DIGITAL MAKERSPACE

EME 6347 Final Project

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My Digital Makerspace was inspired by the readings we did in this course in addition to my own personal beliefs. I believe that education should be free, equitable, and accessible to all and not limited to tests and curriculum dictated by the state. I believe that most of our learning happens incidentally outside of the classroom, especially when we follow our own interests. However, I do believe that we all need the basic skills of reading, knowledge of the world, and computation. Of equal importance are learning skills that enable our self-sufficiency. We need to have an understanding of where our food comes from, the effect of humans on the environment, how to heal ourselves, how machines work, how to build our homes, and how to solve problems and fix things.

Within the limited time frame that I had to create this project, I created a basic **Digital Makerspace** with the idea of continuing this in the Fall. I used Google Sites to host the makerspace since that is the platform used at my school and I created a new website with brightly colored banners and graphics. I attempted to keep it simple and accessible, ensuring that my visually-impaired learners could enjoy the activities. On top of it all, I wanted to ensure that these opportunities and connections to others continued beyond the basic framework of the Makerspace. So basically, I just laid the foundation with the hope of continuing the build.

I chose to focus on Makerspaces for a few different reasons. The first reason was my belief in informal learning which was supported in Illich's convivial communities. Illich was not a fan of our mass education system and he advocated for deschooling society. His premise was that modern society created a dependency that took away the individual's ability to be self-sufficient and free, and I think Marx would agree with him. He wanted knowledge and skills to be passed on through informal and voluntary relationships known as convivial communities. (Illich, 1971)

The second was that I've always been a *bricoleur* and the daughter of a *bricoleur*. I grew up helping my dad fix cars and build stuff in his carpentry workshop. I was fascinated with making things from the day I was born and in learning to be self-sufficient like my father.

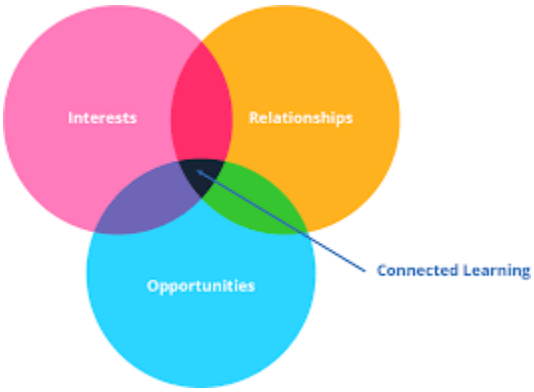
I see Makerspaces as being a potential springboard for learners to become *bricoleurs* and carry these skills over into the world – perhaps into a career. They offer participants a chance to learn based on their interests. Students of all ages need to be granted the freedom to explore and learn through play. Makerspaces also provide opportunities for connected learning in their peer-to-peer collaboration, and connections to the community around them.

> **"Maker spaces promote learning through play; they have the potential to demystify science, math, technology, and engineering; and encourage women and underrepresented minorities to seek careers in those fields." (Britton, 2012)**

There are many examples of Makerspace communities though they are not necessarily identified as such. They can be organized through schools, community centers, libraries, grassroots organizations, or non-profits. One example is the Na'ah Illahee Fund near Seattle, Washington. Native Girls Code introduces young Indigenous women to coding to help them enter the field of technology and become agents of change. In addition to this, they offer classes such as storytelling and fiber crafts to reinforce Native American cultural identity. (O'Leary S. , 2016-17)

Another example can be found in the Tampa Hackerspace. This is a membership-based community which has access to expensive machines and equipment. Members offer free classes and mentorship to the community. (https://tampahackerspace.com/) As I explored their offerings through Meetup, I came upon other grassroots Makerspaces such as "Virtual Open Make – Friday Nights," "Teen Digital Makerspace" hosted by a local library, "Virtual Youth Maker Monday" hosted by a university Makerspace, and many others, some virtual for the time being. This one's logo was one of my favorites because it reminded me of Connected Learning:

Learn, Create, and Collaborate are like the Interests, Opportunities and Relationships of Connected Learning. I believe that Makerspaces are a good example of Connected Learning, precisely because they not only provide participants with a place to create and learn new skills, but also a place to collaborate with others and connect with experts.



