Student Perception of Gamification in the Classroom

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INTRODUCTION

Background

The use of game elements in education began in the 1960’s. Piaget (1962) indicated that games could help students navigate their environments and foster their imagination. Today, gamification has been adopted for a variety of reasons. It is often incorporated by educational practitioners and researchers interested in learning analytics or to design self-directed or self-motivated online learning (Deterding & Walz, 2014).

Accessibility to gaming technology is also an important factor for educational leaders to consider. Portable devices are widespread and ubiquitous in high school classrooms. For this reason, it is logical to think of them as tools rather than objects for “digitally native” students (Prensky, 2001). Interactive and online games are often used by educators to encourage student engagement. Today’s classrooms can benefit from incorporating portable devices to engage students in game-based activities. By using low-risk opportunities in a game-like setting, students are able to participate in learning activities in an authentic and engaging way.

Research Question

To what extent does gamification encourage student engagement in a high school math classroom?

Summary

In particular, this research study will examine how Kahoot software can be used to encourage a positive learning environment that embraces friendly competition in a math
classroom. Current trends in education often avoid using competition during classroom activities. Pressures from administrators and other educational stakeholders often discourage situations where students are in an environment that is not completely safe. Using portable devices in a game-like setting may encourage students to challenge each other and themselves. How will this risk make students feel? What will their perception be on the effect gamification has on their individual motivation? The main goal of this research is to gather evidence in regards to student perception of game-based activities by using Kahoot in the classroom.

**Delimitations**

The purpose of this study is to focus on how students perceive their engagement level when participating in online gaming activities in class. The study does not attempt to address whether or not performance levels increase as a result of this engagement. The scope of this project is to determine how students engage with Kahoot software versus other types of classroom activities. Other activities may include textbook work, group work or project-based learning.

**Limitations**

There are many limiting factors with this research project. The main limitation is time constraints. The nature of this project is focused on a snapshot of time with one section of Math at Work 10 students. Extra time and resources would allow for this project to extend into other subject areas as well as perhaps additional studies focusing on how student performance is impacted by gamification activities.


**Justification**

Justification for using gamification in education often stems from its popularity with a variety of student populations. Research suggests that popularity is widespread. The average gamer is 30 years old, is 45% likely to be female, tends to play puzzle, board or casual games, and is likely a part of the 62% who play games socially (Fels & Seaborn, 2015). Understanding the pervasive nature of gaming is important, because it validates the notion that students are largely members of gaming culture in voluntary settings. It is this inherent motivating factor of games that makes it worthwhile to consider when trying to raise student levels of engagement.

**LITERATURE REVIEW**

**Historical Overview**

Using gamification in an educational environment often stems from a philosophy that games are inherently engaging for learners, but what makes games appealing?

A literature review reveals a wide array of descriptions regarding this area of study; however, Avedon and Sutton-Smith (1971) begin by identifying games as a voluntary activity with rules. Their research further indicates that it is an activity that requires a conflict between parties or individuals with equal opportunities for success, but where an unequal end result occurs. Avedon and Sutton-Smith’s (1971) description highlights the idea that games are fun because there is an element of uncertainty and mystery, but everyone participating has a chance to win. The experience is low risk because it is a voluntary undertaking. The voluntary nature is important to note, because in a classroom it might lose some of this appeal if the games are used as part of assessment and broaden in scope away from a game-like opportunity.
In the 1980’s Malone (1980; 1981; 1982) examined why video games were attractive to players and how this could be connected to improving engagement in education settings. Malone’s focus identified the importance of intrinsic motivation that arose from abandoning routine work activities.

Just after the turn of the millennium Prensky (2001) and Gee (2003) focused their attention on game-based learning. Although this work did not specifically target gamification their research regarding the influence of game play on cognitive behaviour became the core of educational gamification.

