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21st Century Assessment: Online Assessment

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Abstract

In recent years, the growth of teaching and learning has transformed the education world which education is no longer limited to a certain place and time due to the full utilizing of technology. Web-based distance learning, as a new medium of learning, suits the user's needs, and online assessments are essential parts of online learning. The aim of this paper is to determine the effects of Kahoot![®] game-based online assessment on preschool student teacher performance and motivation in a higher education institution. The sample of this study is the students from Early Childhood Education program in, Universiti Pendidikan Sultan Idris. The treatment group consists of 50 students for the treatment group and 50 students in the control group. In this study, data will be analyzed using ANCOVA Analysis. Based on the findings, appropriate recommendations will be put forward.

Keywords: Assessment, Online Assessment, Computer-based Assessment

Introduction

The surge of world transformation toward the 21st century has spiked worldwide. The lavishness of technology utilization in education is no strangely in line with the development of education 4.0 where technology must be fully adapted in the field of education. The surge of world transformation toward the 21st century has spiked worldwide. Technology today has made life easier and better which makes things easy access and save time comparing it in the old fashion way. It is generally known that technology has transformed the humans in a way or another for years. But the rapid and drastic changes can be seen clearly in the world of Information Technology, the ICT. The ICT is playing an increasingly important role in work and personal lives of people. The globalization and internationalization of economy along with the rapid development of information and communication technologies (ICT) are continuously transforming the way in which we live, work, and learn (Voogt & Roblin, 2012). Everything is depending on technology, making every single thing borderless and the most remarkably technology device is the Internet which has the highest demand in every sector worldwide.

Information technology is playing an increasingly important role in work and personal lives of people. Everything is depending on technology, making every single thing borderless and the most remarkably technology device is the Internet which has the highest demand in every sector worldwide. The rapid global changes in information and communication technology (ICT), has affected the availability of technology and made it universal. Technology continues to transform education and training but usually in ways unforeseen by its inventors (Baker & O'Neil, 1994). It can be seen that the invasion of technology in society has forced changes in employment and education (Siddiq, Gochyyev, 2017). The education sector has been transformed towards the rapid development of the Internet. The use of internet has increasingly altering today's education system. Some familiar terms like Mobile learning (M-Learning), E-learning, Kahoot, Massive Open Online Course (MOOC) and Socrative are a new concept of learning and assessing via online. In M-learning environment, knowledge can be transmitted via the mobile phones, laptops, tablet Personal Computer (PC), Personal Digital Assistant (PDA) and etc. (Mahat, Fauzi, Ayub, & Luan, 2012). As the world is becoming increasingly borderless with the demanding usage of internet, the academic spaces are increasingly becoming less confined to the four walls of a classroom. Educators always emphasize on learning outside the classroom which eventually leads to the usage of internet and ICT in the classroom itself.

Nowadays the uses of internet-based or online-based tests are discussed. Published empirical evaluations of online tests indicate that they can be reliable and valid. In Knight (2008), education sectors need to prepare students with the 21st skills which include the 10 super skills example like the digital age literacy, creative thinking, effective communication and high productive skills. These skills are important for the students to thrive in the future. The world is changing rapidly towards 21st century digital era and many research and publications are conducted on what knowledge and skills needed the most for society especially young generations of the 21st century. There are four types of 21st century skills: collaborative problem solving, complex problem solving, creativity and digital information literacy (Geisinger, 2016). Digital information literacy is the critical skill that always been highlighted in education especially in teaching and learning and also assessment as specified in shift 9 Malaysia Education Blueprint for Higher Education and shift 7 in Malaysia Education Blueprint for Pre School to Post-Secondary Education (Ministry of Education, 2015; Ministry of Higher Education, 2015).