"Enhanced by technology, connected learning gives youth the resilience and resources they need to make learning more relevant and impactful. It meets youth where they are by activating their interests, cultivating supportive relationships, and connecting young people to opportunities." (Exchange, 2019)

Connected Learning must be designed with these things in mind. It should be led by curious learners and give them a chance to use technology for creative purposes. It should foster supportive relationships with peers and adults, and provide the opportunity to apply this experience to their future career and community interests. (Exchange, 2019)

With this in mind, I started the Digital Makerspace project by asking the high school students in my Digital Multimedia Class to share some Social Studies projects with the middle school students. I told them to choose different types of activities, including 3D, 360 photos/videos, games, Google Expeditions and Augmented Reality. I provided them with some areas of focus provided by the Social Studies teacher. Although I had initially hoped that they'd create some of the activities to be used in the Makerspace themselves, there wasn't enough time since they were in the process of learning some of the software themselves. However, next year I would like to include their presentations. In the process of creating the makerspace, I included some short video presentations made by my 9th

grade students with their permission. They were part of an app project where they had to make a short presentation about their favorite app which included a video showing someone how to use it, and included something creative. I chose 3 videos which were about different software used in audio editing and included the students' creative harmonies. I wanted it to represent a type of peer connection.

I chose Social Studies since the middle school teacher agreed to try out the Makerspace in her room. The students worked with the activities on two different days. Although I provided varied subjects and activities, I focused a little more on Social Studies for the second day since I knew she was working with some of her students in preparation for the Civics EOC.

While a physical connection was hard to accomplish between the middle schoolers and the high schoolers in this challenging year of COVID, I decided to share resources virtually and focus on creating a Digital Makerspace that would eventually become an ongoing collaborative project. The high schoolers would share projects with the middle schoolers and the middle schoolers, in turn, would share projects with the elementary school students. I started with just the high school students sharing resources with the middle school students.

The first day they got to know the Digital Makerspace, they played freely with any subject from the list below. They could do some activities entirely online while others required software downloads. Some software cost money (2 of the apps suggested by my HS students), and some were free. Of course, the school has restrictions in place that prevent students from downloading software, but some of them will be able to do it at home, while others don't have a personal computer. At least in our school, every student is given a computer.

