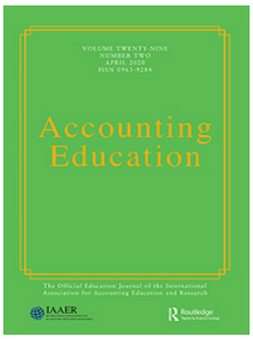

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Accounting Education

ISSN: 0963-9284 (Print) 1468-4489 (Online) Journal homepage: www.tandfonline.com/journals/raed20

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To cite this article: Nermeen Shehata, Caroline Mitry, Maha Shawki & Moataz El-Helaly (2020) Incorporating Nearpod in undergraduate financial accounting classes in Egypt, Accounting Education, 29:2, 137-152, DOI: 10.1080/09639284.2019.1704806

To link to this article: https://doi.org/10.1080/09639284.2019.1704806

Published online: 18 Dec 2019.

ACCOUNTING EDUCATION
2020, VOL. 29, NO. 2, 137–152
https://doi.org/10.1080/09639284.2019.1704806

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Incorporating Nearpod in undergraduate financial accounting classes in Egypt

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ABSTRACT

This paper presents the results of a Classroom Action Research (CAR) on the use of Nearpod, an online platform that facilitates the use of interactive teaching material using mobile devices, to conduct a formative assessment in the classroom. There are two aims of this study. First, exploring the effectiveness of using Nearpod to conduct in-class Multiple-Choice Question (MCQ) quizzes in an introductory undergraduate financial accounting class. Second, exploring its influence on the teaching and learning experiences at one of the top private universities in Egypt. In addition, the research attempted to find out how the instructor's use of Nearpod in the classroom affected students' interest in the subject matter and course material when compared to conventional paper and pen quizzes. Results from students' survey and focus groups indicated that using Nearpod heightened students' interest in the class and positively affected their learning.

ARTICLE HISTORY
Received 11 November 2017
Revised 7 September 2018;
16 February 2019;
21 November 2019
Accepted 11 December 2019

KEYWORDS
Classroom Action Research (CAR); Egypt; financial accounting; Nearpod; student engagement

Introduction

The rapid advancement of technology and its applications has directed developments in many technology-related fields. Technology has become an integral part of modern society; hence, its integration in various aspects of life became inevitable. Education, an essential building block of society, has been making use of new technological products in various ways. Many of these technologies, including the Internet and Internet-based applications, mobile technologies, as well as various multimedia tools, were integrated into classrooms. *Nearpod*, an Internet-based response system, is an example of such technology frequently used in the classroom.

This research presents the results of a Classroom Action Research (CAR) that employs Nearpod to conduct in-class multiple-choice question (MCQ) quizzes in two undergraduate introductory financial accounting sections at a leading private university in Egypt. The course covers the fundamentals of financial accounting. Students enrolled in this course are introduced to accounting as a discipline and its various information usage. Moreover, students are undeclared[1] undergraduates interested in joining the school of business, minoring in one of the school's disciplines, or taking the course as an elective. In other words, this course is a non-major course.

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In this research, the course instructor faced two main challenges. The first one, which is common for most accounting instructors in general and financial accounting instructors in particular, is stimulating students' interest in the subject. The second challenge is that one of the two sections taught by the instructor was an 8.30 am class, which typically results in many late arrivals or a low attendance level. Motivating students to attend such an early class was an issue. In an attempt to overcome those challenges, Nearpod was introduced in the classroom to conduct in-class bonus quizzes at the beginning of class time to encourage students to be punctual and engage with the course content. Despite the relatively small size of the classes, this research is insightful as a pilot to examine the effects of using Nearpod's in-class quizzing feature in introductory financial accounting classes. Limited research on Nearpod in the financial accounting discipline and developing countries such as Egypt motivated the authors to publish the findings of the study. Accordingly, this manuscript aims to answer the following questions: (1) Does the use of Nearpod in an introductory financial accounting class improve students' learning in one of the largest developing countries, Egypt? (2) Did the introduction of Nearpod quizzes, as an alternative to paper and pen quizzes, improve students' learning experience in this course?

Why Nearpod?

Nearpod offers multiple features that allow instructors to create engaging presentations with images, videos, and interactive activities such as polls, open-ended questions, collaborative tasks, and quizzes. Using Nearpod also allows instructors to deliver presentations, observe student's progress, and instantly share results of submitted activities with students.[2] Nearpod can be used to achieve different outcomes in the classroom. It can be used as a formative assessment tool by collecting immediate feedback from the students or as an interactive tool by engaging students with the presentations' content through their submitted answers, comments and questions (Atherton, 2018).