Literature Review

Shift 7 of the Education Blueprint 2013-2025 purposes to leverage on ICT to upgrade learning across the country (Ministry of Education, 2015). Nevertheless we are tapping into comparatively new area of 21st century and the transportation of ICT must be integrated into curricula, teaching and learning and the assessment. This clearly shows that we are moving together towards the 21st century transformation. Those trends have prompted some education reformers to argue that the traditional curriculum is not enough and schools must provide students with a broader set of "21st century skills" to thrive in a rapidly evolving, technology-saturated world.

The Education Ministry and Microsoft Malaysia recently signed a memorandum of understanding (MoU) to encourage the use of ICT in teaching and learning (Star, n.d.). The assessment should move parallel with various teaching and learning method using technology

for 21st century. This is because the emphasis in 21st century learning and assessment goes beyond the basics of reading, writing, interpretation and synthesis but students need to ensure that they also have the ability in mastering some of the skills: cognitive, interpersonal, intrapersonal and technical skills hereafter called OECD approach (Geisinger, 2016).

Assessment

Basically, assessment is always defined as a question or exercise on a test, quiz, or other evaluation. Assessment is a part of teaching and learning process, aim to bring improvement for the assessor and the individual assessed. Assessment can also be viewed as the act of appraisal or judgment (Shaw, 2015). Assessment is roughly to include all those activities carry out by educators in assessing students which will provide information that can be used as feedback to modify the teaching and learning activities in which they are engaged. Activities in conducting assessment may include classroom observation, class discussions, quizzes, homework and test (Black & Wiliam, 2006). There is a distinction between assessment of learning and assessment for learning. Assessment of learning is focused primarily on assigning grades as the principal indicator of student performance and assessment for learning is to enable students through effective feedback, to fully understand their own learning and the goals they are aiming for (Popham, 2002). Therefore, assessment can be concluded as a method used to improve the quality of education because it can enhance life-long learning skills and promote performance in various educational contexts (Nasri, Roslan, Sekuan, Bakar, & Puteh, 2010).

Assessment is an accountability tool, but it can also be an ongoing process for learning. In fact, the concept of learning-centered teaching involves the effective use of both formative and summative assessment. Assessment is to gauge mastery and understand how the students are performing; however, do we differentiate those assessments? 21st century assessment is a list of options where it permits students to make decision in picking and choosig the best technique for showcasing a specific skill. It is also important to explore how assessment techniques can be used to make the feedback loop between instruction and assessment more meaningful. In general, it seems that it is very critical to have the right technique in conducting assessment to student as it will give big impact in creating holistic person in the future. The students should know what they are learning and master the skills needed to be a holistic person rather than just memorizing facts.

Assessment is essential part of formal higher education (Gikandi, Morrow, & Davis, 2011). There are two types of assessment practice in higher education which are the formative and summative assessments. Formative assessment is part of the instructional process and it occurs during learning activities conducted while summative assessments are given periodically to determine at a particular point in time what students know and do not know and it occurs at the end of the lesson (Malaysian Examination Syndicate, 2012; Dixson & Worrell, 2016). Formative assessments deliver evidence of teaching whereas summative assessments deliver evidence of a longer period of learning, for example the summation of a particular subject or year. It is important to choose the right technique in conducting assessment to produce a quality and holistic students as study in Geisinger (2016), stated that this is because from a different perspective, meeting the demands of education work, and commerce in the 21st century necessitates additional layers for communication skills, technological savvy, global view,

collaborative practices, digital skills and more innovative applications rather than memorizations. As in Vonderwell & Boboc (2013), the feedback in formative assessment can foster student engagement, improved achievement and enhance motivation to learn. Instructors need to view assessment as a multidimensional process. Under these circumstances, formative assessment provides instructors with a more accurate representation of student gains in terms of knowledge and skills by using various strategies during the instructional process.

With all the evidences on formative assessment mentioned above, it can be said that formative assessment is the best form of assessment. Therefore the objective of this research is to conduct a quasi-experiment on formative assessment. The impact of examining a formative assessment system on student achievement may provide evidence that data-driven instructional platform that can control student achievement and learning outcomes. Formative assessments are one of the most powerful tools in the teaching, but only if they are part of a comprehensive assessment system (Croteau, 2014). According to (Hattie, 2009), in his research on 50,000 studies and more than 800 meta-analyses, the most effective way in encouraging students' achievement is through the formative assessment.

