Game-Based Learning & Truancy

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Abstract

This qualitative action research study examines the relationship between game-based learning and truancy in an elementary classroom. I collected data over a four-week period during 2015. During this study I looked for patterns of change in attendance behavior when the game-based learning software, MinecraftEdu (TeacherGaming, 2015), was scheduled and played during the first 30 minutes of the school day. The study is a narrative analysis of interviews, observations, surveys and documents. My interpretation of the data revealed positive changes in attendance behavior when MinecraftEdu was used in the classroom. When the game was played students generally felt engaged and motivated to attend and be on time for school.

Game-Based Learning & Truancy

Introduction

During the past 10 years, 2006-2015, I have had the pleasure of working as an elementary teacher. Throughout this time I have seen how poor school attendance affects a child's relationship with school. When attendance becomes an issue, disengagement is heightened and the student is at risk to become disconnected from his or her learning and education.

The purpose of this action research study is to understand the relationship between game-based learning, specifically MinecraftEdu, and student attendance by looking for patterns of change in students' behavior by collecting and analyzing various data sources related to game-based learning and attendance.

The research questions that guide this study are as follows: How does the use of MinecraftEdu in the classroom enhance learning? How does using MinecraftEdu in the classroom influence attendance?   Do chronically tardy students' attendance improve when MinecraftEdu is played during the first part of the school day?

Literature Review

Education is constantly evolving, especially in the area of technology. Technology is shaping the way teachers teach and students learn. Technology in education is necessary to prepare students to compete, succeed and live in the 21st century but technology can also help motivate and engage students in high quality learning. Teachers wishing to enhance engagement and motivations should implement technology as much as possible to support instruction (Godzicki, Godzicki, Krofel, & Michaels, 2013).

One of the ways technology is influencing education is through game-based learning. Game-based learning is the use of games to enrich the learning process. Game-based learning

has been around for almost a half-century and started gaining in popularity in the 1970s with educational games like "The Oregon Trail" (Isaacs, 2015). Game-based should not be confused with gamification in the classroom. Gamification is the idea of adding game elements to a nongame situation (Isaacs, 2015). MinecraftEdu is an example of game-based learning.

Game-based learning can be effective in the classroom. One meta-analysis report concludes that 29 out of the 40 selected studies show that educational games have a positive effect on learning, 7 out of the 40 studies show neutral effect and 2 had unclear results (Backlund & Hendrix, 2013). The studies listed in this literature survey occurred between 2002 and 2012 and covered various grades and topics. The study by Backlund and Hendrix concludes that education games are not always superior to other types of learning material but there is strong evidence that educational games can be effective learning tools. Although the article concludes that game-based learning can be effective, it points out that there is a need for more research. It is important to point out that game-based learning and its effectiveness as a tool in the classroom is a broad topic especially considering that not all games are equal in quality. When examining the effectiveness of game-based learning it may be more informative to look at each game or program separately or to be more specific.

Regardless of the broad subject and need for more research, there are published reports and case studies regarding game-based learning that find that computer games have an important role to play in learning. One report found that in order for games to positively impact learning the games must be related to learning outcomes and be relevant to real world contexts of practice (Freitas, 2006).

Motivation is a key aspect of effective learning. "Therefore the key challenge of effective learning games is for the learner to be engaged, motivated, supported and interested but

also importantly for learning to be undertaken in relation to clear learning outcomes as well as being made relevant to real world's context of practice" (Freitas, 2006, p. 5).

Student engagement plays an important role not only in game-based learning but in school in general. One area where student engagement is visible is in attendance. It is well researched that absences from school (particularly unexcused absences) signal school disengagement. One commonly cited reason that students have given for not attending school was that they "found classes not challenging enough (worksheets and reading with lectures were the predominant activities)" (Railsback, 2004, p. 8).

Absences can negatively impact learning. In Railsback's 2004 study, she determined being tardy is also a form of missing school and has been shown to negatively impact achievement. Her research also found that being tardy not only affects the student but also his or her classmates. The negative impact caused by absences and tardies, both on individuals and classes, are very serious problems in schools (Railsback, 2004).