Social Studies

Music

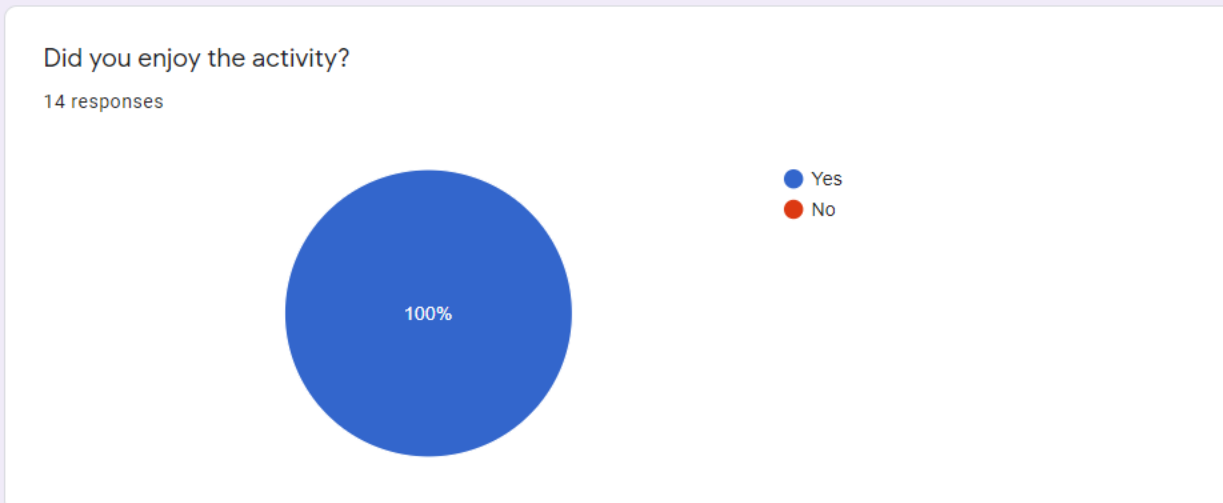
Coding

Graphic Arts

Science

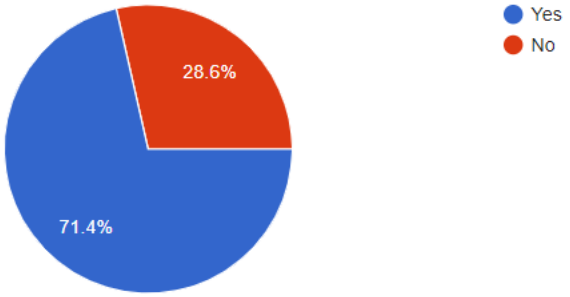
Writing

They loved having the freedom to explore and try out the different categories. The kids who had some vision gravitated to the arts and coding activities as well as Google Expeditions, and the ones who didn't tended to go directly to the music activities and videos. When they finished exploring after about 30 minutes, they were asked to do a short survey and the results are found below, along with the five questions posed to them.



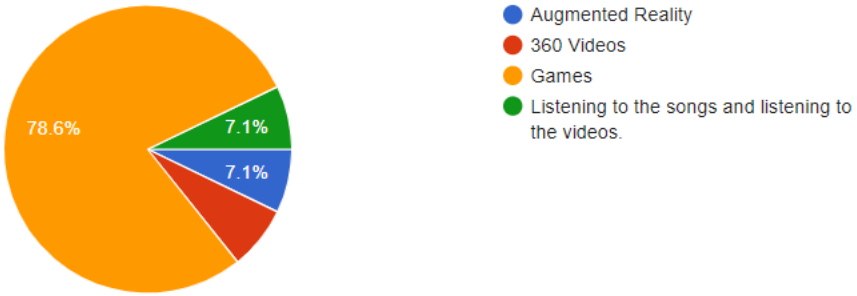
Did you wish you had more time?

14 responses



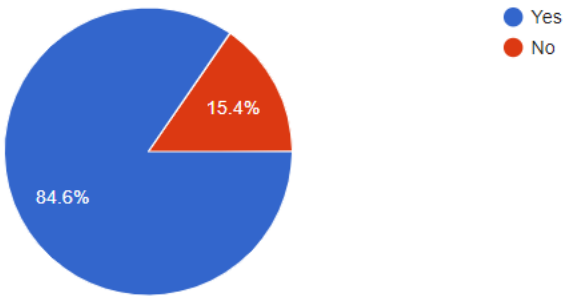
Which was the most fun way of learning?

14 responses



Did you like the videos and experiences from the high school students? (music videos, 360 social studies videos, Middle Ages Google Expeditions)

13 responses



In the fifth question they were asked to write in their favorite activity and due to the scrollbar, I could not get a screenshot that included everything. However, after looking it over, the results were as follows:

2 liked everything

3 liked coding

3 liked art

5 liked virtual drums

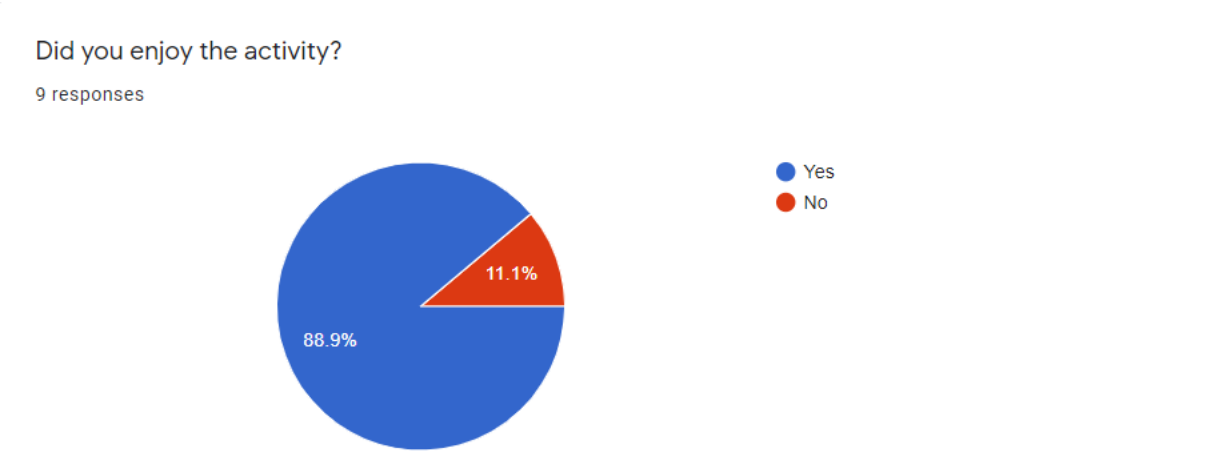
2 liked Civics

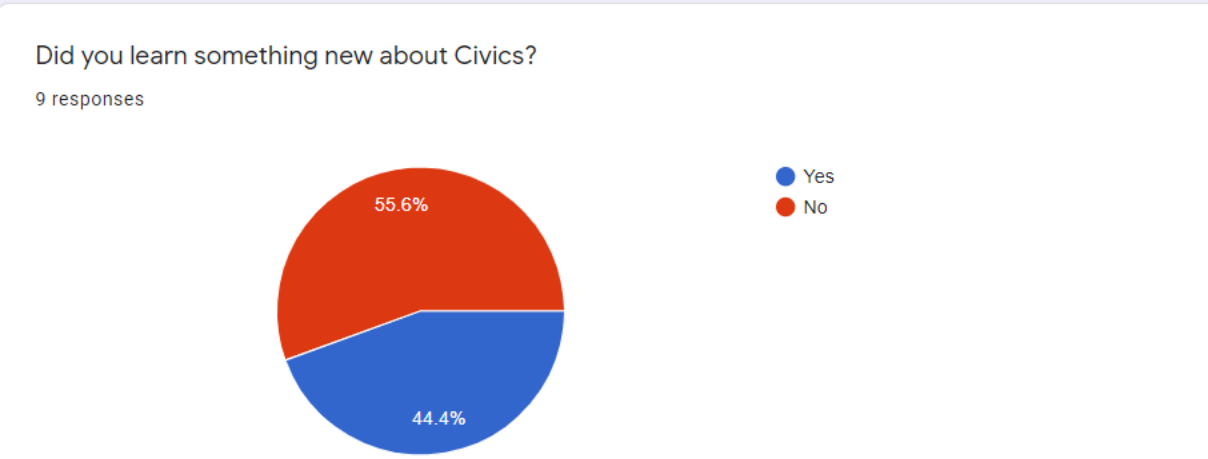
78.6% said they enjoyed the games, but that could refer to the coding or science games so I realized I needed to be more specific. 84.6% said they enjoyed the activities chosen or created by their high school peers. That is an indication that this peer-to-peer connection is important. When it came to the music videos, the 7th and 8th graders knew exactly who had produced them since they were done by 9th graders – their colleagues from last year, whereas the 6th graders enjoyed them without knowing them.

I was inspired by Mimi Ito's connected learning camps, which she co-created with Katie Salen-Tekinbas (Quest to Learn) and Tara Tiger Brown (LA Makerspace), both of whom have extensive technology experience. The camps revolve around Minecraft and are hosted in Outschool for a small fee. They have courses on history, architecture, science, engineering, the arts, and coding. Their classes are offered through Outschool and there is a charge, the average being about $25 per session. The young counselors they employ, teach and mentor the younger students. Learners can join a community of Minecraft enthusiasts as well, so the connected learning continues. The mission of Connected Camps is to provide "connected learning experiences that foster creativity, problem

solving, collaboration and interest-driven learning." (Connected Camps, 2021) They are also a part of the Connected Learning Alliance.