**Defining Gamification**

In the most simplistic terms, gamification in education is the use of game components such as score, challenge, and achievement to learning objectives, in an effort to motivate and engage the student (Deterding et al., 2011). In order for games to be effective in terms of engaging learners, Sweetser and Wyeth suggest that good game design should consider psychological needs from many perspectives. Their research states that good game-design often includes clear goals, levels of skill, feedback, challenges, engagement, enjoyment and rewards.

The data surrounding digital gaming is also compelling, with studies such as the Pew Internet & American Life Project indicating 99% of boys and 94% of girls playing digital games (Lenhart et al., 2008).
Gaps in the Research

Although there are a lot of anecdotal success stories involving gamification in education, there are a lack of peer-reviewed empirical studies to support these claims. This is especially true when assessing the potential benefits of using game-design in non-game situations (Hamari et al. 2014). There is also substantial controversy in defining and categorizing the word gamification. In literature that advocates game-based learning in an educational context, “gamification” is often used as an umbrella term for anything game-related (Deterding & Walz, 2014).

In a study by Bicen and Kocakoyun (2017) they looked at student preference based on mobile device applications designed for gamified use in classrooms. The applications involved in the study were: Kahoot, ClassDojo, Classcraft and Socrative. Out of 130 undergraduate participants Kahoot was the most preferred gamification application. Kahoot had a preference of 39% with ClassDojo in second place at 29%. Due to these current findings this supported using Kahoot for the purposes of this research project. In fact, one of the recommendations in Bicen and Kocakoyun’s (2017) study was for future research to include using the Kahoot application to apply the gamification method.

A more specific Kahoot study was also conducted by Fotaris et al. (2016), but focused on a computer science course. The researchers designed a 15 question online survey that focused on how students perceived their engagement when playing Kahoot. The results indicated that there was a favourable increase in attention span and engagement. One of the recommendations made by the authors was to encourage further studies involving different subjects. The
researchers were also cautious about the short term data claiming the novelty of the online activities could have an influence on the raised engagement levels.

**Contributions of this Study**

Based on recommendations found in gamification literature it appears that there is a lack of peer-reviewed research related to student perceptions of gamification in the classroom. Based on the popularity of Kahoot specifically it follows that a research project focusing on student perceptions of their engagement level while participating in Kahoot is an area of research that would be beneficial to examine.

**Methodology**

**Research Setting**

Research will be conducted at Citadel High School (CHS) in Halifax, Nova Scotia. The school is composed of approximately 1450 students in grades 10 through 12. The school is staffed with one principal, 3 vice-principals, classroom teachers, resource teachers, guidance counsellors, and many other support staff. The research will take place in a Math at Work 10 class, composed of 21 students. The class takes place on normal school days during the first semester of the 2017-2018 school year. All classes are 75 minutes in duration. Students have or will be provided with personal devices that can interact with the Kahoot software used for this research. Students also have access to the school’s WiFi.
**Researcher’s Relationship to Setting**

The researcher is the Math at Work 10 classroom teacher for the students involved in this study. As the instructor, there will be some inherent bias with the research being conducted. All student responses and collected data will be analyzed solely by the researcher. To minimize bias, all responses will be collected without personal identifiers.

The involvement of the researcher does pose some risks to the validity of the data; however, the anonymous data collection will help mitigate as much bias as possible. The data collection will focus on student response without personal input from the researcher. The research participants are at a low risk of harm as students will be completing the same activities regardless of their involvement in the research.

**Research Design**

A cross-sectional survey design (Creswell, 2012) will be used for conducting this research. This type of design is common in educational research and though not as rigorous as experimental designs, it allows for a focus on emerging trends based on data. The focus of the research question for this study is related to perceptions of students, which fits with the tradition of cross-sectional surveys being used to identify important beliefs and attitudes (Creswell, 2012). A cross-sectional survey design is also appropriate for this study, because the data will be collected by the researcher at one specific point in time.