For decades schools have been looking for effective strategies for increasing attendance. Perhaps schools should be looking at how the school experience contributes to absenteeism to keep young students "engaged, in school, and learning what they need to know to be successful" (Railsback, 2004, p. 2). There are school factors that are correlated with both the average number of tardies in a classroom as well as with individual student achievement. One such factor is teacher engagement. "For example, some schools may attract particularly effective or engaging teachers. Thus, classrooms in this school might experience fewer instances of student tardies as a result of being exposed to this set of effective or engaging teachers; alternatively, these effective or engaging teachers might be able to mitigate the educational consequence of having tardy student in their classroom" (Gottfried, 2014, pp. 12-13).

There are some students who would rather be playing video games at home than attending and learning at school. Many students find video-games and technology engaging. Educators can motivate students with game-based learning in the classroom. The popular video game MinecraftEdu provides a new medium for educators and students to unleash their creativity. Joel Levin, an elementary teacher in New York City, was first drawn to Minecraft™ ("Minecraft," 2014) in 2010 (Granata, 2015). He was amazed at how much his 5 year old daughter was learning from playing the game. He brought the computer game into his classroom which lead to the creation of the mod MinecraftEdu (Granata, 2015).

MinecraftEdu is a school-ready version of the original hit game Minecraft. MinecraftEdu has many features (like teacher controls) that make it more suitable for school settings ("MinecraftEdu - About," 2015). In February of 2014 there were over 100 million registered Minecraft users (Futter, 2014).

Minecraft is sweeping the globe. Some countries have even made it part of their curriculum. In Northern Ireland the government made MinecraftEdu available to every student in post-primary school ("Minecraft Launches in NI Schools in Innovative Technology Project - BBC News," 2015). MinecraftEdu is game-based learning that can be adapted to align to core academic standards and assessments. It engages students and creates a high level of on-task behavior. It teaches 21st century skills. Students' interests drive their engagement and motivation which plays an important role in their attendance. By increasing students' motivation to attend school, game-based learning such as MinecraftEdu in the classroom class can have a positive effect in the classroom (Tromba, 2013).

The literature included in this review revealed three themes related to game-based learning and elementary attendance. First, technology infused game-based learning can enhance

student engagement and motivation. Second, research shows one reason students miss school is because they are disengaged and this can have a negative impact on achievement. Third, using students' interest in the software can make MinecraftEdu an effective game-based learning tool in the classroom by engaging and motivating students. The first and second themes are well documented with existing research. The third theme, looking at the relationship between game-based learning and attendance, is a relatively young field of study.

Method

In this action research study, game-based learning and attendance, I took an action based research approach to examine a real world situation without manipulating it. Through this qualitative research design, I explored the relationship between using game based learning (specifically MinecraftEdu) and attendance. If game-based learning occurs during the first 30 minutes of the school day will students be less likely to be tardy or absent?

Participants

The participants for this action research study were a convenience sampling of 18 students from a 2nd grade classroom, 11 male and 8 female students, ages seven through eight. Student names and other identifying information, were not included in the data collection process and were not part of data analysis. Data was collected by myself. The data collection period took approximately 4 weeks.

Documents

I started collecting attendance data prior to initiating early morning gaming to establish a baseline to use for comparison between attendance with and without early game-based learning. I collected basic attendance information through attendance record documents.

Interviews

I collected data through semi-structured individual interviews. When a student was tardy or absent, I verbally asked the student the experience question: "Why were you late/absent?". I recorded the student's oral narrative response. I also recorded any field notes regarding the interview immediately following the interview.

Surveys

Data was collected from a survey that was given to students at the end of the data collection period (see Appendix A). The objective of this survey was to record student feedback about their experience using MinecraftEdu in the classroom. The survey was given to all students in a paper-pencil format to answer.

