

Ownership of Learning Through Minecraft: An Action Research Project

Nozomi Ozaki
University of Hawai'i at Mānoa
Honolulu, HI, USA
nozomio@hawaii.edu

Abstract: Getting young students to understand and apply concepts being learned in their Geology unit of study is a challenge. Students learn about their island home through their classroom teacher and experts from an outside local educational organization. Traditional modes of learning struggle to engage and help students develop a growth mindset as they transfer learning. To address this need, I developed an action research project to use Minecraft Education Edition (EE) to evaluate how game-based learning and instruction impacts student engagement and learning. This paper will discuss the design of the project. Over the course of three weeks, students worked in small groups of three to four to plan, collaborate, and build a particular segment of the formation of the Hawaiian Islands within Minecraft EE. Minecraft EE allowed me to turn passive learning into an interactive and meaningful practice. Each build session was designed to allow students to plan, build, and reflect upon their progress and learning. Students received valuable feedback through small group check-in sessions with me. In addition, constructivism was employed to allow students to showcase their learning as a small group.

Introduction

As the role of librarians continue to evolve in schools, I have found myself serving on various committees addressing makerspaces, technology integration, information literacy, and digital citizenship. A common goal shared in each of these committees is the focus around student learning and achievement. As we work towards helping our students meet national and global standards, there is a need to address how students are engaging in their learning through ownership. Being a one-to-one school where every student has access to their own iPad for educational purposes during the school day, we are exploring various educational technology tools we can utilize to make learning engaging, which in turn would hopefully aid in the students taking ownership of their learning. Through in-depth conversations, educators feel a renewed sense of making learning authentic, where students take ownership of their learning. I have attended a number of conference sessions showing how game-based tools can address this, and I have decided to use this learning opportunity to conduct an action research project using Minecraft Education Edition (EE). The purpose of this action research project was to evaluate the impact of Minecraft EE with third grade students to foster ownership of learning through engagement with a geology unit's lessons at a private school in Honolulu, Hawai'i.

My interest in learning about various educational tools to impact instruction has led me to pursue professional development opportunities and pilot technology tools to support student growth. I value supporting the school's vision of preparing our students for

postsecondary success. Furthermore, my particular enthusiasm for teaching through game-based learning and alternative modes was rooted in my own personal struggle as a non-traditional learner. This research project was created to provide my students the opportunity to showcase and deepen their learning in a non-traditional and engaging manner.

Literature Review

As educators, we must have a growth mindset as we model striving for excellence through reflective practices. These are critical components of action research. Action research is focused around improving teaching practices for the audience serviced. Action research is an iterative process, and this allows students to take learning to a deeper and meaningful level (Milton-Brkich, Shumbera, & Beran, 2010).

Student involvement is strongly connected student ownership (Dewey, 1916). These types of learning opportunities “give pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking, or the intentional noting of connections; learning naturally results” (Dewey, 1916, p. 181). I remember my teachers providing me these types of learning experiences when I was a child; however, the students of today are drawn to having the same experiences enhanced through the use of a variety of technology tools. Game-based learning is one of these teaching venues. There are positive claims to using these types of digital tools in educational settings, especially with secondary students (Bourgonjon et al., 2013). Their research showed that there is an “increased motivation, raised interest in specific subjects, multiple representations, open-ended approach to information, students in control of their own learning processes, and peer collaboration” (Bourgonjon et al., 2013, p. 95). With that in mind, I designed lessons for students to engage in game-based learning to see if the same outcomes are prevalent with elementary students as well.

A constructivist approach was used to constantly assess and ask probing questions of the students as they go through this study. Constructivism helps students transform their learning from being passive to active participants in the learning process (Krahenbuhl, 2016). Krahenbuhl goes on to explain how constructivism keeps students involved in their learning through discovery, inquiry, and collaboration. Throughout this study, I guided discussions and took students through the reflection process as they solved problems, tested their ideas, drew conclusions, made inferences, and conveyed their knowledge. I used the observation protocol to collect data on student engagement and ownership of learning. The constructivist approach impacts classroom management in a positive way (Candar & Sahin, 2013). I believe when students constructed learning in a meaningful way, classrooms self-managed and self-regulated because students were engrossed in the learning taking place.

A student-centered focus brings learning to a personal level when conducted in small group settings (Beck, Kosnik, Madott, & Ebrary, 2006). Student concerns and needs were also addressed in a timely fashion, which fostered student-centered learning. Through these types of learning opportunities, students took ownership and were self-motivated to

showcase their learning (Chan, Graham-Day, Ressa, Peters & Konrad, 2014). Fletcher (2008) delved deep into the impacts of student ownership and how it positively impacted learning in the classroom. Student ownership shaped the classroom into a safe environment where learning had no boundaries.

An essential component of student ownership is the use of formative assessments to facilitate this type of learning. Tay (2015) shared how formative assessments are not only “temperature checks” to guide instruction, but also “temperature checks” to guide students toward learning empowerment. The students felt this empowerment as we utilized Quizizz and Minecraft EE in this action research project.

Minecraft has been around since 2009, and the Education Edition (EE) is only a few years old; however, it has impacted classrooms in a powerful way in this short time. Most students are excited to use Minecraft in the classroom setting. Crafti shared how the level of engagement immediately sky rocketed once the word Minecraft was uttered by the teacher (2016, p.102). He goes on to share how students eagerly waited for the teacher to sign in and launch the server for them to get building within Minecraft. Minecraft is a block-based building game where the possibilities of what can be built virtually is endless. Minecraft is a versatile learning tool and has been used in a variety of content areas and projects (Gallagher & Asselstine, 2015). These projects were guided by the teacher, and what they were able to create was amazing. I did not realize Minecraft could be used in this way and I was fortunate to conduct a school visit to Momilani to see Asselstine in action using Minecraft as a teaching tool to have students delve deeper in their understanding of fractions. I was inspired and needed to put Minecraft to action.

A study focused around knowledge-based acquisition through Minecraft showed how the initial goal of students showing their knowledge of the various American historical events using Minecraft was taken to a higher level due to the details and research students initiated on their own because they wanted to make it accurate as possible (Roberts-Woychesin, Warren, Jones & Norris, n.d.). This was not an anticipated outcome by Robert-Woychesin, Warren, Jones, and Norris (n.d.) and they were pleasantly surprised with the learning process and end products. This outcome goes hand-in-hand with Renwick’s (2014) findings of how students were engaged in the growth mindset while working in Minecraft as they had that desire to continue to iterate and enhance their build throughout this process. He went on to share how students engaged in high level conversations addressing key concepts and ideas.

Project Design

After exploring a variety of educational tools to possibly use to enhance the level of engagement and ownership of learning in their geology unit, the conversation of game-based resources were brought up by a colleague in a planning meeting. Based on research, three major elements for the action research module included: 1) curriculum; 2) technology; and 3) data collection. Taking these elements into account, Minecraft EE was selected as the ideal tool to take students through this learning process, as Minecraft EE was a tool they had not used in the classroom setting before.


Being that Minecraft EE is not a free learning tool, much had to be taken into consideration prior to the project being implemented. I had conversations with my principal and dean concerning the benefits, risks, cost, and implications prior to my meeting with the Information Technology (IT) support staff. With the IT support staff, we addressed concerns around hardware, set-up, roll-out, and then planned and executed implementation. Once the support and permission to use Minecraft EE in the classroom were approved, I initiated conversations with a third grade classroom teacher.