The instructor was inspired to use Nearpod upon the recommendation of the university's Center for Learning and Teaching (CLT),[3] which provided a faculty workshop on Nearpod in the classroom. Nearpod has been frequently used in the university, as it enables instructors to receive instant feedback from students and delivers content to students in an interactive form. In this research, accessibility was a key motivator for choosing Nearpod; students could access it through any mobile device such as cell phones, tablets, and laptops. Using Nearpod does not require the university or students to buy additional devices or pay for licenses. Nearpod offers a free account that allows instructors to use its basic features for classes of up to 30 students.[4] This is one of the most important reasons for selecting Nearpod, since the university has faced budget constraints for a few years, similar to many other institutions in Egypt.

In this research, Nearpod was used to conduct bonus quizzes in the form of multiple-choice questions (MCQs). At the start of the class, the instructor gave students a PIN number to access a quiz. After students finished the quiz, they instantly received the model answer along with their grades. Accordingly, Nearpod not only facilitated formative assessment but also provided a means of receiving formative feedback on students' learning, as the instructor conducted a discussion on points that confused the students directly after they received their grades. The reporting feature of Nearpod allowed the instructor to

analyze students' scores and results later. This provided the instructor with further details on students' progress and showed the difficulty level of questions. It also helped the instructor validate students' understanding and comprehension of financial themes and topics.

Despite the many ways of using Nearpod in a classroom, this research focuses only on using the in-class quizzing feature of Nearpod because it sufficiently addresses the challenges discussed in the introduction. Other features of Nearpod were not introduced in the classroom not to overwhelm students with technology without having a pedagogical need.

Contribution

The significance of this study lies in four main aspects. First, it is the first study, to the researchers' knowledge, to examine use of Nearpod in a university in Egypt. Hence, this study would not only add to the literature on Nearpod in an educational context within developing countries but also would benefit other developing countries where Nearpod is available. Second, in the discipline of financial accounting, existing research on Nearpod is very limited. Therefore, the results of this study will add to the literature on this relatively unexplored topic. Because this could open the door to further comparative studies on the use of Nearpod across various disciplines, the authors were motivated to share and publish the findings of this study. Third, the research contributes to the body of literature examining the use of the in-class quizzing feature of Nearpod within a face-to-face learning environment, as most of the published research examines several uses of Nearpod in a distance learning context rather than face-to-face.[5] Finally, this study offers useful insights into the usage of Nearpod by comparing it to paper quizzes from the student's viewpoint.

Literature review and research questions

Nearpod's multiple features allow instructors to create engaging presentations with images, videos, and interactive activities such as polls, open-ended questions, collaborative tasks, and quizzes. As mentioned earlier, a key advantage of Nearpod is that it serves as an alternative for clickers, yet it does not require a physical clicker since students could access Nearpod through their own mobile phones, tablets or laptops. This distinct feature makes Nearpod distinguishable from clickers and could influence students' perception of its effectiveness.

Many studies and research have examined the effect of clickers in the classroom. Most of the studies are related to integrating clickers in the classroom and whether clickers contribute positively to enhancing the learning environment. As noted by Carnaghan and Webb (2007) and Freeman, Blayney, and Ginns (2006), clickers are sometimes called electronic voting systems (EVS), personal response systems (PRS), group response systems (GRS), classroom communication systems (CCS), classroom performance systems, or audience response systems. The discipline in which this research was conducted is accounting, which students perceive to be boring (Byrne & Willis, 2005; Cohen & Hanno, 1993), especially financial accounting (McGowan, 2012). Accordingly, instructors are challenged to stimulate students' interest in the subject. Another challenge is the fact

that students being 'digital natives' (Camacho-Miñano & Campo, 2016) necessitates changes in the teaching/learning process, where innovative teaching techniques should be implemented.

It is clear from the studies discussed earlier that the main advantages of using clickers and other electronic response systems can be classified into three groups (Yeh & Tao, 2013). First are advantages related to the classroom environment such as higher attendance level and increase in engagement, attention, and participation. Second are benefits related to the learning process, such as a higher level of interaction, discussion, and better learning performance. Third are advantages related to assessment that include instant feedback on their understanding and self-evaluation of students' status compared to the desired level.

Difficulties in integrating clickers in the classroom have been addressed in the literature. These include technological problems affecting usability of the devices, challenges in selecting and formulating questions asked in class by the instructor, and students' reluctance to accept new methods (Yeh & Tao, 2013).