Observations

Observations occurred in the classroom during early morning sessions of MinecraftEdu. When a student arrived late to the classroom I observed the student's verbal and emotional reaction.   During the observation any field notes were immediately documented following the observation.

Analysis

Internal validity in this study was accomplished through triangulation, the analysis of multiple sources of qualitative data (Merriam, 2009). The goal of this qualitative action research was to focus on understanding the relationship between game-based learning, specifically MinecrafEdu, and student attendance. I looked for behavior changes in my students' by collecting and analyzing various data sources related to game-based learning and attendance. A narrative analysis of interviews, observations, surveys and documents was completed at the end of the data collection and analysis period.

Results

The results of the 4 weeks of data collection were very informative. Data was collected through attendance records, interviews, observations and student surveys. During the data collection period, patterns of change in student attendance behavior was noted.

One focus of the research project was to understand if scheduling and playing MinecraftEdu in the classroom during the first 30 minutes of the school day would have an influence on attendance. Attendance records were collected over a 4 week period. During which time, there were 19 days of school. Nine of those days were labeled on the calendar as Minecraft days. On Minecraft days, the popular game-based learning program was played first thing in the morning for 30 minutes.

A total of 25 attendance notes were logged during the data collection period. Figure B1 (see Appendix B) breaks down the attendance records that were examined. There were 20 tardies, 3 unplanned absences and 2 planned absences documented.

There were half as many tardies on days with Minecraft intervention. Figure C1 (see Appendix C) illustrates the average daily number of tardies. There was an average of 1.4 tardies per non-Minecraft day, while there was an average of .67 tardies per day when MinecraftEdu was played.

There were half as many unplanned absences on days with Minecraft intervention. Figure D1 (see Appendix D) shows 2 unplanned absences on non-Minecraft days, as opposed to 1 on a Minecraft intervention day.

During the reporting period there were two documented preplanned absences that occurred on a day with MinecraftEdu. Both preplanned absences were schedule prior to Minecraft days being chosen.

The total number of students who were tardy was also reduced during the period of time where MinecraftEdu was played. Attendance data displayed in Figure E1 (see Appendix E) shows there were 6 students who were tardy on the non-Minecraft days as opposed to 3 students who were tardy on days with the intervention.

Figure F1 (see Appendix F) shows that there was a total of 2 students who had unplanned absences on non-intervention days. There was 1 students who was absent on a day with MinecraftEdu.

Another focus of the study was to look for patterns with chronically tardy students and to see if attendance improved when MinecraftEdu was played during the first part of the school day. Attendance data displayed in Figure G1 (see Appendix G) shows that only two students in the class had more than 2 tardies. These two students were responsible for 2/3 of the class's tardies and were chronically late to school. Student B had 7 tardies and 3 unplanned absences. Student D had 9 tardies and 0 absences.

Figure H1 (see Appendix H) shows that student B's attendance was dramatically higher on Minecraft days. On days without game-based learning intervention, Student B arrived on time to school 50% of the time. On days were MinecraftEdu was planned, Student B arrived at school 78% on time. Data collected through individual interviews reveal that both of Student B's tardies, on Minecraft days, were due to parental decisions and were out of the control of the student.

Student D's attendance did not show a significant difference between non-Minecraft and Minecraft days. Student D arrived at school on time 50% of the time during non-Minecraft days. On days were MinecraftEdu was played Student D arrived at school on time 56% of the time.

Data collected through individual interviews reveal that 3 out of the 4 tardies that Student D had on days with MinecraftEdu were due to reasons outside of the student's control.

During the student survey, both chronically tardy students indicated they had tried to get to school early on the days with MinecraftEdu in the morning. In fact, Figure I1 (see Appendix I) shows that all of the students who had been late or absent during the four week period, reported that they tried to get to school early on days with MinecraftEdu.

The last question that guided this study looked for patterns in how MinecraftEdu enhances learning in the classroom. In addition to attendance, research has found that keeping students motivated and engaged is a key aspect of effective learning (Freitas, 2006, P. 5). On the student survey, when students were asked how they felt about MinecraftEdu, all 18 students referenced positive feelings. Figure J1 (see Appendix J) shows the most referenced word on question 1 of the student survey was "fun".