In this 21st century, formative e-assessment is seen as having the potential to support significant changes in the way in which learning occurs in Higher Education (Pachler, Daly, Mor, & Mellar, 2010). Pachler et al., (2010) mainly interested in Black and William's (1998) work in formative e-assessment which they later propose five key strategies:- 1- Engineering active classroom discussion in questions and learning tasks that elicit evidence of learning, 2- Providing feedback that motivates learners forward, 3- Clarifying and sharing learning intentions and standards for success, 4- Activating students as in control of their own learning and 5- Activating students as instructional resources for one another. Many college professors are using interactive formative assessment tools in which students use their gadget like cell phones to report general understanding. Formative assessment tools are not only informative to instruction, but also can be very engaging for the learner (Ray, 2016). Assessment leading to continuous improvement is important for the development of an engaged community of learners in the online environment (Vonderwell & Boboc, 2013)

Assessment for 21st Century

We are living in the age where assessment is the key in education where we need to know how students are learning and if they are mastering the concept and skills and we often use that key performance to determine teacher effectiveness. One of the main topics in the educational measurement community in the past decade has been the assessment in 21st Century (Geisinger, 2016). Online learning and assessment has become a new educational paradigm, gaining popularity especially at institutions of higher learning in Malaysia. Using the latest technology in online learning, students are able to choose when and where they wish to learn anything (Mahat et al., 2012).

Millennials or the Generation Z is technologically savvy and avid users of a variety of digital platforms. Now the this generation is connected through social media 24/7 and carries mobile devices everywhere. They are the generation of 'millennial' which are the first generation that

did not have to adapt to new technologies of the digital era which are the Internet, mobile technology, and social media (Brigham, 2015). Therefore, educators need to grab this advantage that they have to meet them in their connected, collaborative world to make their learning more meaningful and relevant (Jackson, 2015; Kukulska-Hulme, Norris & Donohue, 2015, p.7; Sharples, 2013 in Alvarado et al., 2016). The spread usage of smartphones and mobile devices was a strong contributor of the millennials' comfort with using technology everywhere and at any time. They are attached to their devices and it their daily routine and most of them master the skills of using and exploring their devices especially via the Internet. Hence, the best and practical way to get their attention in teaching and learning is through their devices and they really need to master the digital literacy and technology literacy. Greenstein (2012), in her book stated that this is actually one of the core skill needed in 21st century which is applying and integrating information and communication technologies in education. Supported by Geisinger (2016), there are four types of 21st Century Skills: collaborative problem solving, complex problem solving, creativity and digital and information literacy. It is clear that digital and information literacy is one of the fundamental aspects that students really need to master. These 21st century skills will help to create Malaysian students who are balanced, resilient, inquisitive, principled, informed, caring, patriotic, as well as effective thinkers, communicators, and team players. Current research has reported that mobile learning can be extrinsically motivating, as well as promote cooperation and collaborative work (Alvarado, Coelho, & Dougherty, 2016). This generation is technology savvy. Educators do not have to spend time on teaching and training the students on how to deal with technologies or IT gadgets. Mastering the IT gadgets is their core skills. Educators especially in higher education should take this opportunity to focus on something fascinating via technologies that can benefit the assessment conducted. As computers become more ubiquitous, familiarity with technology should not be an issue; however, poor instructional design, specifically usability and accessibility, can overload a user's cognitive resources and impede performance (Sweller, 2005; (Mayrath, Carke-Midura, Robinson, & Schraw, 2012).

There are few strategies and techniques that educators can think of in assessment for 21st century. We should consider on technology based assessment rather than traditional paper and pencil type of assessment as to meet the demands of 21st century skills. Some of the famous assessment tools using technology are the computer based assessment, game based assessment, e-portfolios and the online assessment. With the transformation to online assessment, technology plays an integral role in conducting assessment. In many sorts of assessment software available, the assessments appear in game form so that students do not even realize they are actually encountering an assessment.