A series of meetings with this third grade teacher occurred where we discussed the curricular and logistical needs prior to implementation. The curricular connection with their geology unit and schedule to implement this project during their regularly scheduled library times were agreed upon, and within a short period of time the budget was approved to purchase the needed licenses. We set up the accounts and installed Minecraft EE on the Macbook Air laptops.


Prior to students being introduced to Minecraft EE, a parent consent (Appendix I) and student assent (Appendix H) were discussed, distributed, filled out, and signed by both parents and students. Twenty-five parent consent and student assent forms were signed and returned. The consent and assent forms contained information about activities, length of the module, benefits, risks, confidentiality and privacy, and how to contact me. This required paperwork was filed and secured in my library file cabinet.

Curriculum

Students used what they learned in the classroom, library classes, field studies, and guest presenters in connection with their Geology unit of study to inform their build within Minecraft EE. The formed basis of my project’s curriculum was set by the Moanalua Gardens/‘Ōhi’a Project (Figure 1).



**‘Ōhi’a Project
Geology Unit**



**Exploring the Islands
Grade 4**

HCPS Content Standards/Benchmarks	HCPS Performance Indicators
Science: Forces That Shape the Earth <ul style="list-style-type: none"> • Explain the causes and effects of volcanoes. • Examine various rock samples and describe what they are composed of. • Describe the effects of waves, wind, and water on the surface of the Earth. 	<ul style="list-style-type: none"> • Describe the causes and effects of volcanoes. • Observe the rock is composed of different combinations of minerals and/or living things. • Describe the effects of waves, wind, and water on the surface of the Earth.
Social Studies: Physical Systems <ul style="list-style-type: none"> • Explain how physical processes affect formation of <i>volcanoes</i>. 	<ul style="list-style-type: none"> • Explain the Earth’s physical processes (e.g., erosion, earthquakes, lava flows) • Explain formation of volcanic islands and atolls.
Social Studies: Historical Perspectives & Interpretations <ul style="list-style-type: none"> • Identify and describe some of the beliefs/values and education/learning of pre-contact Hawai’i. 	<ul style="list-style-type: none"> • Identify and describe some of the beliefs/values and education/learning of pre-contact Hawai’i.

Figure 1. ‘Ōhi’a Project/Moanalua Gardens Geology Unit

Technology

Students used Minecraft EE to collaborate, plan, build, reflect, and iterate their creation to show their learning and understanding of what was learned in their Geology unit of study. The objective was for students to showcase their learning using a technology tool they had not previously used in the classroom setting.

Initially, students were introduced to Minecraft EE and the expectations prior to using this tool in an educational setting. Students were assessed through Quizizz, an online formative assessment tool. After presenting the initial idea to a panel of University of Hawai'i at Mānoa Department of Learning Design and Technology faculty and staff, it was determined that the focus of the research project should be focused around student engagement and the ownership of learning by students.


With the help of online resources found on the 'Ōhi'a Project/Moanalua Gardens website, I used the indicators as determined by the Hawai'i Content Standards/Benchmarks (HCPS). I also created Google Slides to present information and tutorials on how to use Minecraft EE with the students (Figure 2).



Figure 2. Teacher-created presentations on Google Slides.

Students used the available collaboration and building tools within Minecraft EE to work as a team to build a particular segment of the formation of the Hawaiian Islands. Students documented their plan and progress on a group planning Google Doc template (Figure 3).

Group Planning Sheet



Group Member Names:





Date:	Team Goal:	Each person's responsibility:	Screenshot of today's build:
			

Figure 3. Group Google Doc planning sheet.

The small group work in the class sessions consisted of tasks that guided students towards the goal of building of a particular segment of the formation of the Hawaiian Islands. Resources from ‘Ōhi‘a Project/Moanalua Gardens, guest presentations, HCPS standards, and teacher lessons were consulted to create the tasks for each lesson. Students worked with their peers in small groups, to collaborate, discuss, and plan their Minecraft EE build.

Methods

The project participants of the action research project were twenty-five third grade students who are under my locus of control. I service and teach these students for a forty-five minute class period following a six-day rotating schedule (Figure 4). It is during these lessons that students are taught about digital citizenship, information literacy, and research skills. The class makeup consisted of thirteen girls (52%) and twelve boys (48%). Small groups were randomly created with a balanced distribution of girls and boys. These student participants have been one-to-one users where each student has access to their own iPad for educational purposes. These students have been users of iPads for the past three years and have a range of experience with using Minecraft for recreational and personal purposes. None of the students have used Minecraft EE in a classroom setting before and are not familiar with the features in the Education Edition of Minecraft. This study took place over a period of three weeks.

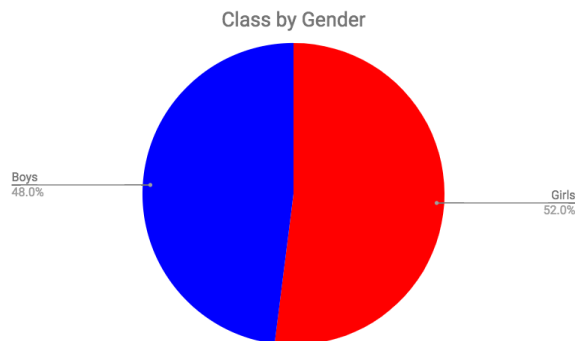


Figure 4. Project Participant Demographic Information

Using an informal five-finger formative check of the students self-rating of Minecraft use, three (12%) considered themselves experts, while five (20%) rated themselves as being proficient, seven (28%) as developing, ten (40%) as novice users, and none (0%) having had no experience using either Minecraft Pocket Edition or Minecraft PC version (Figure 5). This data was used to further determine the groupings of each team.

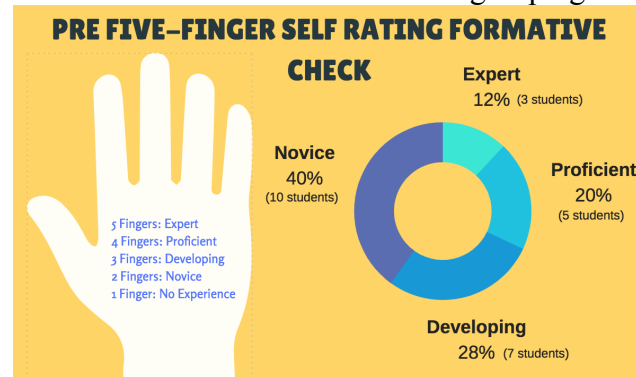


Figure 5. Pre Self Rating of Minecraft Skill-Set

This research study was designed to answer the following questions:

1. What is the impact on ownership when using Minecraft to display learning?
2. How engaged are students when collaborating on tasks in Minecraft compared to traditional learning opportunities?

Google Slides were used to share learning targets, content, and tasks. Lessons were scaffolded according to specific skills and needs of the students throughout the research process. Lessons guided students through a variety of steps, including but not limited to the following: introduction of Minecraft Education Edition; sharing of the culminating project and rubric ([Appendix J](#)); dividing students into groups of three to four; establishing group names, norms, and team agreements; building understanding of how to use Minecraft EE as a tool to showcase learning; creating designs; and presenting work to the class.

A variety of instruments were used to gather data for formative and summative purposes. Formative data from three Quizizz assessments were used to check students' understanding of the content, assist in planning for small group instruction, and provide quantitative information. For each Quizizz assessment, the data was automatically saved by Quizizz into a spreadsheet that was broken down by each individual student and individual question (Figure 6).