Every student in the class reported that they thought MinecraftEdu should be played at school (see Figure K1, Appendix K). Students were asked a follow up question, "If yes, what time should Minecraft be played at school and why?" The most popular response was in the morning but most of the 2nd graders who were given this survey did not state why.

Fourteen students indicated they always arrive at school on time. When those 14 students were asked why they came to school early the most popular answer was "to learn". Figure L1 (see Appendix L) shows that 9 students listed Minecraft as a reason why they come to school early. During observations 0 negative comments were heard or recorded regarding Minecraft.

Discussion

The purpose of this action research study was to understand the relationship between game-based learning and student attendance. I collected and analyzed various data relating to

MinecraftEdu and attendance and found patterns of change in students' behavior. Significant

changes in attendance and engagement were noted when MinecraftEdu was used as an

intervention in the classroom.

These results demonstrate a possible relationship between student attendance and

engagement through game-based learning similar to the results that were found in the literature

review included in this study. By increasing students' motivation to attend school, MinecraftEdu

in the classroom had a positive effect on student behavior (Tromba, 2013).

Using MinecraftEdu positively influenced attendance. The number of tardies and

unplanned absences were reduced by 50% on days were MinecraftEdu was played.   This

popular game-based learning program also appeared to positively increase attendance rates for

some chronically tardy students. However, not all chronically tardy students had significant

changes in attendance. This could be a result of students' level of dependency on others. For

example, some students, especially young students like these second graders, rely on others to

wake them up and get them to school on time.

The results of this action research, in general, support the notion that students are engaged

and motivated when MinecraftEdu is used in the classroom and by increasing engagement, this

intervention has a positive effect on attendance.

Though the internal validity and the experimental realism of this study seems strong it

should be noted that it is limited in that it used a convenience sample. The study also suffers

from limitations regarding a short data collection window. I would recommend lengthening the

collection window to a minimum 8 weeks.

Based on the initial patterns of changes found in this study, I would recommend further

studies in the correlation between MinecraftEdu and attendance.   Additional research is needed

to explore if similar changes in behavior occur in older, more indepent students.   Another study

of interest would be to see if similar patterns of change occur with sporadic unannounced use of

MinecraftEdu in the classroom.

Conclusion

A November 2015 podcast, by EdSurge, regarding Minecraft stated, "Imagine you are a

student in school, you come to school one morning and the teacher asks you to take out your

very favorite toy and use it for the next hour to learn math" (Winters & Madda, 2015). Is it

accurate to compare students using Minecraft in the classroom to students using their favorite toy

to build knowledge? Would attendance improve if a student was allowed to use their favorite toy

to learn? Results from this action research seems to indicate that it can.

The data showed that when the popular game-based learning software, MinecraftEdu ,

was used at the start of the school day, positive patterns of change were noted in students'

attendance behavior. The results were insightful.

Educational technology is expanding and so is the impact it has on students' ability to

compete and succeed in the 21st century. This new growing field creates a need for further

understanding about the influences technologies have on students. Educators, parents and

students need to be aware of the ways game-based learning can change behavior through

motivation and engagement.

The results of this study suggest that MinecraftEdu could be used as an effective strategy

for increasing attendance. Truancy is a very serious problem facing schools today. Absences

and tardies negatively impact learning. I am fascinated by the level of enthusiasm I witnessed

when MinecraftEdu was used as a tool by the teacher. Programs like Minecraft could be used as

an intervention to truancy issues by engaging, motivating, and supporting interests in the

classroom. I plan to continue to use MinecraftEdu as an intervention tool. I suggest, other

educators who are dealing with truancy issues, explore using MinecraftEdu. Many schools

around the country have afterschool Minecraft clubs, but based on the results of this study,

perhaps schools should consider changing the time or adding a before school Minecraft clubs.