Online Assessment

When we think of assessment, pen, pencils, piles of paper and definitely red pen marking the students' examination sheet come to mind. Just imagine what if we bring in the hand phones, laptops, i-pads and other tools in conducting assessment? Isn't that more on moving towards the 21st century features in education? There will be less expenses in buying piles of paper, bullets for stapler, photocopying exams paper and preparation in seating arrangement and so forth. Assessment of student learning is a vital component of school activities. Research indicates that a sizable amount of classroom time is devoted to the assessment of student learning (Ling, Lan,

Suah, & Ong, 2012). This is when the technology-based assessment or to be specified, the online assessment offers some unique challenges for assessment and opportunities for positive ongoing assessment.

Numerous studies have attempted to explain that using effective assessment techniques can improve educators in understanding of student needs and support and one of the best techniques to be conducted is the online assessment where it can actually takes a new meaning of education in the world of digital assessment (Croteau, 2014; Gaytan & McEwen, 2007; Vonderwell & Boboc, 2013). Compared to paper-based assessment formats, online assessment have a greater potential to measure complex learning skills, provide immediate feedback and scoring, decrease the time and cost to input data manually (Kuo & Wu, 2013). Studies have found that testing format does not affect test scores, and that CBT offers several advantages over paper and pencil (PNP) testing, viz convenience of scheduling and the ability to score exam papers instantly (when applied to multiple choice questions) and enhanced security (E. C. Lim, Ong, Wilder-Smith, & Seet, 2006). This clearly shows the importance of choosing the right assessment technique for students and the best technique for 21st century assessment is none other than online assessment technique. There are multiple opportunities to exploit the power of technology for formative assessment when students are learning online. The same technology that supports learning activities gathers data in the course of learning that can be used for assessment. As students work, the system can capture their inputs and collect evidence of their problem-solving sequences, knowledge, and strategy use, as reflected by the information each student selects or inputs, the number of attempts they make, the number of hints and feedback given, and the time allocation across parts of the problem (United States Department of Education, 2011).

Advantages of Online Assessment

Recent and previous evidence in journals and publications show that online assessment proffered several benefits to educators, students, invigilators and faculty (Hertel, Naumann, Konradt, & Batinic, 2002; Lim et al., 2006). The finding in Hoskins & Van Hooff (2005), show that the achievement of students is extremely promising via an online assessment learning platform. There are several advantages that online assessment can offer to educators and students in higher education as presented below:-

Auto-Marking

The first reason educators usually give after conducting an examination or assessment is no time marking the question papers. This issue can be solved by using online assessment platforms that educators can create by their own or by using the platforms available online for free. Educators can easily get the result of their students' right after they have finished sitting for the exam. Just a simple click and marking process is done easily. Auto-marking was thus possible, but answers had to be submitted a few days in advance to the computer centre for programming purposes (E. C. Lim et al., 2006). This is the best way to save time and very reliable as students could not alter the answer and also to avoid human error when marking the questions. In online assessment, the order of questions and answers could not be altered once the answer template was submitted and it is protected for its security.

Quality Feedback and Fun Discussion

Online assessment should be viewed as a system of components for evaluating student academic achievement. Just because it may be difficult to measure the amount of learning does not mean that learning has not taken place and one of the most important compartment in assessment is the feedback. Effective assessment is when online educators can adapt their assessment activities to provide useful feedback, accountability and opportunities to demonstrates quality (Robles & Braathen, 2002). In online assessment, students or educators can give a very quality and longer feedback towards their performance in the question paper they have answered.

