Online Educational Games:

Exploring Frequency, Placement, Type, and Student Choice

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Abstract

Many educators across the country would agree that technology can be used to increase student motivation and achievement in the classroom. The issue this study addresses is the lack of knowledge about best practices of the implementation of online educational games in the classroom. To address this problem, the objective of this mixed-methods study will be exploring various implementation factors (frequency, placement, type, element of student choice) and their relationship to student motivation and achievement in the secondary English Language Arts classroom. Researchers will work collaboratively with Missouri teachers to design, conduct, and analyze a series of unit plans containing online educational games that will test the aforementioned implementation factors. Surveys, interviews, and focus groups will be conducted with both teachers and students to gather data. From this data, we will hopefully gain insight into which implementation factor(s) have the greatest effect on student motivation and achievement. These insights will be useful for understanding the best way for educators to implement online educational games in the classroom.

Introduction

With the rise of technology being incorporated into K-12 classrooms across the country, it is important for educators to understand best practices of integrating new technologies with the curriculum. Many educators will acknowledge that utilizing technology in the classroom increases student motivation and achievement. Beyond this, there is a deficiency in understanding key implementation factors such as frequency, placement, type, and the element of student choice. The purpose of this study is to explore the relationships of these various implementation factors in order to maximize student motivation/achievement.

Online educational games are designed to help students learn about certain subjects, expand concepts, reinforce development, or assist them in learning a skill as they play. For this study, the frequency of online educational game is considered how often the game is repeated during the unit. The placement is defined as the particular place within the unit in relation to the instruction, practice, and assessment. The type of online educational game includes the platform. Examples of online educational games include Kahoot, Quizlet, Quizizz, and Socrative. Student choice happens when students are allowed to choose from two or more options. Choosing individually, as a team, or as a class, students might choose frequency, placement, or type of online educational game.

Central Question How does the implementation of online educational games within a given unit affect student motivation/achievement in secondary English Language Arts classrooms?

Hypotheses

1. There is a positive relationship between the frequency of online educational games and student motivation/achievement.

2. There is a positive relationship between the placement of online educational games and student motivation/ achievement.
3. There is a positive relationship between the type/format of online educational game and student motivation/achievement.
4. There is a positive relationship between student choice of online educational games and student motivation/achievement.

Additional Sub-questions

1. Which of the above implementation factors have the biggest effect on student motivation/achievement?
2. How do the interviews with teachers help to explain any differences in student motivation/achievement?

Literature Review

The literature reviewed for this study largely focuses on the design of online educational games and the effect on student motivation and achievement. Several studies explored specific types of online educational game, but only a few focused on the frequency. Much research has been done about the benefits of student choice in general; however, the element of student choice in how these games are implemented appears to be rather unstudied. Finally, there were findings exploring the relationships between English Language Arts skills and the use of online educational games.

With student motivation being a key component to this study, it is important to understand the theory of intrinsic motivation. The theory of intrinsic motivation began with B.F. Skinner, and was later expanded upon by Hao Wang and Chuen-Tsai Sun's into the idea of

Game Reward Systems which is a "structure of rewards and incentives in a game that inspire intrinsic motivation in the player while also offering extrinsic rewards" (David, 2016, p.1). Online educational games can be intrinsically motivating instruction when, according to Thomas W. Malone, "it provides players with choice around three key categories: challenge, curiosity, and fantasy" (Intrinsically Motivating Instruction, 2015, p.1).

The Design-Based Research method is a lens that combines theory with practice and focuses on "understanding how, when, and why educational innovations work in practice" (Design-Based Research Methods, 2007, p.1). Also, a participatory framework, similar to action research, allows for teacher participants to collaborate throughout the research study and bring about change into the classroom.

Multiple studies have been done about the online educational game, Kahoot. For university students, the game Kahoot has resulted in increased motivation and achievement (Iwamoto, Hargis, Taitano & Vuong, 2017; Wichadee & Pattanapichet, 2018). Similarly, the use of Kahoot has led to high levels of student motivation and achievement in middle-school classrooms as well (Lee, Hao, Lee, Simm & Huang, 2018; Turan & Meral, 2018). The majority of studies that exist are comparing a classroom that utilizes an online educational game with a classroom that does not utilize an online educational game. Games have a tendency to increase the intrinsic motivation for adolescent learners (Jenkins, 2005, p.48-51). Allowing time for play is an integral part of adolescent engagement in the classroom (Conklin, 2014, p.1227-1255).