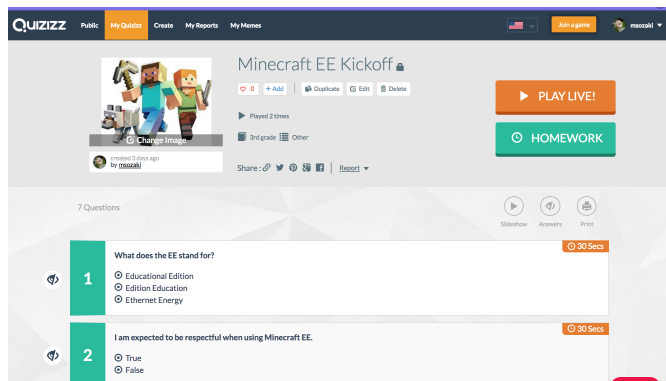


Figure 6. Screenshot of Quizizz formative assessment.

This formative data was collected prior to students logging into Minecraft EE to ensure students had an understanding of the essential facts and information about the formation of the islands, along with how to use various tools and features within Minecraft. Small group instruction took place in direct and indirect ways to address the needs found in the formative assessment. Personalized learning opportunities did surface for some, and I worked closely with those students and/or groups as needed.

Next, I considered avenues for collecting data on student engagement, ownership of learning, and perceptions about using Minecraft EE to display their learning. An observational protocol was developed as a means of gathering information on student engagement and ownership of learning in the classroom during face-to-face sessions (Figure 7). The observation protocol measured engagement and ownership of learning in the classroom through a series of coded on-task and off-task behaviors.

Observation Protocol

Teacher:		Date:	
Observation Focus:	Student Engagement	Time of Observation	_____ to _____

Intervals	Student Names			
8:00-8:15				
8:15-8:30				
8:30-8:45				
8:45-9:00				
9:00-9:15				
9:15-9:30				
9:30-9:45				
9:45-10:00				
Total				

Engaged Behavior: (on task) B1: Listening attentively B2: Contributing to discussions B3: Working collaboratively w/ others B4: Asking questions B5: Completing tasks B6: Uses technology effectively	Unengaged Behaviors: (off task) F1: Not listening/passive F2: Not contributing to discussion F3: Not working collaboratively F4: Not asking questions F5: Distracted/not completing task F6: Uses technology ineffectively	Teacher Observations:
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Figure 7. Observation Protocol for student engagement.

During fifteen minute intervals in a single class period, I assessed individual and/or group conduct and noted the observed behaviors. In addition, I used prior teaching experiences to gauge motivation and ownership of learning. Retention skills were assessed through

formative data collected through Quizizz and by students completing the daily assigned tasks in class. A four-point rating scale determined levels of mastery. Observation protocols were used to collect data to address the level of engagement and ownership of learning by students (Figure 7 and 8). This protocol was used daily throughout the project.

Observation Protocol

Teacher:		Date:	
Observation Focus:	Ownership of Learning	Time of Observation	_____ to _____

Intervals	Student Names				
8:00-8:15					
8:15-8:30					
8:30-8:45					
8:45-9:00					
9:00-9:15					
9:15-9:30					
9:30-9:45					
9:45-10:00					
Total					

Engaged Behavior: (on task)	Unengaged Behaviors: (off task)	Teacher Observations:
B1: Actively planning and participating in group build B2: Reflective about learning process B3: Empathy is built with team B4: Connected to project	F1: Not participating in planning and group build F2: Not reflective about learning process F3: Empathy is not being built with team F4: Not feeling connected to project	

Figure 8. Observation protocol for ownership of learning.

In addition, the end-of-module questionnaire and gallery walk at the conclusion of the Minecraft build were final measurements of skill retention, overall engagement and learning. This Google Form questionnaire consisted of thirteen Likert-type and three open-ended response questions (Figure 9). All quantitative data was stored on a spreadsheet and kept secure.

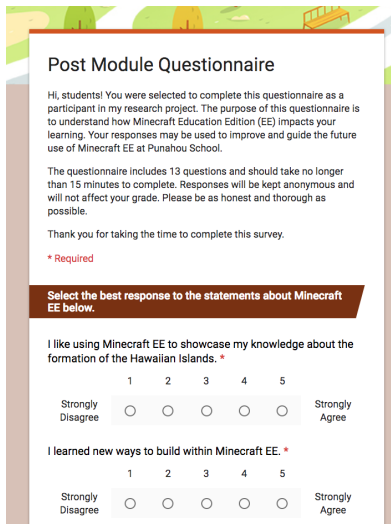


Figure 9. Screenshot of post module questionnaire.

Quantitative and qualitative data was summarized in figures made using Google Sheets with data-mining add-on XL Miner.

The implementation of this research project required approximately three and a half months of work, starting in December of 2017, and finishing in March of 2018. During the fall 2017 semester, the formative assessments, instructional plan, timelines, observational protocols, and modules were created. Between semesters, these materials were refined and in the first six weeks of Spring 2018, I implemented the project and completed in-progress module iterations. Data collection and analysis were conducted three weeks following the project in preparation for the 2018 Teaching Colleges and Community Conference (TCC).

Timeline and Goals

#:	Date:	Objective:	Goal:
1	1/5/18	<ul style="list-style-type: none"> ● Send home parent consent forms 	<ul style="list-style-type: none"> ● Have at least 15 parent consent forms signed and returned ● Forms Due: 1/15/17
2	1/9/18	<ul style="list-style-type: none"> ● Student assent forms ● Minecraft Kickoff Presentation 	<ul style="list-style-type: none"> ● Go through student assent form and have those who choose to participate to sign ● Introduce Minecraft Education Edition ● Share purpose ● Expected behavior ● Introduce culminating project
3	1/12/18	<ul style="list-style-type: none"> ● Creation of small groups of 2-3 students ● Group norm agreements 	<ul style="list-style-type: none"> ● Groups come up with team norms while collaborating on this Minecraft EE project ● Norms documented on <u>padlet</u>
4	1/17/18	<ul style="list-style-type: none"> ● Minecraft basics 1 ● Tutorial World part 1 	<ul style="list-style-type: none"> ● Students log into Minecraft EE ● Complete tutorial world part 1
5	1/22/18	<ul style="list-style-type: none"> ● Minecraft basic controls 2 ● Tutorial World part 2 	<ul style="list-style-type: none"> ● How to place blocks, break blocks, and access inventory ● Complete tutorial world part 2
6	1/26/18	<ul style="list-style-type: none"> ● Go over daily build rubric expectations ● Group Planning Sheet 	<ul style="list-style-type: none"> ● Students have a clear understanding of how they will be held accountable throughout the project with a rubric ● Students access and begin filling out the group planning sheet

7	1/29/18	<ul style="list-style-type: none"> ● Day 1 of building in Minecraft EE 	<ul style="list-style-type: none"> ● Continue filling out their plan for the group build in Minecraft EE ● Begin build in Minecraft EE ● Teacher to observe students using observation protocols ● Students complete daily reflection sheet individually
8	2/1/18	<ul style="list-style-type: none"> ● Day 2 of building in Minecraft EE 	<ul style="list-style-type: none"> ● Continue filling out their plan for the group build in Minecraft EE ● Begin build in Minecraft EE ● Teacher to observe students using observation protocols ● Students complete daily reflection sheet individually
9	2/6/18	<ul style="list-style-type: none"> ● Day 3 of building in Minecraft EE 	<ul style="list-style-type: none"> ● Continue filling out their plan for the group build in Minecraft EE ● Begin build in Minecraft EE ● Teacher to observe students using observation protocols ● Students complete daily reflection sheet individually
10	2/9/18	<ul style="list-style-type: none"> ● Share build with classmates through a gallery walk 	<ul style="list-style-type: none"> ● Gallery walk and peer feedback ● Students complete post assessment questionnaire

Figure 10. Table of timeline and goals.