MinecraftEdu just might be the powerful intervention tool schools have been looking for.

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Appendix A

Student Survey

Name_____

1. How did you feel about using Minecraft in class?

_____

_____

_____

2. Do you think Minecraft should be played at school?

☐ Yes   ☐ No

If yes what time should Minecraft be played at school and why?

_____

_____

If no why?

_____

_____

3. Do you always come early to school before the morning bell rings?

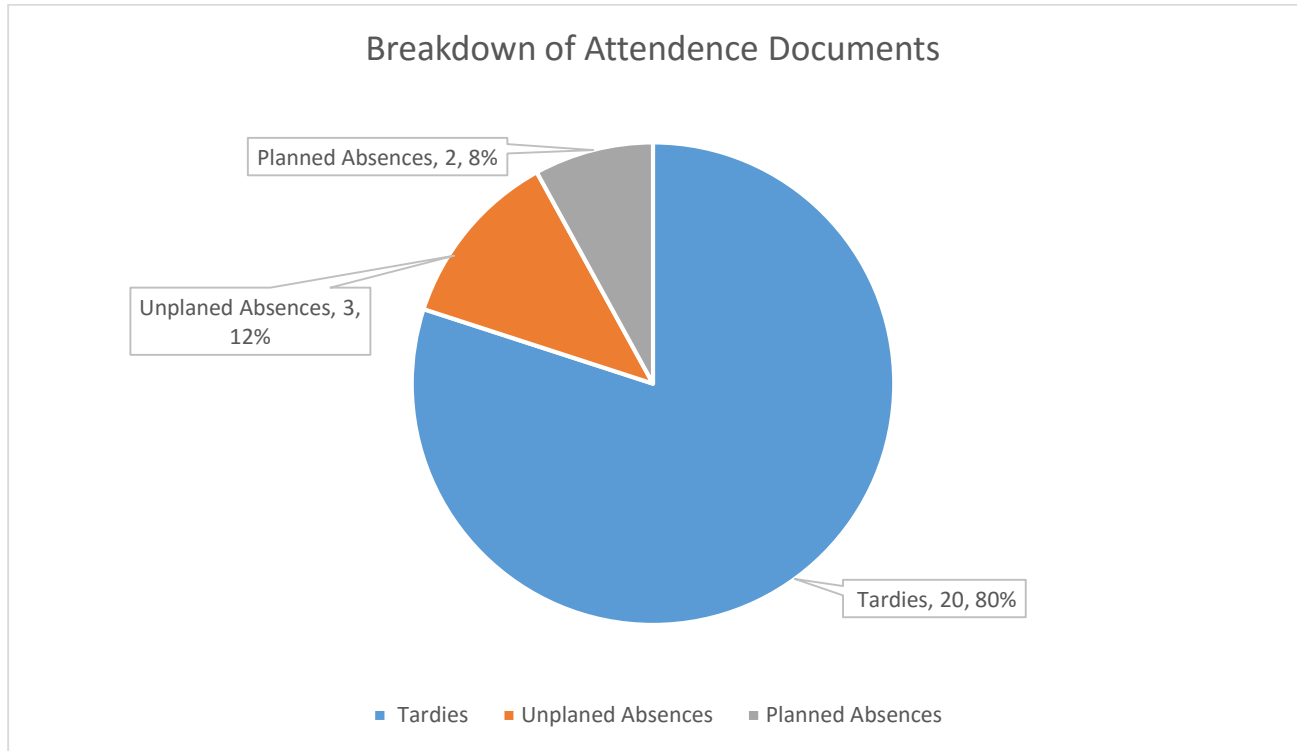|	
☐ Yes	☐ No
If yes, why were you early? ☐ Its when the bus brought me ☐ Its when I get dropped off ☐ To learn ☐ To see friends ☐ To go to breakfast club ☐ To play Minecraft ☐ Other:_____	If no, why you were you tardy? ☐ I slept in ☐ I Missed the bus ☐ Had to wait for family ☐ Took me a long time to get ready ☐ I didn't feel good ☐ I didn't want to go to school ☐ Other:_____