Throughout the literature, several studies assessed the influence of clickers on students in introductory financial accounting classes. Evidence on how using clickers heightens students' in-class participation, understanding the subject taught and overall learning was found by Mula and Kavanagh (2009). Camacho-Miñano and Campo (2016) empirically tested the effectiveness of using clickers and found that their use was effective in helping students learn the subject, understand its theoretical questions, and receive instant feedback. Studies of Premuroso, Tong, and Beed (2011), Segovia (2008), and Woolley (2015) assessed the effectiveness of using clickers on student performance. Findings of the previously mentioned studies concluded that using clickers as an in-class quiz tool had a positive effect on students' performance.

A study by Carnaghan and Webb (2007) in an introductory management accounting course found significant evidence that students were satisfied with using clickers in class, slight evidence supporting heightened students' interest in the course, and evidence of a moderate decline in student's engagement. Similarly, Edmonds and Edmonds (2008) found that students' performance in managerial accounting classes that used clickers was higher than those not using the technology. In a tax accounting class, Cummings and Hsu (2007) found that clicker usage positively affected students' exam grades.

Other business disciplines also examined the effectiveness of using clickers in the learning process. A study by Lincoln (2007) in a marketing class found that students using clickers perceived it to be an easy and fun activity, but it did not enhance their learning of the course. However, a study by Masikunas, Panayiotidis, and Burke (2007) concluded that using clickers motivated students and enhanced their learning of marketing and business modules. In management information systems, Nelson and Hauck (2008) found that classes using clickers had better student attendance levels, and that the more clickers are used in class, the better the students' perception regarding feedback provided, motivation and active learning. Yourstone, Kraye, and Albaum (2008) found that using clickers had a significant positive influence on students' learning of operations management due to its major advantage of providing instant feedback. Chan and Snavely (2009) also found a positive influence of using clickers on students' performance in finance classes.

The use of clickers in higher education has been researched in many other disciplines. For example, Chien, Chang, and Chang (2016) examine the related literature from 1970

till 2010. They argue that two findings can be concluded; first, most students have a positive attitude towards using clickers in classrooms. Second, using clickers can increase students' attendance level in university.

Other studies suggest that using clickers also helps students in reducing the gap between their actual learning status and the desired learning goal, as clickers provide them with instant feedback on their performance, especially if integrated with peer discussions (Chien et al., 2016). This ability for clickers to replace silence in classrooms for dialog and feedback discussions has been supported by studies such as Kolikant, Drane, and Calkins (2010), and Sutherlin, Sutherlin, and Akpanudo (2013). A study done in the nursing discipline indicated that faculty and students found that using clickers fostered engagement and critical thinking (Sutherlin et al., 2013).

Accounting educators have been interested in using clickers since the last decade. The main advantage of using clickers in accounting classes is motivating students to concentrate and maintain their attention in class, as such interactive tools increase their level of engagement (Edmonds, 2005; Tietz, 2005). Instant feedback provided to the instructor and students about understanding certain topics is one of the highlighted advantages of clickers (Caron & Gely, 2004; Edmonds, 2005; Tietz, 2005). As suggested by the literature, using clickers in class stimulates students' enjoyment of the course because the clickers allowed students to have fun, which increased their interest interesting (Conoley, Moore, Croom, & Flowers, 2006; Duncan, 2006; Stuart, Brown, & Draper, 2004) and promotes the learning process (Camacho-Miñano & Campo, 2016; Carnaghan, Edmonds, Lechner, & Olds, 2011). Accordingly, using clickers in accounting classes could heighten students' interest, and involvement in the class and hence their understanding of accounting (Cunningham, 2008; Fortin, Sauvé, Viger, & Landry, 2016). Moreover, in-class use of clickers increases students' attendance (Carnaghan et al., 2011; Keller, 2007; Kenright, 2009; Keough, 2012; MacGeorge et al., 2008; Nelson & Hauck, 2008; Robinson, 2006). Clickers are a tool that could be used 'to align students' interests as digital natives' (Camacho-Miñano & Campo, 2016, p.719). Finally, Carnaghan et al. (2011) documented that clickers could be used to track participation, especially in big classes. Accordingly, they recommended that clickers could be used 'to award bonus points in large classes, where tracking participation any other way may be impractical' (Carnaghan et al., 2011, p. 275).