Results

Results found that Minecraft Education Edition *positively* impacted student engagement and the ownership of learning. I witnessed a high level of engagement for almost 100% of all collaborative build sessions. Several even asked when the project was completed as to when we would be using Minecraft again because they enjoyed it thoroughly. Data collected throughout the project supported the positive impact of Minecraft in connection their learning in Geology of the Hawaiian Islands.

The post-module student questionnaire was focused on the impacts of Minecraft on their learning. This questionnaire was used to gather viewpoints on a) using Minecraft to showcase their learning and b) using Minecraft to reflect on the learning process that took

place. As shown in Table 1, each category contained four to five questions and asked students to select the response they agree with on a Likert-type scale (1=Strongly disagree, 5=Strongly agree). Responses for each question was sorted, averaged, then converted to percentages to assist in interpretation. The categories were further organized into overall measurements of Engagement and Ownership of Learning.

Table 1. Post-Module Questionnaire Results and Overall Percent Rating - Engagement and Ownership of Learning

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Overall Percent Rating
Engagement (n=25)						95%
Using Minecraft EE made learning fun.				2/25 8%	23/25 92%	98%
I was focused and engaged when using Minecraft EE.				3/25 12%	22/25 88%	97%
I like using Minecraft EE to showcase my knowledge about the formation of the Hawaiian Islands.			1/25 4%	6/25 24%	18/25 72%	94%
I enjoyed building our team's creation in Minecraft EE.			1/25 4%	1/25 4%	23/25 92%	97%
I learned new ways to build within Minecraft EE.			3/25 12%	7/25 28%	15/25 60%	89%
Ownership of Learning (n=25)						97%
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Overall Percent Rating
Using Minecraft EE helped me to deepen my learning of the formation of the Hawaiian Islands.					25/25 100%	100%
I understood how to use the commands and build tools within Minecraft EE.			2/25 8%	5/25 20%	18/25 72%	92%

I would recommend using Minecraft EE to a friend in another class.					25/25 100%	100%
I was more motivated to learn because we were using Minecraft EE.				3/25 12%	22/25 88%	97%

Data presented in Table 1 indicated an overall positive experience with Minecraft EE in the areas of Engagement and Ownership of Learning with an average overall rating of 95% and 97%. Under Engagement, “Using Minecraft EE made learning fun” received the highest individual rating along with “I enjoyed building our team’s creation in Minecraft EE.” For Ownership of Learning, two areas got 100% of students Strongly Agreeing that “Using Minecraft EE helped me to deepen my learning of the formation of the Hawaiian Islands” and “I would recommend using Minecraft EE to a friend in another class.” None of the participants selected “Strongly Disagree” or “Disagree” for any of the posed questions, which leads to the generalization that that all students had a positive learning experience using Minecraft EE to showcase their learning of the formation of the Hawaiian Islands.

Students who self-rated themselves as Expert users of Minecraft may have been a part of the 12% who responded with “Neutral” for “I learned new ways to build within Minecraft EE.” Since they self-identified as experts, those students may not have learned anything new from the lessons. There was also one student who would get motion sickness from the movement within Minecraft EE, so I believe the Neutral response that “I like using Minecraft EE to showcase my knowledge about the formation of the Hawaiian Islands” and “I enjoyed building our team’s creation in Minecraft EE” was caused by this motion sickness issue. Even before the project began, this student shared how they get motion sickness when they have previously used Minecraft. Therefore, we made agreements to ensure this student could engage and contribute to the group in an impactful manner despite the potential for motion sickness. Overall, this student felt their contributions to the group build were meaningful, and occasional absence in the virtual world did not negatively impact the group’s work. Thus, 100% of students selected “Strongly Agree” in response to “Using Minecraft EE helped me to deepen my learning of the formation of the Hawaiian Islands.”

A four point rubric was used as students actively built their projects within Minecraft EE. The results were averaged from three Daily Reflections to display their self-ratings (Figure 11). The option of Strongly Disagree and Neutral were omitted as it was not selected by any students. An overwhelming 98% of students rated themselves as Strongly Agreeing that they were “Engaged throughout the class period” with 2% Agreeing that they were “Engaged in [the] task most of the time”. In the area of Planning, 96% Strongly Agreed that their plan “Contains no errors and all parts related to task are included.” The other 4% Agreed that their plan “Contains some errors and most parts related to task are

included in plan.” Overall, students rated themselves with an Agree or Strongly Agree rating for these four components.

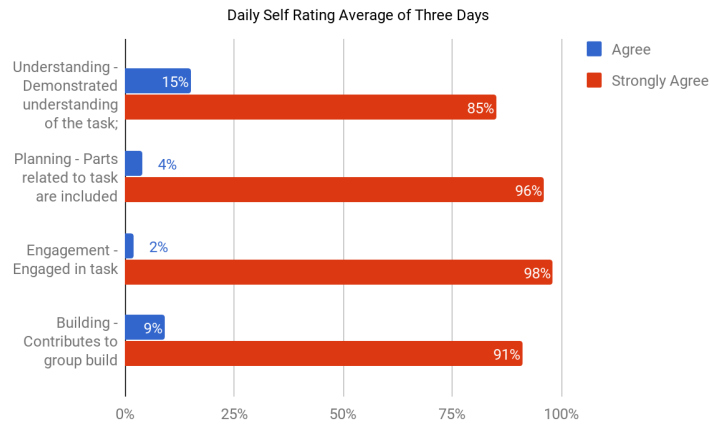


Figure 11. Daily Self Reflection and Rating. Participants rated themselves using a four point scale rubric.

The post-module questionnaire contained three open-ended questions to gather their feedback on what they liked best about using Minecraft EE to showcase their learning and depth of the formation of the Hawaiian Islands. The written responses were inserted into a word cloud generator to further examine trends. In response to what they liked most about using Minecraft EE, there was the overwhelming response of “fun” and “collaborate.” Students expressed that using Minecraft EE in school was fun and that they enjoyed working with their friends in class to collaboratively build a commonly planned and agreed upon build (Figure 12). A few students even expressed how they learned new things and have asked their parents to purchase the Minecraft Pocket Edition so they can further use the tool to create and build on their own.



Figure 12. Word cloud. This figure illustrates commonalities in participants’ responses to what they liked most about using Minecraft EE.

In response to the second open-ended response of what they liked least about using Minecraft EE, students made it known that they wanted “more time” (Figure 13). They thoroughly enjoyed working within Minecraft EE, and there were many “ahhhs” and disappointed faces when students were given the two minute warning before our library class time was over. The three, forty-five minute class periods to build were used to its fullest and students were seen running to the library from their classroom to utilize every minute they could get within Minecraft EE. A minor issue arose where the laptop battery drained quickly while students were using Minecraft EE. However, a quick purchase of multiple powerstrips alleviated that issue.

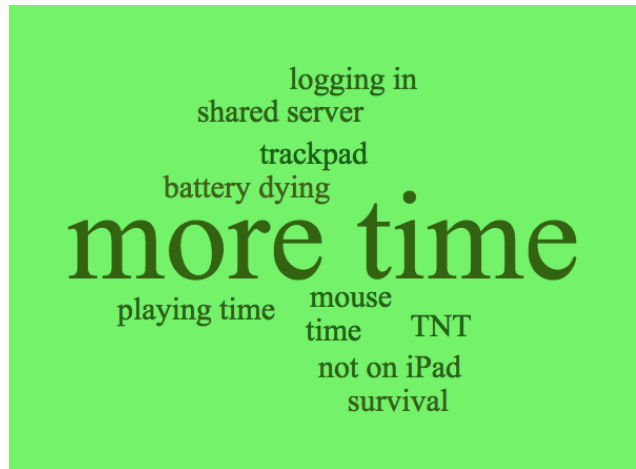


Figure 13. Word cloud. This figure illustrates commonalities in participants’ response to what they liked least about using Minecraft EE.