Studies have been conducted that explore the frequency and implementation of formative assessments (both online and offline) throughout a unit or semester. In another study, the research investigated differences in the amount of credit, the number of attempts, supervised or

unsupervised, timed or untimed, open or closed book. Findings showed that low-stakes (untimed, unsupervised) formative quizzing had the biggest impact on student engagement and achievement (Marden, Ulman, Wilson & Velan, 2013, p.192-200). From a study by McDaniel (2011), it appears that a formative review assessment immediately prior to testing showed the biggest result in student engagement and achievement (p.399-414). The type of questions included on formative assessments was the topic of a later study by McDaniel. When comparing definition and application questions, application questions were found to increase exam performance (2013, p.360-372). In another study, a slight drop in engagement was found with more frequent use of the online educational game, Kahoot (Wang, 2015, p.217-227).

There are many studies that show the benefits of adding the element of student choice into the classroom. A study by Kern & State finds that student choice is easy for teachers to implement and leads to reduced problem behaviors in students (2009). Along with choice, online digital games compared to non-digital activities tend to lead to higher achievement, especially in terms of vocabulary instruction (Dizon & Tang, 2017, p.3-15). The use of Quizlet, an online educational game that provides students with digital flashcards, was shown to boost students' vocabulary test scores by 6% compared to those using traditional methods (Lander, 2016). In addition to vocabulary, grammar and language skills have been studied as well. One study showed that "70% of [university] students [felt] motivated to learn grammar after they [had] played Kahoot" (Zarzycka-Piskorz, 2016, p.14).

These studies have proven that the use of online educational games can lead to increased student motivation and achievement. It is clear that there are benefits to using online educational games. However, it is unclear how best to implement them. Comparisons have been made

between use and non-use of online educational games. The lack of knowledge lies in the comparisons between different frequencies, different placements, and different types. The idea of incorporating student choice into the implementation of online educational games is an unexplored area as well.

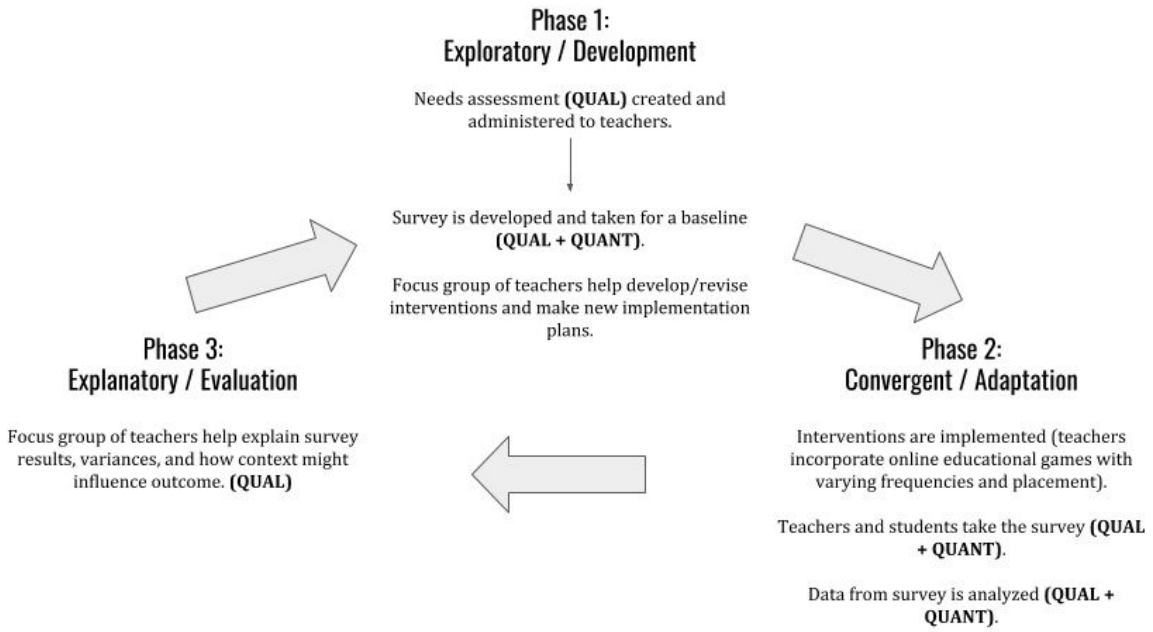
Methods

Mixed methods research, or the use of both qualitative and quantitative data, is a valuable approach for this study. Gaming in an educational sense is at the forefront of new research with more and more districts adopting 1:1 program. This approach allows for a more complete understanding in a few different ways. First, it allows the researcher to compare both quantitative and qualitative survey data. Second, it allows for qualitative follow-up data that attempts to explain the survey data. Third, it allows for the development and creation of various experimental implementation plans. These implementation plans include the use of online educational games in the classroom with varying frequency, placement, and type.

A complex mixed method design is best suited for this study. Specifically, a three-phase evaluation design will be utilized within a participatory framework. Teachers and other stakeholders will have an active role in the process of developing, conducting, and evaluating different implementation plans over time. After analysis, each implementation plan will be revised and the cycle will continue over time with each new unit.

