

Google Slides

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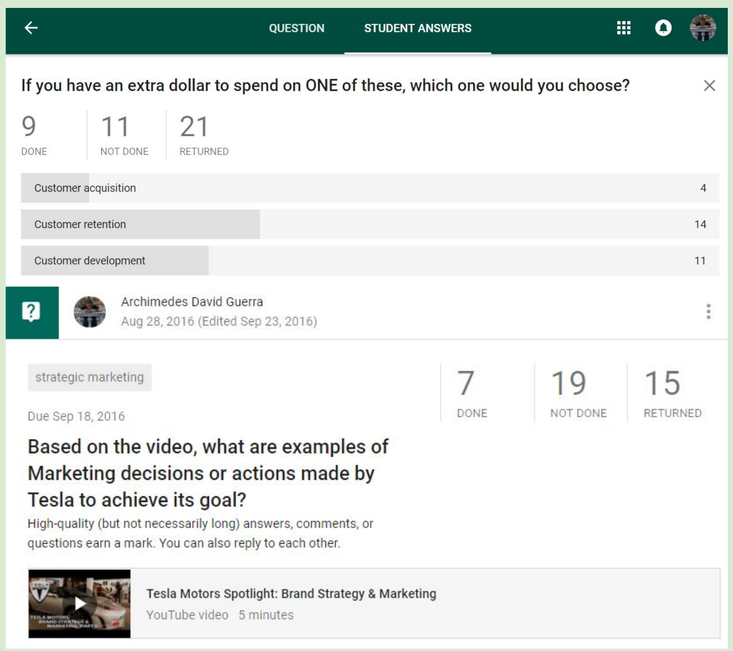
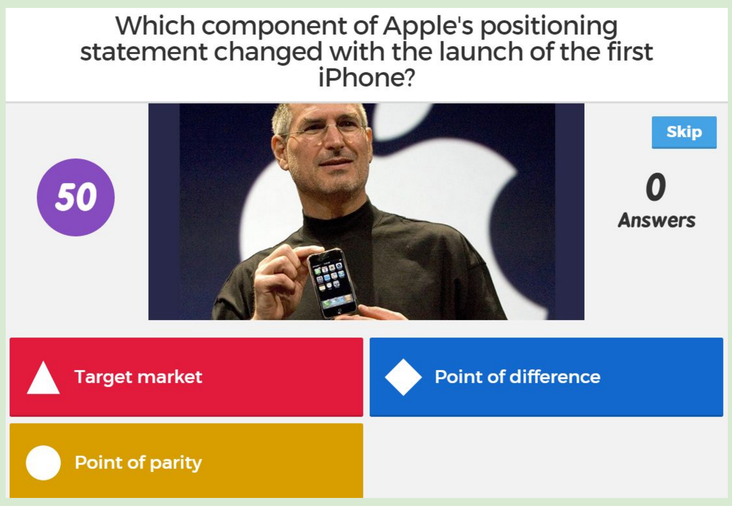
Learning Activities

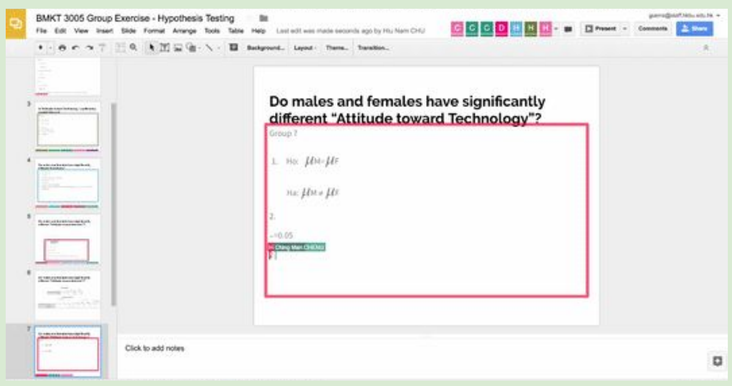
Online MC and essay questions on Google Classroom