In addition to the previous benefits of using clickers, other advantages to the university and the instructor include being environmentally friendly since no pen and paper is used, efficiency, as it saves time for marking and posting grades, and improved the accuracy of the previous tasks compared to doing them manually (Premuroso et al., 2011). The instant feedback provided by using clickers in class is considered a major advantage that is perceived positively by students in introductory financial accounting (Eng, Lea, & Cai, 2013). In addition, it is perceived as a means of active learning (Eng et al., 2013). As discussed by Nelson and Hauck (2008) and Beatty (2004), effective learning could be achieved through four principles including providing feedback, active learning, motivation, and increasing attention span. Accordingly, since using clickers provides instant feedback and acts as an active learning tool, it leads to effective learning. This argument is in line with the findings of Kulesza, Clawson, and Ridgway (2014), who found that the use of clickers was associated with better performance in exams, improved overall class performance, and student satisfaction due to using clickers in the course.[6]

That being said, there is a dearth of research on using the in-class quizzing feature of Nearpod in a face-to-face learning environment and accounting classes. This void in the research is observable in developing countries in general and in Egypt more specifically. Therefore, as mentioned earlier, we aim to investigate two main research questions:

RQ1: According to students, did the use of Nearpod improve their learning experience in an introductory financial accounting course?

RQ2: According to students, did the use of Nearpod quizzes improve their learning experience better than use of paper and pen quizzes?

Methodology

Educational setting

This study was conducted in two undergraduate introductory financial accounting sections at a leading private university in Egypt. The course covers the fundamentals of financial accounting where students are introduced to accounting as a discipline and its various information usage. Students enrolled in the course are students who have not yet chosen a major to study, students interested in joining the school of business, students minoring in one of the school's disciplines, or those who are taking the course as an elective. In other words, this course is a non-major course.

The two sections were taught by the same instructor. One of the two sections was taught at 8.30 am while the other section was delivered at 2.00 pm It was challenging for the instructor not only to have a high attendance level in the 8.30 am class, but also to have students coming on time.

Sample

The sample included 44 students from the two introductory financial accounting sections. Students voluntarily participated in the in-class survey and the focus group.

Design

A non-probability purposive sampling technique was applied, where students in two introductory undergraduate financial accounting classes were asked to participate in the research. Students registered in these classes were asked to sign a consent form indicating their agreement to participate in the study. Upon agreement,[7] 44 students completed an in-class survey and participated in focus groups, where a facilitator from CLT engaged them in discussion about the use of Nearpod in the course. As mentioned earlier, despite the relatively small sample size in this research, its results could provide insight into the effects of using Nearpod in the classroom on student interaction and engagement.

Survey development

The course instructor, in collaboration with the CLT at the university, designed a survey (Appendix A) for students in two financial accounting sections. For triangulation

purposes, the survey was followed by in-class focus groups facilitated by the CLT, to collect more qualitative data from students.

The methodology and assessment processes were identical for the two sections; students in each section were asked to take a survey and participate in focus group discussions after having taken ten in-class quizzes (three in a traditional 'pen and paper' format and seven online quizzes via Nearpod). As discussed earlier, quizzes were given at the beginning of the class and used to award bonus points to students. Bonus points were awarded for both types of formats, pen and paper format and Nearpod.

To tackle the issue of financial accounting being perceived as 'boring' (as mentioned earlier), most survey questions focused on getting students' feedback on the use of Nearpod for in-class quizzes and assessing its effectiveness on their interest in the course content, compared to traditional paper quizzes. The survey also included questions prompting students to express their opinions on the way the instructor used Nearpod in the classroom in terms of efficiency and effectiveness as well as their evaluations of Nearpod as a platform. Following that, focus group discussions explored the above issues to find out more about the students' experience with Nearpod.

Procedures

Towards the end of the semester, the two coauthors, who are CLT members, were invited to the two classes to distribute the survey and conduct the focus groups. Questions addressed in the focus group are presented in Appendix B. One CLT member asked the questions, while the other took notes. The professor who taught this course provided a brief introduction regarding the purpose of the survey and focus group being important since using Nearpod was being examined for the first time in the course and department. The professor then left the class so that students would share their experiences honestly.

Results and discussion

This section presents the descriptive statistics and quantitative and qualitative results of the study. In particular, first, we present the descriptive statistics of our sampled subjects. Second, we present our quantitative and qualitative findings concerning our first research question related to student's experience with Nearpod. Finally, we present our findings on the second research question, where students assess the usefulness of Nearpod compared to paper and pen quizzes.

Descriptive statistics

Table 1 presents the descriptive statistics of the sample in terms of gender distribution, academic standing,[8] and academic status. Most of the declared students majored in engineering (with different specializations), and a few majored in physics, integrated mass communication, chemistry, actuarial science, political science, and English and comparative literature.

Table 1. Descriptive statistics.