One advantage to using a cross-sectional design for this study is the ability to provide information in a short amount of time. The survey will be administered using Google Forms and will provide quantitative data using a Likert scale of 1-5, with 1 being strongly disagree and 5 being strongly agree.
Methods of Data Collection

The data collected for this study will be in the form of student survey. The student sample selected for this research is small relative to the overall population of students taking Math at Work 10 in Nova Scotia. To narrow the scope of this study the target population (Creswell, 2012) will be Math at Work 10 students in the HRSB and the sample will be the 21 students that are participants in this research study at Citadel High School. The sample size mentioned above may vary depending on submission of parental consent forms. All best efforts were made to follow best practice for sample selection. Due to the small scope of the study some compromises will occur regarding: coverage error, sampling error, measurement error and nonresponse error (Creswell, 2012). As a web-based survey it is also important to note some methodological issues. Sills and Song (2002) note that these types of surveys often result in low response rates. The researchers also point out that there are problems regarding non-random sampling, which makes it difficult to make generalizations to a general population.

Research Findings

Data Analysis

The data analysis of this study will be based on student surveys in the form of questionnaires. The questionnaires will be given through Google Forms with no identifying markers. To follow appropriate procedures with cross-sectional design it is necessary for the researcher to report on the response rate of the survey and by checking for bias in responses (Creswell, 2012). The analysis will include a descriptive report for each item of the survey as well as an effort to correlate questions to build scales that reflect groups of questions. The
quantitative data will be analysed using tables and graphs that focus on both a question by question basis, as well as the correlative analysis that is reflected by groups of questions.

Findings

During this quantitative study a five-level likert scale was used. The survey contained ten items. The survey focused on 3 main themes relating to student perceptions of themselves.

Item 1 addressed the students’ ability to access the software in a classroom setting. It stated, “I found it quick and easy to login to Kahoot”, out of 5 respondents, 5 out of 5 students (100%) strongly agreed that it was quick and easy to access the software.

Items 2,3 and 4 addressed the students’ initial motivation for engaging with the Kahoot software. Item 2 stated, “Kahoot motivates me because I want to earn points.” For this item, 1 out of 5 students (20%) neither agreed nor disagreed, 1 out of 5 students (20%) agreed, and 3 out of 5 (60%) strongly agreed. The median and mode (3) of this item indicates that students “strongly agree” that earning points motivates them to engage with the course content.
Item 3 stated, “Kahoot motivates me because of the presence of a leader board. For this item, 1 out of 5 students (20%) neither agreed nor disagreed, 1 out of 5 students (20%) agreed, and 3 out of 5 students (60%) strongly agreed. The median and mode of this item (3) suggests that students strongly agree that the presence of a leader board in Kahoot has a motivating influence.

Item 4 stated, “Kahoot motivates me because of competition with my peers”. For this item, 1 out of 5 students (20%) agreed and 4 out of 5 students (80%) strongly agreed. The
median and mode of this item (4) suggests that students strongly agree that peer competition during Kahoot was a motivating factor.

Items 5,6 and 7 addressed the students’ focus and desire to be successful when engaged with opportunities involving Kahoot. Item 5 stated, “during Kahoots I am focused on the activity”. For this item, 1 out of 5 students (20%) neither agreed nor disagreed, and 4 out of 5 students (80%) strongly agreed. The median and mode of this item (4) suggests that students strongly agreed that they were focused on activities involving Kahoot.
Item 6 stated, “I want to learn to be more successful and get a higher score at Kahoot”. For this item, 2 out of 5 students (40%) agreed, and 3 out of 5 students (60%) strongly agreed. The median and mode of this item (3) suggests that students “strongly agree” that when engaging in Kahoot they want to be successful to gain a higher score.

![Chart for Item 6]

Item 7 stated, “I try my best in class when I’m doing Kahoots”. For this item, 2 out of 5 students (40%) agreed and 3 out of 5 students (60%) strongly agreed. The median and mode of this item (3) suggests that students “strongly agree” that they try their best when playing Kahoot.