4. On the days we had Minecraft did you try to get to school on time?
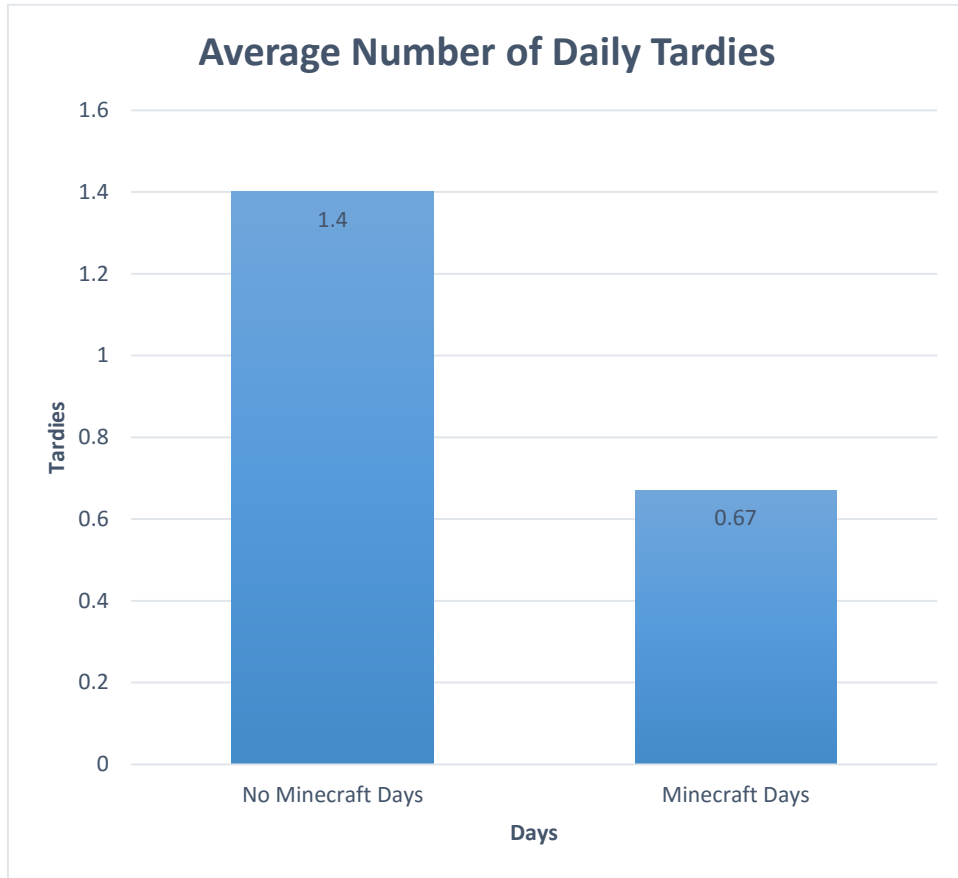
☐ Yes   ☐ No - it didn't matter