	%	Number of responses
A. Gender distribution		
Male	55	24
Female	45	20
B. Academic standing[a] distribution[b]		
Freshman (1st Year)	34	14
Sophomore (2nd Year)	37	15
Junior (3rd Year)	24	10
Senior (4th Year or graduating)	5	2
C. Academic status distribution[c]		
Declared	42	18
Undeclared	58	25

[a]Please refer to footnote 8 for the definition of academic standing.
[b]Three students skipped this question on the survey.
[c]One student skipped this question on the survey.

Evaluating students' experience with Nearpod

Students' responses to questions about how effective they found Nearpod in terms of adding value to their learning and enhancing their overall learning experience are presented in Table 2, which shows the detailed percentage distribution of students' responses and the descriptive statistics (no. of respondents, mean response and standard deviation) for each question. As illustrated in Table 2, most students (91%) liked the way the professor used Nearpod in the classroom (average response 4.52) for conducting in-class MCQ quizzes. This corresponds with existing literature on how undergraduate students in higher education (being digital natives) favor and like the idea of using new technologies in the classroom. Many students further recommended the use of Nearpod in other courses in the university and suggested that it can be used for self-assessment practice tests, end-of-chapter review exercises, and for assignments and graded quizzes. Most students (60%) believed that using Nearpod for MCQ quizzes enhanced their learning of basic accounting concepts (average response 3.61), and that it added value to their overall learning experience.

The students' experience using Nearpod was also discussed in the focus group. Generally, students were positive about the experience and recommended the use of Nearpod for ungraded assignments, in-class activities and student polls. They believed it would be

Table 2. The effectiveness of using Nearpod in class.

Scale[a]	Strongly agree (5) (%)	Agree (4) (%)	Neutral (3) (%)	Disagree (2) (%)	Strongly disagree (1) (%)	SD	Mean	*N*
I believe that using Nearpod has added value to my learning experience	**23**	**45**	23	9	**0**	0.89	3.81	44
Using Nearpod is useful	32	52	11	2.5	2.5	0.85	4.09	44
Using Nearpod has enhanced my learning of basic financial accounting concepts	**12**	**48**	36	2	2	0.86	3.61	44
I recommend using Nearpod in other courses	**43**	**36**	16	0	5	1	4.13	44
I like how my professor used Nearpod in the classroom	**75**	**16**	9	0	0	0.77	4.52	43

[a]5 represents strongly agree, while 1 represents strongly disagree.

effective to make use of Nearpod with such activities. According to the students, the advantages of Nearpod included that it is time-saving, new, nice, and 'cool', especially with the immediate feedback they got from the instructor after taking the quiz. The discussions also showed that many students enjoyed the experience and would like Nearpod to be used in other assessments to further engage them with the course content. One student commented on this. 'If Nearpod is used in more than quizzes, like in assignments and more activities, it will be great'. Another student commented on how using Nearpod was effective especially in helping the students focus on the theoretical component of each chapter 'Nearpod is a great site for pop quizzes that focuses on the theoretical part of each chapter'. Further, students also commented on how Nearpod increased their overall level of attentiveness 'The quizzes were more interactive and kept us alert'.

Few students were indifferent about the use of Nearpod in the classroom. One said, 'It is just a different way of doing things.' Some students also commented on the drawbacks of using Nearpod. Students commented that Nearpod needs a stable internet connection and that sometimes this causes problems. Another student commented that 'Not everyone would prefer a new technology to be used for quizzes'.

Comparing traditional paper quizzes to Nearpod quizzes

Students were asked to compare their experience taking in-class quizzes using pen and paper versus online using Nearpod in terms of the ease of use, effect on learning, effect on class discussions that follow quizzes along with instructor's instant feedback, among others. Tables 3 and 4 present the percentage distribution of students' responses to those questions as well as the descriptive statistics for each question.

When it comes to comparing a traditional pen and paper quiz to a Nearpod quiz, students' responses were most evident regarding how the use of Nearpod positively affected their interest in the class more than traditional pen and paper quiz. Most of the students (73%) indicated that Nearpod quizzes positively affected their interest in class (with an average response of 3.95 on a scale of 5). This was perhaps the most interesting finding of the research, where use of Nearpod helped in dealing with the boredom issue, which affects many students in accounting, highlighted throughout the literature. Interest in class is followed by the general positive effect students felt use of Nearpod has had on their learning experience in class, given the instant feedback they received from the

Table 3. Evaluating Nearpod quizzes.