The last open-ended question inquired participants as to what they would change about the Minecraft EE project. Students openly and candidly shared that they wish they could have “more build time” and use Minecraft EE in other areas of study (Figure 14). Students enjoyed being able to use this tool in a learning environment and expressed their wish for their homeroom teacher to get trained and use Minecraft EE in their classroom as well. I am hopeful that Minecraft EE will be more integrated into their classrooms as more teachers explore this engaging and rich learning tool.

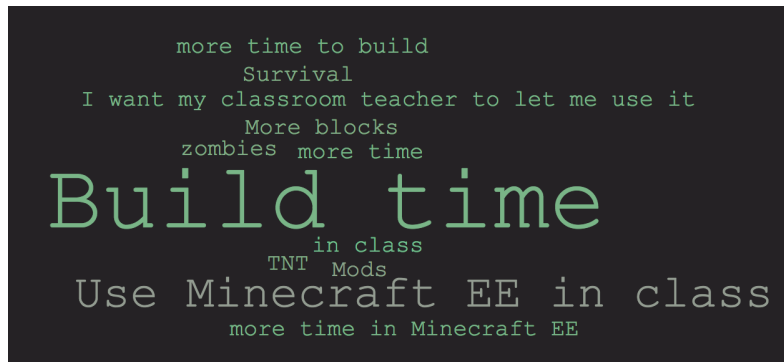


Figure 14. Word cloud. This figure illustrates commonalities in participants’ response to what is one thing they would change about the Minecraft EE project.

Finally, using the same informal five-finger formative check of the students self-rating of Minecraft, nine (36%) now considered themselves experts, ten (40%) rated themselves as being proficient, six (24%) as developing, with none (0%) rating themselves as novice or not having had no experience with Minecraft (Figure 15). There was a three-time increase of those considering themselves experts from three (12%) to nine students (36%). A two-time increase of those feeling proficient from five (20%) to ten students (40%). A decrease of those rating themselves as developing from seven (28%) to six students (24%). With a decrease of those rating themselves as novice from ten (40%) to no students (0%). Overall, at the end of the project twenty-five students (100%) showed an increase with their skill-set with using Minecraft through a five-finger self-rating formative check.

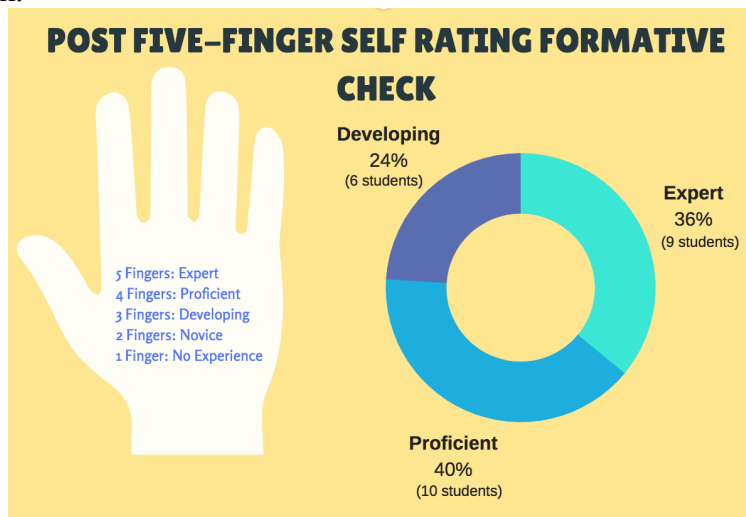


Figure 15. Post Self Rating of Minecraft Skill-Set

Discussion and Conclusions

The results of the post questionnaire and daily four-point reflection indicated significant growth in the area of engagement and ownership of learning throughout the project. The high level of energy and excitement in the eyes of the third grade participants was truly a treat. The love of learning and sharing of that learning with others was evident throughout the three week period. I wish this passion for learning could translate into other areas of learning for the students.

During the face-to-face library sessions, students were highly engaged and behavior issues were minimal to none. If anything, the students' noise volume increased when students learned a new skill, got excited, and wanted to share what they learned with their group members. This was a great "problem" to have. The students' desire to ensure their Minecraft EE build was accurate and aligned with the project outcomes drove rich conversations amongst group members.

The conversations demonstrated that students took the lesson to a deeper level as they not only had to recall the information, but they were required to plan, design, further research

if needed, build, and explain their creation to others. During the gallery walk at the completion of the project, groups were able to share their learning with each other and their homeroom teacher, teaching assistant, learning support specialist, and dean. Every person who attended the gallery walk was impressed by the students' excitement and ownership of learning. The gallery walk did not require rehearsal because students were intrinsically motivated and eagerly wanted to share their learning with others.

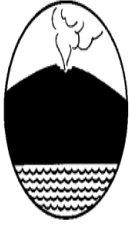
This showcase of learning even sparked conversations about ways we could bring this type of learning into other content areas. We have yet to set a meeting time to further this conversation; however, I am glad the seed has been planted to look at the constructivist approach again when evaluating our curriculum.

Throughout the implementation of this project, I gained valuable insight into how game-based learning tools like Minecraft EE can impact student engagement and the ownership of learning. I look forward to sharing the project findings with co-workers and furthering discussions on possible next steps to take this type of learning to a larger audience.

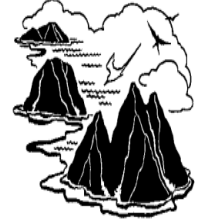
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Appendix A:
 ‘Ōhi‘a Project/Moanalua Gardens Geology Unit



**‘Ōhi‘a Project
 Geology Unit**



**Exploring the Islands
 Grade 4**

HCPS Content Standards/Benchmarks	HCPS Performance Indicators
<p>Science: Forces That Shape the Earth</p> <ul style="list-style-type: none"> • Explain the causes and effects of volcanoes. • Examine various rock samples and describe what they are composed of. • Describe the effects of waves, wind, and water on the surface of the Earth. 	<ul style="list-style-type: none"> • Describe the causes and effects of volcanoes. • Observe the rock is composed of different combinations of minerals and/or living things. • Describe the effects of waves, wind, and water on the surface of the Earth.
<p>Social Studies: Physical Systems</p> <ul style="list-style-type: none"> • Explain how physical processes affect formation of <i>volcanoes</i>. 	<ul style="list-style-type: none"> • Explain the Earth’s physical processes (e.g., erosion, earthquakes, lava flows) • Explain formation of volcanic islands and atolls.
<p>Social Studies: Historical Perspectives & Interpretations</p> <ul style="list-style-type: none"> • Identify and describe some of the beliefs/values and education/learning of pre-contact Hawai‘i. 	<ul style="list-style-type: none"> • Identify and describe some of the beliefs/values and education/learning of pre-contact Hawai‘i.

Appendix B:
Teacher-created presentations on Google Slides.



Learning Target:

- Students will understand the purpose and expectations of using Minecraft Education Edition (EE)
- Students will show their understanding of using Minecraft EE through a Quizizz assessment

An icon for 'Learning Targets' featuring the text 'Learning Targets' in a bold, sans-serif font next to a red target symbol with a black bullseye.

What is Minecraft Education Edition?

Create. Connect. Collaborate.