Appendix B

Figure B1.
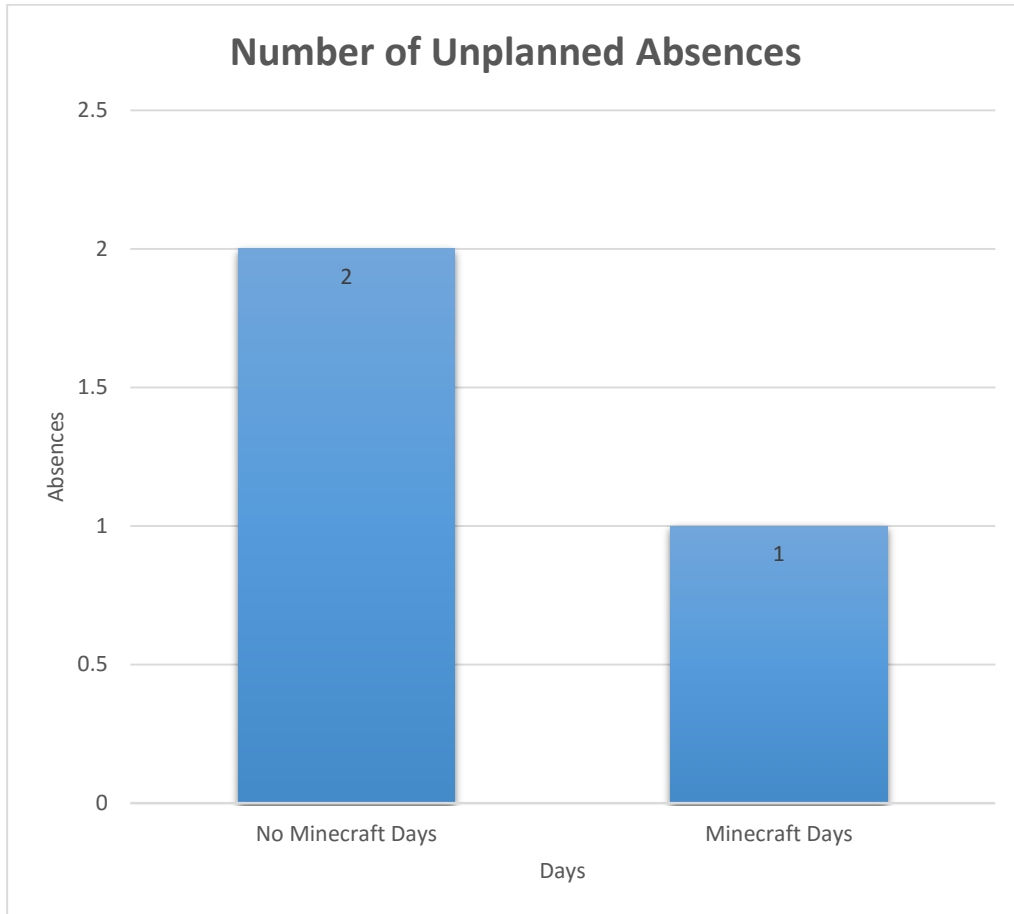

Breakdown of Attendence Documents

Planned Absences, 2, 8%

Unplaned Absences, 3, 12%

Tardies, 20, 80%

- Tardies - Unplaned Absences - Planned Absences

Appendix C

Figure C1.

Average Number of Daily Tardies

Appendix D

Figure D1.

Appendix E

Figure E1.

Number of Students with at Least 1 Tardy

Bar chart showing Students on the y-axis (0 to 7) and Days on the x-axis. No Minecraft Days: 6. Minecraft Days: 3.

Appendix F

Figure F1.

Number of Unplanned Absences

Appendix G

Figure G1.

Attendance Data Breakdown by Student

(Bar chart showing Days on the y-axis, Student on the x-axis)

Student	# of Tardies No Minecraft	# of Tardies with Minecraft	# of absenses No Minecraft	# of absenses With Minecraft
Student A	1	0	0	0
Student B	5	2	1	1
Student C	0	0	1	0
Student D	5	4	0	0
Student E	1	0	0	0
Student F	1	1	0	0
Student G	1	0	0	0

Appendix H

Figure H1.

Chronically Tardy Students' Attendance

Appendix I

Figure I1.

Students with Tardies:
On days with Minecraft did you try to get
to school on time?
Student Survey - Question 4

100%

■ Yes ■ no

Appendix J

Figure J1.

Key Words Mentioned in Student Survey - Question 1

Appendix K

Figure K1.

Should Minecraft© be Played at school? Student Survey - Question 2

100%

● Yes ● no

Appendix L

Figure L1.

Reason Why Students are Early to School
Student Survey - Question 3

(Bar chart. Y-axis: Students, ranging 0 to 12. X-axis: Reasons)

Reason	Students
bus	4
Dropped off	9
To Learn	10
To see Friends	8
To go to breakfast club	1
To play Minecraft	9
Other	5