Scale[a]	5 (%)	4 (%)	3 (%)	2 (%)	1 (%)	SD	Mean	*N*
Effect on in-class discussion that follows quizzes (5 = highly effective, 1 = not effective at all)	**68**	**23**	7	0	2	0.81	4.55	44
Usefulness of feedback received from instructor (5 = very useful, 1 = not useful at all)	**59**	**30**	7	0	4	0.96	4.39	44
Ease of use (5 = very easy, 1 = not easy at all)	**48**	**39**	11	2	0	0.77	4.32	44
Positively affected your learning (5 = very much, 1 = not at all)	**41**	**45**	11	0	3	0.83	4.23	44
Effect on your interest in class (5 = highly effective, 1 = not effective at all)	**39**	**34**	18	2	7	1.14	3.95	43
Effect on your engagement in class (5 = highly effective, 1 = not effective at all)	**36**	**34**	20	7	3	1.03	3.95	44

[a]5 represents the highest evaluation, while 1 represents the lowest evaluation.

Table 4. Evaluating pen and paper quizzes.

Scale[a]	5 (%)	4 (%)	3 (%)	2 (%)	1 (%)	SD	Mean	*N*
Effect on in-class discussion that follows quizzes (5 = highly effective, 1 = not effective at all)	50	30	14	2	4	1.06	4.18	44
Usefulness of feedback received from instructor (5 = very useful, 1 = not useful at all)	52	27	14	0	7	1.12	4.18	44
Ease of use (5 = very easy, 1 = not easy at all)	82	11	7	0	0	0.57	4.75	44
Positively affected your learning (5 = very much, 1 = not at all)	45	32	21	0	2	0.92	4.18	44
Effect on your interest in class (5 = highly effective, 1 = not effective at all)	37	16	37	5	5	1.15	3.77	43
Effect on your engagement in class (5 = highly effective, 1 = not effective at all)	27	43	23	5	2	0.94	3.89	44

[a]5 represents the highest evaluation, while 1 represents the lowest evaluation.

instructor. This is also in line with the comments received in the focus group 'I like the fact that the result of the quiz appears immediately, with instant feedback and grade'. Here again, using Nearpod directly contributed to improving students' experience with learning introductory financial accounting.

In the focus group, students shared their experience regarding the differences between Nearpod quizzes and paper and pen quizzes. One of the advantages of using Nearpod for quizzes, from the students' point of view, is ensuring fairness (where the quiz turns off for all at the same time), in addition to them generally feeling less stressed about taking a quiz. They mentioned that Nearpod is especially effective with MCQs. In particular, one student commented that 'I think Nearpod is quicker and it is fair and everyone is allowed the exact same amount of time to complete the quiz'.

On the other hand, some students commented that it is not much different from pen and paper quizzes, and that they did not prefer one way to the other for taking a quiz. One student commented, 'The whole idea behind Nearpod is that it saves paper and ink; that is all. It makes no difference at all whether we take the quiz online or on paper'. Yet, this student mentioned that the good thing about Nearpod is that it is more environmentally friendly.

Moreover, few students reported some ethical issues, such as sharing quiz codes with non-present students, where quizzes should have been taken by students present in class, or accessing Google (via the same device) to find answers to the quiz.

To further assess the significance of our statistical results, we conduct a Wilcoxon signed rank test. The objective of this test is to evaluate the mean difference significance in students' response in each of the questions addressed in Tables 3 and 4. The results presented in Table 5 show that beyond the economic significance of the differences between Nearpod and paper and pen quizzes that are obvious in Tables 3 and 4, the differences are statistically significant in three out of the six questions mentioned earlier. In particular, the difference in means[9] is positive and statistically significant for the effect of in-class discussions after the quiz, usefulness of feedback and effect on interest in class. Our interpretation to this is that the use of Nearpod, at the very minimum, could contribute positively to students' learning experience. The channels through which this contribution takes place, as per statistical evidence suggest, are most likely to be enhanced in class discussion and usefulness of feedback received from the instructor hose findings are also supported by student comments. For example, one student commented on the ease of use of

Table 5. Wilcoxon signed rank test.[a]

Question	*N*	Higher Mean Response	Mean Difference	+ve Ranks	−ve Ranks	*Z*-Value	Asymp. Sig. (2-tailed)
Effect on in-class discussion that follows quizzes	44	Nearpod	0.364***	9	0	−2.701	0.007***
Usefulness of feedback received from instructor	44	Nearpod	0.205*	7	2	−1.897	0.058*
Ease of use	44	Paper/Pen	−0.432***	3	18	−2.637	0.008***
Positively affected your learning	44	Nearpod	0.045	7	6	−0.50	0.617
Effect on your interest in class.	43	Nearpod	0.186*	9	3	−1.890	0.059*
Effect on your engagement in class	44	Nearpod	0.068	7	3	−0.832	0.405

***, ** & *Indicate significance at the 1%, 5% & 10% levels, respectively.

[a]The difference in means and positive/negative ranks are the outcome of (response score for Nearpod question- response score for paper/pen question). In other words, a positive mean difference indicates an overall statistical significance that suggests that Nearpod quizzes were more satisfactory and a negative mean difference indicates an overall statistical significance that suggests more satisfaction with paper/pen quizzes. Similarly, when the number of negative ranks is higher than the number of positive ranks, this indicates that paper/pen quizzes received a higher average response in this question.