Opportunity to **CREATE** and show your learning in the world of Minecraft
CONNECT your learning in a fun, interactive, and meaningful manner in an interdisciplinary way
 Work with others to **COLLABORATE** on projects and build positive relationships with one another

*Introducing MinecraftEdu Hosting Beta - MinecraftEdu, Web, 23 Jan, 2015.

A slide explaining the core concepts of Minecraft Education Edition. It includes a small image of a grass block and a footer with a small URL.

Why are we using Minecraft?

- Opportunity for kumu to try new learning tools to integrate technology into the curriculum
- Opportunity for haumāna to use this educational tool to deepen their understanding and learning

A slide explaining the reasons for using Minecraft. It includes a small icon of a Minecraft world inside a blue hexagonal frame.

How is Minecraft Education Edition going to look like?

A slide asking about the appearance of Minecraft Education Edition. It features a large image of a Minecraft character in a colorful, blocky world.

E Hō'ihī-Show Respect/Mutual Respect

- While using Minecraft, you are expected to be...
 - Respectful of others (Take turns, sharing responsibility, etc)
 - Not causing harm to others or to their creations
 - Doing things you would be willing to share with Kahu, your parents, and grandparents

A slide discussing the concept of mutual respect in Minecraft. It includes a small image of a Minecraft interior scene with various items and structures.

Appendix D:
Observation Protocol for student engagement

Observation Protocol

Teacher:		Date:	
Observation Focus:	Student Engagement	Time of Observation	_____ to _____

Intervals	Student Names				
8:00-8:15					
8:15-8:30					
8:30-8:45					
8:45-9:00					
9:00-9:15					
9:15-9:30					
9:30-9:45					
9:45-10:00					
Total					

Engaged Behavior: (on task)	Unengaged Behaviors: (off task)	Teacher Observations:
B1: Listening attentively B2: Contributing to discussions B3: Working collaboratively w/ others B4: Asking questions B5: Completing tasks B6: Uses technology effectively	F1: Not listening/passive F2: Not contributing to discussion F3: Not working collaboratively F4: Not asking questions F5: Distracted/not completing task F6: Uses technology ineffectively	

Appendix E:
Observation Protocol for ownership of learning

Observation Protocol

Teacher:		Date:	
Observation Focus:	Ownership of Learning	Time of Observation	_____ to _____

Intervals	Student Names				
8:00-8:15					
8:15-8:30					
8:30-8:45					
8:45-9:00					
9:00-9:15					
9:15-9:30					
9:30-9:45					
9:45-10:00					
Total					

Engaged Behavior: (on task)	Unengaged Behaviors: (off task)	Teacher Observations:
B1: Actively planning and participating in group build B2: Reflective about learning process B3: Empathy is built with team B4: Connected to project	F1: Not participating in planning and group build F2: Not reflective about learning process F3: Empathy is not being built with team F4: Not feeling connected to project	

Appendix F:
Post Module Questionnaire

Post Module Questionnaire

Hi, students! You were selected to complete this questionnaire as a participant in my research project. The purpose of this questionnaire is to understand how Minecraft Education Edition (EE) impacts your learning. Your responses may be used to improve and guide the future use of Minecraft EE at Punahou School.

The questionnaire includes 13 questions and should take no longer than 15 minutes to complete. Responses will be kept anonymous and will not affect your grade. Please be as honest and thorough as possible.

Thank you for taking the time to complete this survey.

* Required

Select the best response to the statements about Minecraft EE below.

I like using Minecraft EE to showcase my knowledge about the formation of the Hawaiian Islands. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

I learned new ways to build within Minecraft EE. *

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Appendix G:
Screenshot of Quizizz formative assessment

The screenshot shows the Quizizz interface for a formative assessment titled "Minecraft EE Kickoff". The top navigation bar includes the Quizizz logo, "Public", "My Quizizz", "Create", "My Reports", and "My Memes". On the right, there is a language selector (USA), a "Join a game" button, and a user profile for "msozaki".

The main content area features a header with the title "Minecraft EE Kickoff" and a lock icon. Below the title are interaction buttons: a heart icon with "0", a "+ Add" button, "Duplicate", "Edit", and "Delete". A "PLAY LIVE!" button is prominently displayed in orange. Below this, it indicates "Played 2 times" and "3rd grade" with a menu icon for "Other". A "HOMEWORK" button is shown in green. A "Share:" section includes social media icons and a "Report" dropdown.

The assessment details show it was "created 3 days ago by msozaki" and has a "Change Image" button. The question list indicates "7 Questions". At the top right of the question area, there are icons for "Slideshow", "Answers", and "Print".

The first question is: "What does the EE stand for?" with a 30-second timer. The options are: Educational Edition, Edition Education, and Ethernet Energy.

The second question is: "I am expected to be respectful when using Minecraft EE." with a 30-second timer. The options are: True and False.

Appendix H:
Student Assent Form

Research Assent Form

Hi! My name is Ms. Ozaki and I am inviting you to participate in my research study. As you know, I am your librarian at Punahou School.

I am also a graduate student at the University of Hawai‘i at Mānoa (UHM), Department of Learning Design and Technology. In order to get my degree, I am doing this research project. I want to learn about what 3rd grade students think about using Minecraft Education Edition (EE) to showcase your learning of the geology unit of study.



What is a research study?

Research studies help us learn new things. We can test new ideas. First, we ask a question. Then we try to find the answer.

This paper talks about my research project and the choice that you have to take part in it or not. I want you to ask me any questions that you have. You can ask questions any time.

Important things to know...

- You get to decide if you want to take part
- You can say ‘No’ or you can say ‘Yes’
- No one will be upset if you say ‘No’
- If you say “Yes”, you can always say ‘No’ later
- You can say ‘No’ at anytime



Why am I doing this research?

I am doing this research to find out more about what 3rd grade students think about using Minecraft Education Edition (EE) to showcase your learning of the geology unit of study.



What would happen if I join this research?

If you decide to be in the research, I would ask you to do the following:

- Questions: I would ask you to fill out Google Form surveys/questionnaires on your iPad.
- Questions: I would ask you to fill out an online formative assessment, Quizizz on your iPad.



Could bad things happen if I join this research?

Some of the questions might be hard to answer. If you don't want to answer a question, that is fine. We can skip that question and ask another question, or you can stop the questions all together. You can say 'no' to what I ask you to do for the research at any time and I will stop. I don't think anything bad will happen to you if you join this research project.



Could the research help me?

This research project will not help you. I do hope to learn something from this research though. And someday I hope it will help me and other teachers as we design classroom projects using online game-based learning tools.



What else should I know about this research?

If you don't want to be in the study, you don't have to be.

It is also OK to say yes and change your mind later. You can stop being in the research at any time. If you want to stop, please tell me.

You can ask questions any time. You can talk to me, Ms. Ozaki. Ask me any questions you have. Take the time you need to make your choice.

You may contact the UH Human Studies Program at 808.956.5007 or uhirb@hawaii.edu to discuss problems, concerns and questions; obtain information; or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit <https://www.hawaii.edu/researchcompliance/information-research-participants> for more information on your rights as a research participant.

Keep this copy of the informed consent for your records and reference.



Is there anything else?

If you want to be in the research after we talk, please write your name below. I will write my name too. This shows we talked about the research and that you want to take part.