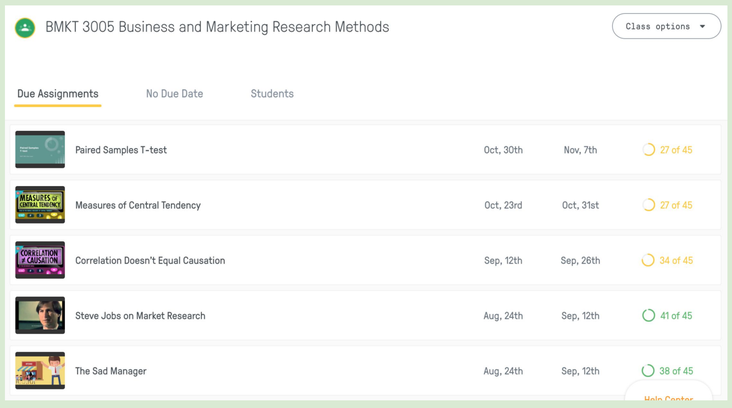
Group and individual Kahoot! games

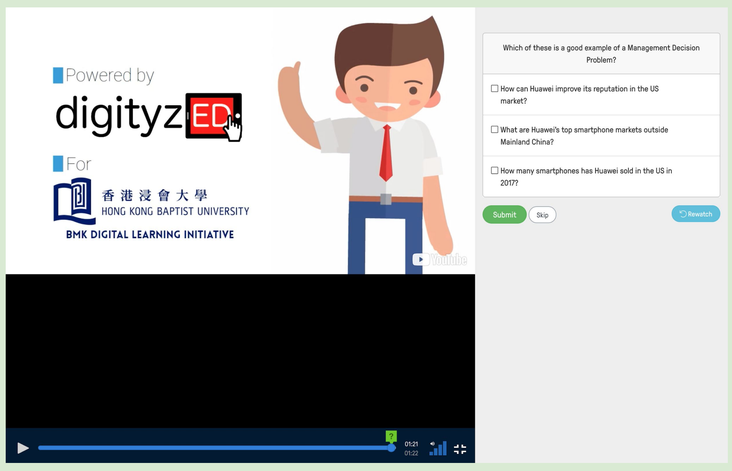


Collaborative learning activities on Google Slides



Flipped videos on Edpuzzle

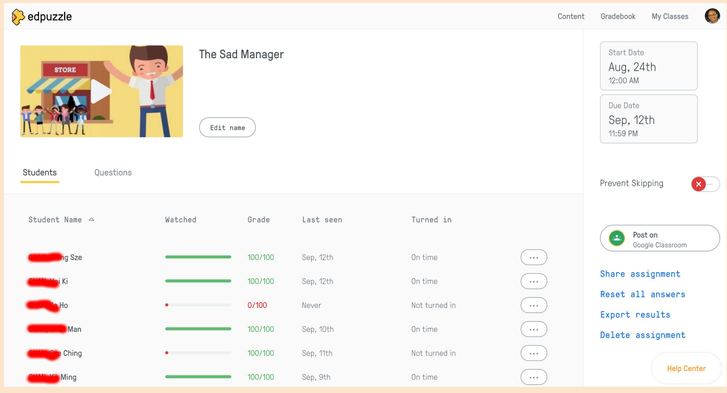




Evidence for Engagement

Participation Rates

Poll/Multiple Choice Questions using Kahoot and Google Classroom	79%
Reflective Questions on Google Classroom	85%
Reflective Questions for a Youtube Video on Google Classroom	54%
Student Feedback, Questions, or Comments on Google Classroom	64%
Student Feedback, Questions, or Comments on Padlet	58%
Collaborative Learning Activities using Google Slides	100%



Qualitative Feedback

From focus groups:

- **Convenience** *(It is convenient for me to use my phone to type, even compared with using paper.)*
- **Interactions** *(The apps are good because we can use them to interact with each other and the teacher online.)*
- **Opportunity to contribute** *(Google Slides is effective because we can all edit the presentation at the same time during class.)*
- **Preference for mobile technology** *(I prefer using my phone and sometimes my tablet when working on class activities.)*
- **Effectiveness of learning** *(Using Google Classroom helps learn better compared to Moodle; I am motivated to learn more because I want to perform better than other groups.)*

Student comments from the 2015-16 teaching evaluation (control group: minimal use of learning technologies:

- *lecturer introduced some new method of presentation*
- *Class activities help me to understand the theories very much. We have well interaction between students and also teacher.*
- *Good interaction in class*

Student comments from the 2016-17 teaching evaluation (treatment group: extensive use of learning technologies:

- *High interactive during the lesson, it able students to exchange mind and discuss instantly*
- *use classroom* (presumably Google Classroom)
- *Kahoot game is very interesting for me. And the Google classroom is a good apps for student to study.*
- *interactive class activities*
- *Good use of Google classroom and Kahoot*
- *Kahoot! game can encourage case reading.*
- *Use technology to facilitate the lesson.*
- *I love Kahoot game.*
- *Class activities (Kahoot) are interesting and helping me to have better understanding on the courses*

Evidence for Learning

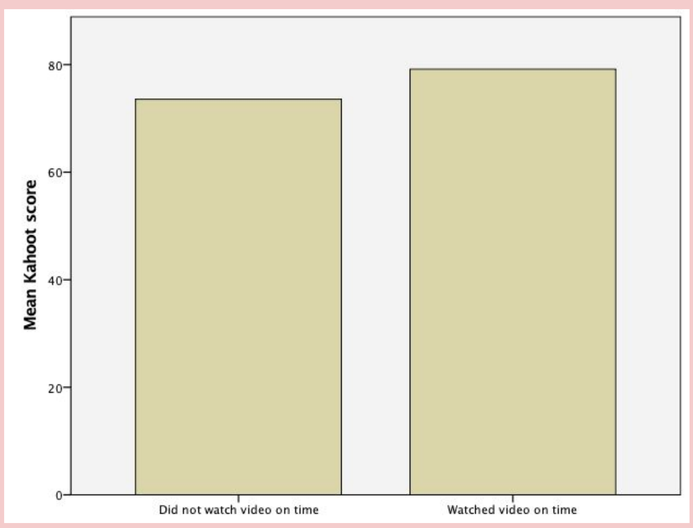
Effect of Blended Learning on Teaching Evaluation

Teaching Evaluation Questionnaire Item	Control Group Mean Score (n = 44)	Treatment Group Mean Score (n = 24)	Effect size	Significance of difference
The teaching and learning activities provided me the opportunities to learn through active participation.	4.11	4.50	0.67	$p < 0.05$
The teaching and learning activities helped me learn what I was supposed to learn.	4.18	4.54	0.64	$p < 0.05$
I have achieved what I was supposed to learn in this course.	4.18	4.38	0.33	*n.s.*

Effect of Blended Learning on Exam Scores

	Control Group Mean Score (n = 84)	Treatment Group Mean Score (n = 64)	Effect size	Significance of difference
Final Examination	69.51	73.07	0.24	*n.s.*

Effect of Flipped Videos on Kahoot! Performance



	Control Group Mean Score (n = 37)	Treatment Group Mean Score (n = 87)	Effect size	Significance of difference
Kahoot! game score in class one week after video was posted	73.56	79.16	0.30	*n.s.*