![Chart for Item 7]
Finally, items 8, 9 and 10 addressed the students’ perceptions of their effort level when engaging with more traditional classroom activities. Item 8 stated, “I try my best in class when I’m using our math work book”. For this item, 1 out of 5 students (20%) neither agreed or disagreed, 1 out of 5 students (20%) agreed, and 3 out of 5 students (60%) strongly agreed. The median and mode of this item (3) suggests that students “strongly agreed” that they try their best when using a math work book.

I try my best in class when I'm using our math work book.

![Chart showing responses]

Item 9 stated, “I try my best in class when I’m doing group work”. For this item, 2 out of 5 students (40%) neither agreed nor disagreed, and 3 out of 5 students (60%) strongly agreed. The median and mode of this item (3) suggests that students “strongly agreed” that they try their best during group work.
Item 10 stated, “I try my best in class when I’m working with concrete materials.”

For this item, 1 out of 5 students (20%) neither agreed nor disagreed, and 4 out of 5 students (80%) strongly agreed. The median and mode of this item (4) suggests that students “strongly agreed” that they try their best when working with concrete materials.

Summary of Results

The purpose of this study was to examine student perceptions of using Kahoot software in the math classroom. As shown in the results above, there were four main themes that were examined with this research project. Based on the first theme that was examined in item 1, 100% of students indicated that they did not have any issues accessing the Kahoot software.
The second theme that was examined in items 2, 3 and 4. The trend here demonstrated that nearly 87% of students either agreed or strongly agreed that there were characteristics in the Kahoot software that motivated them to engage with their math outcomes.

The next theme was examined in items 5, 6 and 7 and indicated that over 93% of students agreed or strongly agreed that Kahoot increased their focus and desire to be successful when engaging in math outcomes.

Finally, the last theme addressed student perceptions of how they engaged with more traditional math activities. This theme was examined in items 8, 9 and 10 and indicated that just over 73% of students agreed or strongly agreed that traditional classroom activities increased their engagement in relation to the math outcomes.

**Conclusion and Discussions**

**Discussion of Results**

The results of this research matches much of the research discussed earlier in the literature review. The description of gamification in education as the use of game components such as score, challenge, and achievement to learning objectives, in an effort to motivate and engage the student (Deterding et al., 2011) coincides with many of the survey responses from this study’s survey. In fact, the survey items 2, 3, and 4 directly support that Kahoots use of game components was an effective motivating factor.

In the Bicen and Kocakoyun (2017) study they looked at student preference based on mobile device applications designed for gamified use in classrooms. The applications involved in the study were: Kahoot, ClassDojo, Classcraft and Socrative. Out of 130 undergraduate
participants Kahoot was the most preferred gamification application. Although, the research presented in this paper does not compare other applications. The positive student responses reported in the student survey regarding motivation and engagement with Kahoot seem to suggest that it is regarded positively as a classroom tool for gamification.

**Implications**

It is difficult to attach any meaningful implications to this study due to the extremely small sample of students. Although, the study supports using Kahoot to promote students’ motivation and engagement, it is necessary to be cautious as only five students completed the survey.

**Suggestions for Further Research**

In making suggestions for future research it is clear that there is a great need for more studies involving gamification. As mentioned in the literature review, Fotaris et. al. (2016) designed a 15 question online survey that focused on how students perceived their engagement when playing Kahoot. The results indicated that there was a favourable increase in attention span and engagement. One of the recommendations made by the authors was to encourage further studies involving different subjects. The researchers were also cautious about the short term data claiming the novelty of the online activities could have an influence on the raised engagement levels.