Name of Participant _____
(To be written by child)

Printed Name of Researcher _____

Signature of Researcher _____

Date _____ Time _____

Original form to:
Researcher File

Copies to:
Parents/Guardians

APPENDIX I: PARENT/GUARDIAN CONSENT FORM

Appendix I:
Parent Consent Form

Parent/Guardian Consent Form

Aloha! My name is Nozomi Ozaki and I am requesting your permission for your child to participate in my research project. I am your child's librarian at Punahou School. I am also a graduate student at the University of Hawai'i at Mānoa (UHM), in the Department of Learning Design and Technology. One requirement for earning my Master's degree is to do a research project. The purpose of my research project is to observe elementary school students' as they use Minecraft Education Edition (EE) to showcase their learning of a geology unit of study. I will be focusing on how Minecraft EE impacts the growth mindset and level of engagement in connection with student learning. I am asking your permission for your child to participate in this project. I also will ask your child if they agree to participate in this project.

Activities and Time Commitment: If you and your child agree for your child to be in the study, during our forty-five (45) minute class session, your child will work in small groups of 2-3 to show what they are learning about the geology of Hawai'i from expert/guest visits, teacher presentations, and field studies.

For approximately two weeks, students will be given an opportunity to learn about Minecraft EE, go through the tutorial world to learn the commands of using Minecraft EE, collaboratively create a plan, and then begin building their team's creation. A Minecraft EE website will be created to house the information and resources needed for our project. This means that students will need access to the internet over the course of the project. Since this project is taking place during school hours, the school-issued iPad and laptop will provide your child with the needed internet access.

Participation in this research project means that I will observe behaviors, and collect information through surveys/questionnaires, student work, and formative assessment data. *Should you decide against letting your child participate, he/she will still be provided the opportunity to use Minecraft EE to showcase their knowledge of the formation of the Hawaiian Islands and will be asked to take the surveys/questionnaires as well as formative assessments. However, I will not use his/her data in my research project.*

Benefits and Risks: There may be no direct benefits to your child for participating in my research project. The results of this project might help me, other teachers, and researchers learn more about elementary school students' views on using Minecraft EE in the classroom setting, as well as the impacts on the growth mindset and level of engagement with student learning. I believe there is little or no risk to your child in participating in this project. There is a possibility your child may become uncomfortable or stressed by answering a questionnaire or survey. If that happens, we will skip the question, take a break, or stop the survey or questionnaire. Your child may also withdraw from the project altogether at any time.

Confidentiality and Privacy: Your child’s privacy is very important to Punahou School and me. I will keep all study data secure in a locked cabinet in a locked off/encrypted on a password protected computer. Only my University of Hawai’i advisor and I will have access to the information. Any information I collect as a result of this study will remain confidential and will be disclosed only with parental permission or as required by law. When I report results of my research project, I will use a pseudonym (fake name) for your child. If you would like a summary of my final report, please contact me at the number listed near the end of this consent form.

Other agencies that have legal permission have the right to review research records. The University of Hawai’i Human Studies Program has the right to review research records for this study.

Voluntary Participation: Your child’s participation in the research project is voluntary. Your decision whether or not to allow your child to participate will not affect his/her academic performance or relationship with Punahou School. If you decide to allow your child to participate, you and/or your child are free to withdraw consent and discontinue participation at any time without consequence. If you decide *against* allowing your child to participate, your child’s data will not be used in my research project.

Questions or Concerns: If you have any questions about the study, please feel free to contact me at (808) 943-3281 or at nozomio@hawaii.edu. You may also contact my advisor Dr. Curtis Ho at curtis@hawaii.edu. You may contact the UH Human Studies Program at (808) 956-5007 or uhirb@hawaii.edu to discuss problems, concerns and questions; obtain information; or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit <https://www.hawaii.edu/researchcompliance/information-research-participants> for more information on your rights as a research participant.

Please sign below to indicate that you have read and understand the information on this form. You will receive a copy for your records.

I give permission for my child to participate in the research project entitled Ownership of Learning Through Minecraft: An Action Research Project. I understand that my child must also agree to participate. I understand that my child can change (his/her) mind about participating at any time. I can change my mind about participating at any time by notifying the researcher of my decision to end participation in this project.

Name of Child (Print): _____

Name of Parent/Guardian (Print): _____

Parent/Guardian Signature: _____

Date: _____

I consent to the use of my child’s work in the research project: _____ (initial)


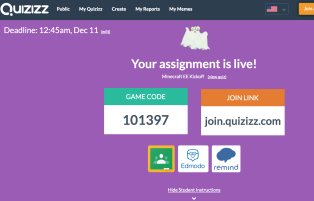
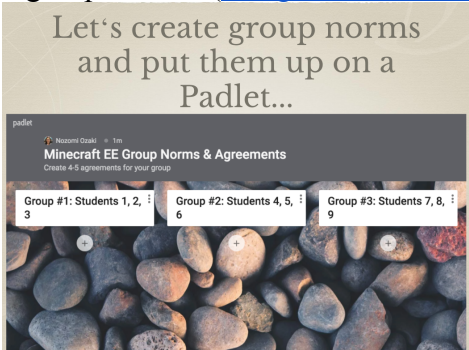
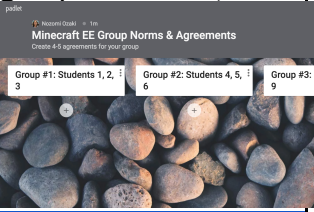
Mahalo!

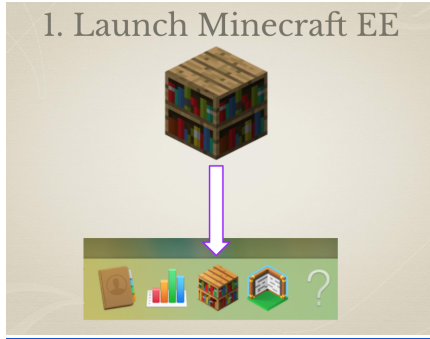
Appendix J:
Daily Group Build Rubric

Daily Minecraft EE Rubric (Once they start building)

	1	2	3	4	Notes:
Understanding	Demonstrates no or very little understanding of task	Demonstrates partial understanding of the task; identifies some elements of the task	Demonstrates basic understanding of the task; identifies most elements of the task	Demonstrates complete understanding of the task; identifies all elements of the task	
Planning	Plans do not make sense and do not relate to task	Contains major errors and not all parts related to task are included in plan	Contains some errors and most parts related to task are included in plan	Contains no errors and all parts related to task are included	
Engagement	Not engaged in task	Some engagement in task	Engaged in task most of the time	Engaged throughout the class period	
Building	No contributions to group build	Minimal contributions to group build	Contributed to group build	Contributed greatly to the group build (went above and beyond)	

Appendix K:
Instructional Plan

Day	Lesson	In-Class Tasks
<p>1</p> <p><u>*Student and parent consent forms to be sent home 2 weeks prior to lesson 1</u></p>	<p>Introduce Minecraft EE, share purpose, privilege of using Minecraft EE, and expected behavior</p> <p><u>Introduce Culminating Project:</u> Building the formation of the Hawaiian Islands learned through expert/guest visits, teacher presentations, and field studies. (Google Slide Presentation)</p> 	<p>Quizizz formative assessment covering what Minecraft EE is, it's purpose, and the expected behavior.</p> 
<p>2</p>	<p>Small group creation (2-3 students) *Collaborate with the classroom teacher to create groups. (Pairing of varying experience with Minecraft and personalities)</p> <p>What are group norms? (Google Slide Presentation)</p> 	<p>Create class group norms on Padlet (small then whole group discussion)</p> 
<p>3</p>	<p>How to log-into Minecraft EE (Google Slide Presentation)</p>	<p>Log into Minecraft EE with credentials, customize skin, practice moving forward, back, left and right</p>



- Basics:
- Controls (forward, back, left, and right)
 - Jumping



4

Basic Controls Part II: ([Google Slides Presentation](#))