As in Heath, Lawyer, & Rasmussen (2007), students who completed evaluations over the online setting were more likely to give qualitative feedback compared to students who completed their evaluations in the classroom which is using paper-and-pencil group. The implication is where the online platform is designed to provide more immediate feedback to educators so that accommodations and learning strategies could be designed for the following year systematically. With the help of quality feedback from educators and students, educators themselves can manage their students' performance and set a target for each student throughout the year. For educators in wanting to find out their student's prior knowledge, giving them a quick pre-assessment will help them to know how to focus on lesson or what they do not know themselves. According to (Baggaley, 2013), these whole processes can be really efficient with an online survey sites like survey monkey or google forms. Definitely there will be no extra work for educators to mark the pre-assessment using online surveys as everything will automatically marked and calculated for them. Everything is done for them. They will identify and rectify the students' weaknesses in certain topics and understand more on what to really focus to teach each and particular student (Lim & Tan, 1999). Although online instruction may be more efficient, convenient and flexible for bot student and teachers, it must be stressed that this technology should be used to facilitate teaching and promote learning (Robles & Braathen, 2002).

Moreover in an online setting, the focus shifts away from the teacher and allows more sharing among the students in class. The interaction that takes place online mimics that of a small group discussion. Students can add up their comments with images and colourful words or even pictures. *Figure 2.1* shows the example of online comments and feedback done by students and educators in class. The educational experience can be more stimulating, fun and encourage more critical thinking than the traditional method (Robles & Braathen, 2002)

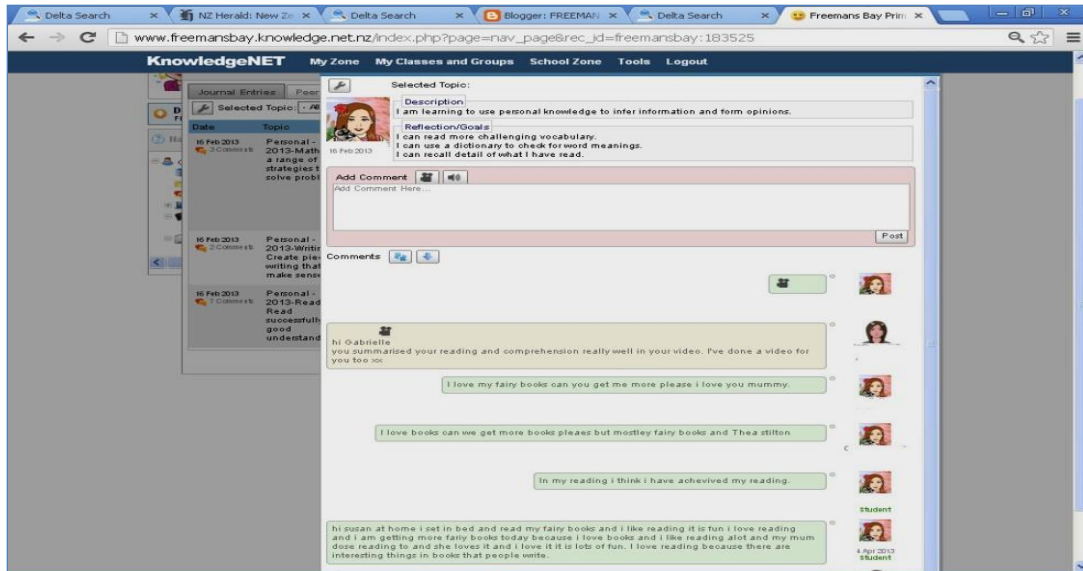


Figure 2.1 Online comments and feedback

Reliable and Valid Measurement

The question and marking in online setting is reliable and valid. To establish a valid and reliable CBT, the International Guidelines on Computer-Based Testing (International Test Commission 2004) stated that equivalent test scores should be established for the conventional paper-based testing (PBT) and its computer-based mode (Piaw, 2012). Firstly, allowed faculty to make online changes to the questions and answers prior to publication of the examination and secondly, there was little chance of a security breach, as only the “webmaster” in charge of the examination would have access to the paper (Lim et al., 2006). This popularity was largely due to their economy and standardized structure that enabled reliable and valid measure (Buchanan, 2002; Hertel et al., 2002).