The design illustrated below was selected for its expected outcomes. During phase one, an exploratory sequential design will allow the production of a collaboratively-created survey and an implementation plan. During phase two, the convergent mixed methods design will allow the comparison of different student and teacher perspectives via the merging of both quantitative

and qualitative survey data. During the last phase, the explanatory sequential mixed method will allow for a deeper investigation of the quantitative survey results by collecting qualitative data through participant focus groups interviews.



Population and Sample

In Missouri, there are approximately 68,000 public school teachers. The multi-stage sample design will first identify a population of 6th - 8th grade English Language Arts classrooms that have access to technology for online educational games. From there, a stratified sample will be used to represent the population of all middle-school English Language Arts classrooms in Missouri. Ideally, the sample will proportionately reflect characteristics such as rural or urban, public or private, and size of the school district.

Data Sources, Collection, Management, and Analysis

Data will be collected and interpreted differently during each phase of the study. Prior to the first phase, a preliminary survey will be sent to all Missouri teachers with the goal of identifying a sample for the study.

Once participants have been selected, the first phase begins. During the first phase, qualitative data from the preliminary survey will be hand coded. Questions about educators' opinions of online educational games will be utilized. The first implementation plan will be collaboratively created with teacher participants. Each implementation plan will focus on manipulating and testing one of the variables (frequency, placement, type, student choice). Once implementation plans have been decided upon, researchers and teacher participants will work together to create a teacher and student survey for evaluation of that particular plan. This survey will gather data about perceived and actual student motivation and achievement in relation to the use of online educational games.

After the unit, both teachers and students will complete the survey. During the second phase, qualitative and quantitative data from those surveys will be analyzed using SPSS. After an initial analysis, specific focus groups of teachers and students will be formed. The purpose of these focus group interviews is to follow up with any discrepancies and investigate particular findings from the initial analysis. The qualitative data from these focus group interviews will be hand-coded.

Finally, data from all three phases will then be used to create each new, subsequent implementation plan based on previous findings. New theories will be tested in terms of frequency, placement, type, and student choice of online educational games.

Ethics

During this study, ethical issues will be addressed in a variety of ways. Prior to the study, teacher and student participants will be contacted, informed about the general purpose of the study, and made aware that they do not have to sign a consent form. Since the study involves adolescents, appropriate consent from parents, as well as the children, will be obtained. While collecting data it will be important to avoid deceiving participants, leading questions, collecting harmful information, and disclosing sensitive information. Upon analyzing and reporting the data, aliases will be used to respect the privacy and anonymity of participants and the data will be stored securely.

Timeframes

Prior to the first phase, it is important to take the time to identify the correct sample. This may take a few weeks. Once participants have been selected, several meeting times and dates will be set up throughout the summer to collaboratively plan and create the surveys and implementation plans for the following fall semester. During the fall semester, teachers will follow through with the implementation plan and include time for both teachers and students to take the follow-up surveys. Towards the end of the fall semester, survey data will quickly be analyzed and a few more meeting times and dates scheduled. This will allow researchers to conduct focus group interviews and reconvene with teachers to collaboratively create a new implementation plan for the following spring semester. Again at the end of the semester, teachers and students will take the survey while researchers quickly analyze the data. At the conclusion of the school year, focus group interviews will be conducted. Over the summer, the process will continue with a new implementation plan created for the fall.

Strengths and Weaknesses

There are several strengths to this study. When thinking about internal threats to validity, a few measures are taken into account to mitigate these threats. For example, history and maturation could unduly influence results, but the participants in this study will be aging at the same rate as well as experiencing events at the same time. The selection of participants could predispose them to certain outcomes. However, participants are selected randomly within the criteria for a stratified sample. There are several external threats that need to be considered as well. The interaction of selection and treatment can be addressed by experimenting with groups with different characteristics than the initial sample. The interaction of setting and treatment is already addressed through the repetition of the experiment in different classrooms across the state.

Significance

This study will have immediate implications for educators with access to technology in their classrooms. As more and more teachers begin or continue to utilize online educational games in the classroom, there will be some knowledge as to the best way to do so. As educators and curriculum coordinators design units, there will be information regarding the best frequency, best placement and the best type of online educational game to integrate. The results of student choice on motivation and achievement will hopefully provide teachers with more reason to allow their students options of online educational games. Ultimately, this study will provide educators with practical ways to implement online educational games in their own classrooms to increase student motivation and achievement.

Budget

A budget will need to be considered for the cost of a small team of researchers. Since data will need to be analyzed quickly at certain points during the study, it is important to have enough people to do so. When meeting with educators, money will be needed to rent out meeting space, provide lunches, and cover the cost of substitutes if the meeting takes place during a school day. Finally, the cost of a secure server for a data management system will be required since some survey data might relate to student test scores, and it is important to protect that privacy.

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