- Placing blocks
- Breaking blocks
- Block inventory



5

Go over [daily build rubric expectations](#)

Daily Minecraft EE Rubric (Once they start building)

	1	2	3	4	Notes:
Understanding	Demonstrates no or very little understanding of task	Demonstrates partial understanding of the task; identifies some elements of the task	Demonstrates basic understanding of the task; identifies most elements of the task	Demonstrates complete understanding of the task; identifies all elements of the task	
Planning	Plans do not make sense and do not relate to task	Contains major errors and not all parts related to task are included in plan	Contains some errors and most parts related to task are included in plan	Contains no errors and all parts related to task are included	
Engagement	Not engaged in task	Some engagement in task	Engaged in task most of the time	Engaged throughout the class period	
Building	No contributions to group build	Minimal contributions to group build	Contributed to group build	Contributed greatly to the group build (went above and beyond)	

Share [planning sheet](#)

[Google Form](#) covering daily build rubric expectations

Students add names and know that pink boxes are to input plans

6

Group Planning Sheet

Group Member Names: _____			
Date:	Team Goal:	Each person's responsibility:	Screenshot of today's build:

How to take screenshots to document build process

Demonstrate that the shift+command+3 or shift+command+4 takes screenshots

6

Group planning and small group teacher meetings

Observation Protocol

Teacher: _____		Date: _____	
Observation Focus: Ownership of Learning	Time of Observation	_____ to _____	

Intervals	Student Names			
8:00-8:15				
8:15-8:30				
8:30-8:45				
8:45-9:00				
9:00-9:15				
9:15-9:30				
9:30-9:45				
9:45-10:00				
Total				

Engaged Behavior: (on task)	Unengaged Behaviors: (off task)	Teacher Observations:
B1: Actively planning and participating in group build B2: Reflective about learning process B3: Empathy is built with team B4: Connected to project	F1: Not participating in planning and group build F2: Not reflective about learning process F3: Empathy is not being built with team F4: Not feeling connected to project	

Observation Protocol

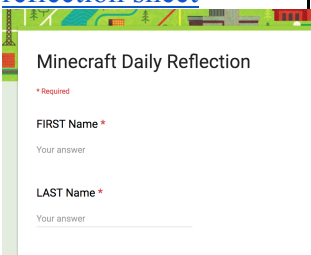
Teacher: _____		Date: _____	
Observation Focus: Student Engagement	Time of Observation	_____ to _____	

Intervals	Student Names			
8:00-8:15				
8:15-8:30				
8:30-8:45				
8:45-9:00				
9:00-9:15				
9:15-9:30				
9:30-9:45				
9:45-10:00				
Total				

Engaged Behavior: (on task)	Unengaged Behaviors: (off task)	Teacher Observations:
B1: Listening attentively B2: Contributing to discussions B3: Working collaboratively w/ others B4: Asking questions B5: Completing tasks B6: Uses technology effectively	F1: Not listening/passive F2: Not contributing to discussions F3: Not working collaboratively F4: Not asking questions F5: Distracted/not completing tasks F6: Uses technology ineffectively	

Begin filling out plans for build as a group

Complete [daily reflection sheet](#)



Minecraft Daily Reflection

* Required

FIRST Name *

Your answer

LAST Name *

Your answer

7

Begin build within Minecraft EE

Start build in team space

[Complete daily reflection](#)

8

Observation Protocol

Teacher:		Date:	
Observation Focus:	Ownership of Learning	Time of Observation	_____ to _____

Intervals	Student Names			
8:00-8:15				
8:15-8:30				
8:30-8:45				
8:45-9:00				
9:00-9:15				
9:15-9:30				
9:30-9:45				
9:45-10:00				
Total				

Engaged Behavior: (on task) B1: Actively planning and participating in group build B2: Reflective about learning process B3: Empathy is built with team B4: Connected to project	Unengaged Behaviors: (off task) F1: Not participating in planning and group build F2: Not reflective about learning process F3: Empathy is not being built with team F4: Not feeling connected to project	Teacher Observations:
---	--	--------------------------------------

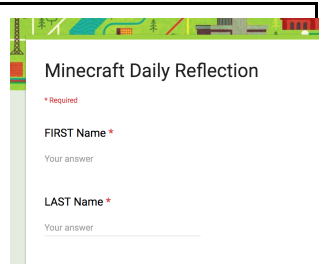
Observation Protocol

Teacher:		Date:	
Observation Focus:	Student Engagement	Time of Observation	_____ to _____

Intervals	Student Names			
8:00-8:15				
8:15-8:30				
8:30-8:45				
8:45-9:00				
9:00-9:15				
9:15-9:30				
9:30-9:45				
9:45-10:00				
Total				

Engaged Behavior: (on task) B1: Listening attentively B2: Contributing to discussions B3: Working collaboratively w/ others B4: Asking questions B5: Completing tasks B6: Uses technology effectively	Unengaged Behaviors: (off task) F1: Not listening/passive F2: Not contributing to discussions F3: Not working collaboratively F4: Not asking questions F5: Distracted/not completing tasks F6: Uses technology ineffectively	Teacher Observations:
--	---	--------------------------------------

Continue build within Minecraft EE and small group teacher meetings



Minecraft Daily Reflection

* Required

FIRST Name *

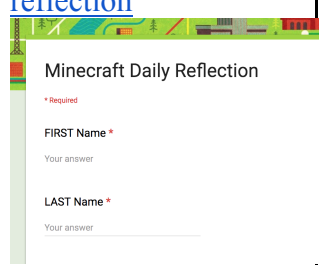
Your answer

LAST Name *

Your answer

Continue build in team space

Complete daily reflection



Minecraft Daily Reflection

* Required

FIRST Name *

Your answer

LAST Name *

Your answer

Observation Protocol				
Teacher:		Date:		
Observation Focus:	Student Engagement	Time of Observation	_____ to _____	
Intervals	Student Names			
8:00-8:15				
8:15-8:30				
8:30-8:45				
8:45-9:00				
9:00-9:15				
9:15-9:30				
9:30-9:45				
9:45-10:00				
Total				
Engaged Behavior: (on task)	Unengaged Behaviors: (off task)	Teacher Observations:		
B1: Listening attentively B2: Contributing to discussions B3: Working collaboratively w/ others B4: Asking questions B5: Completing tasks B6: Uses technology effectively	F1: Not listening/passive F2: Not contributing to discussions F3: Not working collaboratively F4: Not asking questions F5: Distracted/not completing tasks F6: Uses technology ineffectively			

9	<p>Share build with classmates through a gallery walk</p>	<p>Gallery walk and peer feedback</p> <p>Complete post assessment questionnaire</p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p style="text-align: center; margin: 0;">Post Module Questionnaire</p> <p style="font-size: 8px; margin: 0;">Hi, students! You were selected to complete this questionnaire as a participant in my research project. The purpose of this questionnaire is to understand how Minecraft Education Edition impacts your learning. Your responses will be used to improve and guide the future use of Minecraft EE at Punahou School.</p> <p style="font-size: 8px; margin: 0;">The questionnaire includes 13 questions and should take no longer than 15 minutes to complete. Responses will be kept anonymous and will not affect your grade. Please be as honest and thorough as possible.</p> <p style="font-size: 8px; margin: 0;">Thank you for taking the time to complete this survey.</p> <p style="font-size: 8px; margin: 0;">* Required</p> <p style="background-color: #800000; color: white; padding: 2px; text-align: center; font-weight: bold; margin: 0;">Select the best response to the statements about Minecraft EE below.</p> </div>
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