Economic and Ecological

The nature of using online setting itself is environmental friendly as it is paperless. Indeed, online assessment platform can be convenient, cost-effective and environmental friendly. Expenses in conducting the online assessments are very low because time and materials can be minimized and all the data acquisition and analyses can run automatically. Other than that, advertising for studies can be simpler and more convenient and cost-effective via Internet (Hertel et al., 2002). The nature of an online course allows the instructor to create online portfolios of students' work. The instructor can create an electronic portfolio of each student's progress in the course, accumulating online homework, comments, instructor notes, and projects to assess student learning. Assessment will consist of monitoring those performance through a pre-determined set of objectives (Robles & Braathen, 2002). Tons of paper would be saved within a year if schools, universities and educational institutions were to replace paper–pencil tests with computer-based tests.(Chua, 2012). Reducing paper consumption will indirectly reduce greenhouse gases and energy consumption

Practical

Online assessment is practical it can be done anytime and as what is planned by educators. It also enables a more flexible pace of learning. Participants respond faster than paper-and pencil questionnaires, which leads to changes of performance norms particularly in aptitude setting and the computer itself have the capability of handling much larger item-pools than what is usually printed on paper-and-pencil versions, and can draw random samples from these item pools (Hertel et al., 2002). Online learning is providing higher education institutions with an entirely new modality for educating learners free from the constraints of time and location (Albee, 2015).

Motivation

Motivation has always been one of the most important factors for learning (Bandura, 1989). It is one of the core components in ensuring the achievement of students. Broadly defined, motivation has been separated into two different categories; extrinsic and intrinsic. Extrinsic motivation is often defined as behavior influenced by external reward or punishment. Intrinsic motivation is described as behavior driven by personal ambition or enjoyment (Brigham, 2015). Academic success is strongly influenced by individual differences in motivation and achievement (Komarraju, Karau, & Schmeck, 2009). As described in an article by (Weiner, 1985), motivation is believed to be determined by what one can get (incentive) as well as by the likelihood of getting it (expectancy) and also refers to an immediate interest or desire to engage in an activity. The study done by Ushida (2005), on students' motivation and attitudes in online language course found that learning in an online platform created a unique class culture and affecting students' motivation and attitudes. The findings also reinforced that student's attitude and motivation has frequently been reported to be the most critical factor for success within computer-assisted learning. The learning process including the assessment using computer especially via online is more unique, fun and absolutely meets the demands on what is needed for 21st skills. The most important element in online learning and assessment is the touch of gamification which what the students are looking for. Students are easily attracted with the online learning including the assessment as it provides modern setting different from what the traditional environment offered. Data analyzed by Marina (2009), showed that the gaming approach was both more effective in promoting students' knowledge of computer memory concepts and more motivational than the non-gaming approach and the online learning can be effective and motivational learning environments. A study conducted by (E. C. Lim et al., (2006), reported that students preferred the computer based assessment than paper and pencil method as they felt more motivated to answer in online setting and they could proceed answering at their own pace.

Regardless of the amount of instruction and interaction that a student may have in the online learning environment, there is debate on whether or not a student's motivation is a factor in their ability to learn. This has been argued in Cocea (2006), which human tutors usually infer motivation from observational cues example like mimics, posture, gesture, conversational cues etc which are difficult to be processed by adaptive systems and most of the research is directed towards finding a way to assess motivation from cues that can be easily processed automatically example learner's interactions with the system or time spent on a task. There are three approaches focussing on motivational states which measures students without directly asking them.