Nearpod 'the results are clearer than paper quizzes'. Hence, our evidence suggests that Nearpod positively affected the students' interest in the class. The later claim is also supported by qualitative evidence as. One student described Nearpod quizzes as 'Interesting' while another student commented 'Overall, we enjoyed having quizzes online'.

The results in Table 5 also show that the difference in means is not statistically significant when we try to compare between Nearpod and paper/pen quizzes' influence on 'having a positive learning experience' and 'engagement in class'. While, the evidence in Tables 3 and 4 shows that, on average, students found that Nearpod is more effective in terms of enriching their learning experience and increase their engagement in class, yet the difference between Nearpod and paper/pen quizzes is not statistically significant. Finally, as mentioned earlier one drawback of using Nearpod is that not all students will prefer a technology-based replacement for quizzes. Therefore, the difference in means for the 'ease of use' was negative and statistically significant at the 1% level. This indicates that students find paper/pen quizzes significantly easier than Nearpod quizzes. Our interpretation to this, as discussed in subsection 4.2, is that not all students will be welcome using a new technology for a formal assessment that will count in as part of their overall grade of the course.

Conclusion

This research aimed at exploring the effectiveness of teaching and learning experiences through using Nearpod in undergraduate introductory financial accounting classes at one of the leading private universities in Egypt. The objective of this paper is to answer two main questions. First, to what extent students perceive that using Nearpod was useful for their learning experience. Second, to what extent the students prefer Nearpod-based quizzes as opposed to paper and pen quizzes.

Results indicated that using Nearpod for MCQs in class not only heightened students' interest in the class but also positively affected their learning. Most of the students' feedback shared in the focus group was positive, whereas few comments were neutral or

negative. Students also provided several recommendations regarding how the use of Nearpod could be extended to other classes and activities.

Our statistical analysis, as well as the discussions held in focus groups about using Nearpod for quizzes, shows that it is more enjoyable, less stressful and helps students receive timely feedback more than conventional paper and pen quizzes. The findings of our statistical analysis were further confirmed by a non-parametric Wilcoxon signed rank test check that the differences between Nearpod and paper and pen quizzes are statistically significant for some of our investigated attributes. Collectively, our findings show that for most students, introducing a new interactive tool like Nearpod for quizzes. However, the attributes that are statistically significant are ease of use and enhancing the value of in-class discussions after the quiz. It is also not surprising that for few students the effect of using Nearpod on their learning experience is neutral or even negative. It is worth mentioning that students who did not think that Nearpod enhanced their learning experience attributed this mainly either to technical problems or lack of interest in adopting a technological tool for assessment purposes.

Results are in line with and complement prior findings that investigate the impact of using clickers in the classroom. Results are comparable to studies conducted about financial accounting in developed countries such as those of Camacho-Miñano and Campo (2016), Mula and Kavanagh (2009), Premuroso et al. (2011), Segovia (2008), and Woolley (2015), which concluded that using clickers as an in-class quiz tool positively influences students' performance. Moreover, this positive association between using clickers in class and students' performance in financial accounting classes has been found throughout the literature in other accounting disciplines, such as management accounting (Carnaghan & Webb, 2007; Edmonds & Edmonds, 2008) and other business disciplines including marketing (Lincoln, 2007; Masikunas et al., 2007), management information systems (Nelson & Hauck, 2008), operations management (Yourstone et al., 2008), and finance (Chan & Snavely, 2009).

Concerning the instructor's reflection on the experience, the instructor found it was efficient to use Nearpod for quizzes as it saved resources, was a fair assessment tool in terms of assuring that the quiz started and ended at the same point, and increased students' attendance, even though it was not measured but was clearly noticed. Moreover, the most important advantages were providing instant feedback to students and enhancing their interest, as evidenced by the quantitative analysis. It was rewarding to find students coming to class, excited about having a Nearpod quiz rather than having a traditional pen and paper quiz. Students enjoyed using their mobile phones for an in-class quiz, which is normal since they are digital natives. However, two main drawbacks were identified for using Nearpod. First, preparing the quizzes was somewhat time-consuming, as the instructor needed to set the questions and have them uploaded along with the model answers in advance, unlike traditional quizzes. Second, technical problems (as highlighted by students) ranged from having difficulties in accessing the internet when the wi-fi connection was not functioning properly to experiencing glitches in the system, where it recorded correct students' answers as 'incorrect' a couple of times.