Since I wanted more data, I decided to add to the Civics page. Since the teacher was busy preparing them for the Civics EOC, I had to tailor the activities to that end and include a survey specific to those students. Since this was not the original intention of the makerspace, I chose a variety of activities to provide choices. There were Google Expeditions, different types of videos they could relate to, and Quizlet exercises. These are the results:



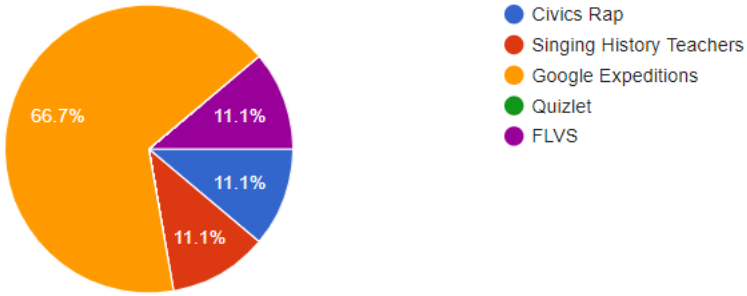


What's the coolest part about learning Civics with technology?

9 responses

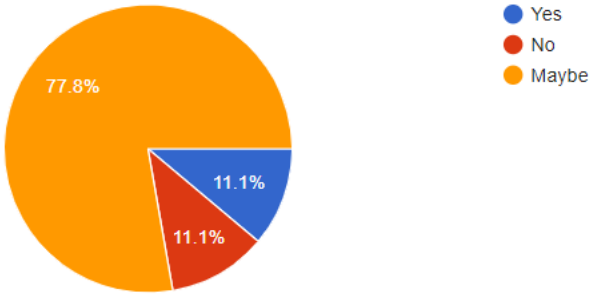
What was your favorite Civics activity?

9 responses



Do you think you're going to do better on the Civics EOC?

9 responses



What I did notice while observing this second group of activities was that they were fascinated by Google Expeditions primarily due to the 360 degree photos and few reviewed the text that went with it. I keep thinking in terms of outcomes but the Makerspace is not about outcomes. It's about students choosing to learn the activities which are of interest to them, and hopefully learn skills that they can carry on into their lives, whether they be for college or work.

Let's take a closer look at the importance of youth as content creators, since they can do some of these activities in a Digital Makerspace. 84.6 percent of the students surveyed in my makerspace enjoyed viewing the content of their peers. Entertainment Media and Research stated that 17 percent of teens created their own YouTube channel in order to share their content. "Researchers see these virtual spaces as becoming portals to communities where youth bond with peers, engage in public discourse, explore identity, and acquire new skills."(Chau, 2010) This type of engagement is just the type of engagement encouraged in connected learning .

Scratch is a program developed at MIT and influenced by the Logo programming environment which was developed by Seymour Papert and other MIT researchers. It was designed to be simple so that users could program visually. The nice thing about Scratch and other software or Web 2.0 tools, is that learners are actively creating in areas of their interest which supports Constructionist theory. Constructionism is when learners construct their own knowledge through building and making instead of knowledge being transmitted from the teacher to the student. (Karen Brennan M. R., 2012)

It's interesting to note that although creating in these virtual spaces is motivated by personal interest, it also helps participants understand complex concepts, develop critical thinking and problem-solving skills, and encourage design expression. In addition, content creators participate in the Iterative Design Process which "involves design cycles of imagining, creating, playing, sharing, and reflecting." (Karen Brennan M. R., 2012)

The Scratch designers also created a Scratch Online Community so that participants could share their creations with others and comment. They can even download each other's projects to understand how they are made, and remix them to add their own personal slant. Connectivism supports these connections with others, and like the connected learning camps, are an important part of the connected learning framework. These connections can lead to a career interest or enhance a college application. I believe that makerspaces can also play a role in the connected learning framework. I've included a sample blog for peer support, and hope students will join some of the online communities available to them in the different programs. With more time, I will add these links. Please take a look at the **Digital Makerspace** in the link below.

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