Methodology

This study is a quantitative research with quasi-experiment design. The purpose of this research is to identify the effects of Kahoot!® online assessment on students' performance and motivation. This research comes with another objectives which to determine the perceptions of students and lecturers about the usability of Kahoot!® online assessment. Quantitative methodology is an appropriate method to support the data analysis and collection process. The benefit of quantitative research is that a large number of individuals can be surveyed and the results are quantifiable, however, quantitative research does not depict the human experience (Creswell, 2005). Quantitative studies use statistical instruments to measure variables and collect data (Neuman, 2008). T-test is an inferential statistics test used in this study to compare two sets of data. It is used in this research due to random sampling. T-test is run to determine whether there are significant differences between the two sets of data (Piaw, 2014). There are four types of T-test 1- Independent samples t-test, 2-Paired-samples t-test, 3-Matched-smples t-test and 4-One-sample t-test. The paired-samples t-test is used in this research because pre and post test is carried out. Student achievement scores from the control and treatment groups in the pre-post tests will be measured twice. Data from both measurements is compared. Each individual will obtain two scores which are from the pre-post tests respectively. The t-test is used to determine whether there is a significant difference between mean values from two sets of data. Students' scores from the pre-post tests will be analyzed using Statistical Package for the Social Science (SPSS). The result from the SPSS through t-test analysis will be paired samples statistics, paired samples correlations and paired samples test. Table of paired samples statistics will show the differences in mean value for pre and post test. From paired samples correlations table, correlation value will be shown. Analysis from t-test will determine either null hypothesis of this research is rejected or accepted. The components of t-test will be reported are the value of t-test, significant level, sample size, mean score and standard deviation.

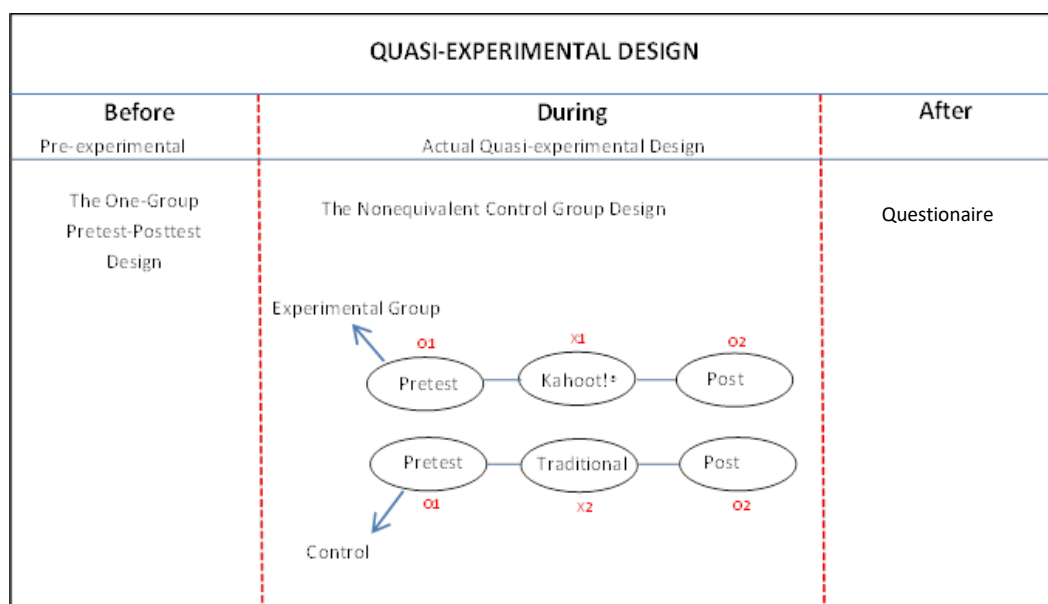


Figure 2.2 Design using quasi-experiment research

Conclusion

Kahoot!® is online tool that helps teachers to create an active, competitive, engaging fun environment and relaxing atmosphere, which can help improve learner performance as well. Kahoot!® is valuable not only for academic purposes, but also psychological purposes. Students can grow in confidence by doing well on the quiz as well as by being recognized by their teachers and peers. Will all the experiment conducted and data gathered from publications, it is highly recommended that Kahoot! ® to be applied in conducting formative assessment in higher education institution.

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