Although the research conducted in this project attempts to look at Kahoot in a math classroom, it is important that more work is done to complete studies with larger sample sizes. It is also important to remain cautious as Fotaris et. al (2016) suggest when looking at whether or
not student engagement sustains over longer periods of time. Future research should attempt to gather evidence over longer periods of time and also attempt to assess the effectiveness of gamification in a broad range of subjects.

**Personal Reflection**

Upon completing this specific research project it is apparent that this study needs to be duplicated with a larger sample size. As mentioned in above, Sills and Song (2002) noted that online surveys, like the one offered in this report, often result in low response rates. These researchers also pointed out that there are problems regarding non-random sampling, which makes it difficult to make generalizations to a general population. It is for these reasons that this research simply points to the need to duplicate this study with a larger sample before discussing further implications.
Back Matter

References


Retrieved


Appendix A

Game-Based Learning Questionnaire

Respond to the following questions using the following guide:
  1  Strongly Disagree
  2  Disagree
  3  Neither agree or Disagree
  4  Agree
  5  Strongly Agree

I found it quick and easy to login to kahoot.
1 2 3 4 5

Kahoot motivates me because I want to earn points.
1 2 3 4 5

Kahoot motivates me because of the presence of a leader board.
1 2 3 4 5

Kahoot motivates me because of competition with my peers.
1 2 3 4 5

During Kahoots I am focused on the activity *
1 2 3 4 5

I want to learn to be more successful and get a higher score at Kahoot. *
1 2 3 4 5

I try my best in class when I'm doing Kahoots.
1 2 3 4 5

I try my best in class when I'm using our math work book.
1 2 3 4 5

I try my best in class when I'm doing group work.
1 2 3 4 5

I try my best in class when I'm working with concrete materials.
1 2 3 4 5
STUDENT AND PARENT/GUARDIAN INFORMED CONSENT

Student Perceptions of Gamification in the Classroom

Research Purpose
As part of my graduate studies at Cape Breton University I am conducting research around my teaching practice. The purpose of this research is to study student perceptions regarding the use of Kahoot software in a math classroom. Students who participate in this study will play a web-based game that focuses on curriculum outcomes. Participants will complete a short questionnaire to reflect on the experience. The activity, itself, is part of the normal class requirements however I am requesting that students complete a survey regarding the experience. It is this survey questionnaire that I am asking students to complete as part of the research study.

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Research Description
As per Halifax Regional School Board policy, the researcher will adhere to the following:

· No HRSB students, parents, staff or schools will be identified in any publications or presentations resulting from this research.
· Confidentiality of participants will be maintained throughout all research activities and all individual identifiers will be destroyed after completion of the data analysis.
· No personal information will be used to contact participants after completion of the research.
· Information collected during this research will only be used in the manner indicated in this application.
· I will provide HRSB with copies of interim and final research reports and/or publications (e.g., abstracts or executive summaries).
Informed Consent

I ______________________________________ (student signature) have been informed of the purpose of this research and agree to participate in this survey. If you have any questions that have not been answered satisfactorily by the researcher(s) or supervisor(s) named above, please contact:

I ______________________________________ (parent/guardian) have been informed of the purpose of this research and agree to allow my child to participate in this survey. If you have any questions that have not been answered satisfactorily by the researcher(s) or supervisor(s) named above, please contact:

If you have any questions that have not been answered satisfactorily by the researcher(s) or supervisor(s) named above, please contact the Vice-Chair of the Research Ethics Board at Cape Breton University, John Hudec, at (902) 563-1982 or email John_hudec@CBU.ca

Note: Participants are to be informed of the researcher(s)’ “Duty to disclose” suspected abuse or neglect of a child or an adult in need of protection. Under section 23(1), Nova Scotia Children and their Family, The Protection of Children and Adoption (1990) states that “Every person who has information, whether it is confidential or privileged, indicating that a child is in need of protective services shall forthwith report that information to an agency.” Agency is defined as “an agency continued by or established and incorporated pursuant to the act…” that is, Nova Scotia Department of Community Service Child Welfare.