There are several recommendations for future research, including increasing the number of students (sample size) participating in the study, assessing how instructors' personal traits could affect the results by including participants from multiple sections taught by different instructors, identifying how students' high school background studies (science

versus non-science) or different majors could affect the results, determining whether students' status (seniors versus freshmen) and age might influence the results, and examining how different formats of the quizzes could affect students' learning. Finally, future research could assess the influence of using Nearpod in class on students' performance; in other words, to what extent are students' grades different for students' who take online quizzes versus those who do not?

Notes

1. Undeclared students are students who have not yet chosen a major to study, while declared students are already enrolled in a major.
2. http://www.emmaclemens.com/10-reasons-to-use-nearpod/.
3. The Center for Learning at Teaching (CLT) at the university provides support and resources to faculty members, helping them develop and redesign courses, integrate technologies into the classroom, design and implement assessments which eventually contribute to enhancing the teaching and learning experience.
4. https://nearpod.com/pricing.
5. Since distance learning is beyond the scope of the current research, using Nearpod in distance learning has not been addressed.
6. Kulesza et al. (2014) conducted the study in a Biology course.
7. Consent forms and Institutional Review Board (IRB) approval were obtained prior to assessment.
8. Academic standing at the university examined is determined by the number of credit hours completed by the students. Students are freshmen as soon as they are enrolled at the university. Students become sophomores on completing 30 credit hours, juniors on completing 60 credit hours, and seniors on completing 90 credit hours.
9. The difference in means are calculated as the mean of the response score of the Nearpod question less the mean of the response score of the paper/pen quiz question. Therefore, a positive difference indicates a higher level of satisfaction for Nearpod quizzes as compared to paper/pen quizzes.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendices

Appendix A Exploring the use of Nearpod in undergraduate financial accounting class (Spring 2016)

1.	**Gender**:	Male	☐	Female	☐						
2.	**Year**:	Freshman	☐	Sophomore	☐	Junior	☐	Senior	☐		
3.	**Status**:	Declared	☐	Undeclared	☐						
	Major (if you are declared): … … … … … … … … … … … … …										

4. Please indicate how much you agree/disagree with the sentences below:

	5 Strongly agree	4 Agree	3 Neither agree nor disagree	2 Disagree	1 Strongly disagree
I like how my professor used Nearpod in the classroom.					
Using Nearpod in the class is a waste of time.					
Using Nearpod has enhanced my learning of basic financial accounting concepts.					
Using Nearpod has not added any value to my learning experience in the course.					
I recommend using Nearpod in other courses.					

5. In this class, you took three paper quizzes and seven online quizzes (on Nearpod). How would you rate your experience in terms of the criteria below (with 5 being the highest on the scale and 1 being the lowest)?

Criteria	Online Quizzes					Paper Quizzes				
	5	4	3	2	1	5	4	3	2	1
Ease of use (5 = very easy, 1 = not easy at all)										
Positively affected your learning (5 = very much, 1 = not at all)										
Usefulness of feedback received from the instructor on quizzes (5 = very useful, 1 = not useful at all)										
Effect on the in-class discussion that followed quizzes (5 = Highly enhanced, 1 = not enhanced at all)										
Effect on your engagement in class (5 = highly effective, 1 = not effective at all)										
Effect on your interest in class (5 = highly effective, 1 = not effective at all)										

6. Please include any suggestions for different uses of Nearpod in this course (or other courses).
… …
… …
… …

7. Please include any other comments you may have below: … … … … … … … … … …
… …
… …
… … … … … … … … … … … … … … … …

Appendix B Class discussion about the use of Nearpod

We are here to assess the use of Nearpod in this class and whether it enhances your learning in any way. Please note that this discussion is totally anonymous, and we will send the instructor a typed report of the discussion.

Did anyone use Nearpod before?

So, this is the first time for everyone. How do you feel about it?

How many don't like the instant grading?

Any other comments about Nearpod that you would like to add?

So, how is this time compared to paper and pen quizzes?

Any other comments about the difference between paper/pen quizzes and Nearpod quizzes?

Did you face any technical problems while Nearpod was in use? If yes, how frequently?

How many think having pen and paper is stressful compared to Nearpod?

For Nearpod quizzes, does it feel any different in terms of getting different questions?

Discussions after the quiz, how do you think Nearpod makes a difference when compared to paper/pen quizzes?

Would you recommend Nearpod for other classes?

OK, thank you very much for your participation