Makerspace Data Analysis

The three community focus groups that participated in this study were students, faculty members and off site members (see attached schedule for details).Three categories of data were collected to establish a baseline and triangulate common themes among the community members. Pre survey questions, initial interview questions and observations established the first category “What do I know about a Makerspace”. This data determined experience and prior knowledge among members before any instruction or use of the makerspace. Observations and interview questions about current practices and procedures complied data for “How do I use the maker space”. Although procedures are in place and being used they have not been fully defined or tested. Open response and interview questions identified the third category “How can I be more efficient in the Makerspace” community members had an opportunity to make suggestions that could improve the Makerspace based on their recent experiences.

“What is a Makerspace” Pre Survey, observations and interviews

Pre introduction data showed that community members did not understand the need or use of a Makerspace. They could not give a definition or describe how the space might be used. A few member from AF and BF had some ideas but were not clear about the processes and procedures that should be used in such a space. There were concern about safety and training for teachers and students. See the data samples listed below:

All Participants-67.5 % percent of community members did not know what a makerspace was.

All participants - 80% Did not know where the Makerspace was located in the school

All participants **-** 42% felt they had average capabilities with technology

Observations **–** 72.5% did not know that they would be allowed to use the space after regular school hrs.

Group DS-90% indicated they had been in a Makerspace 0-3 times.

Group DS - 85% said they apply things they learn in one class to other classes.

Group DS - 80% indicated that they like to work in groups some of the time.

Group DS- 80% indicated that they like working alone some of the time.

Group DS- felt they had skills that would be usefully in a group project.

Groups- AF, BF, EF, FF-had some ideas about how to use the space could be used.

“How do I use the makerspace” Post survey, interviews, observations

All participants – 91.5 % knew what a makerspace was and could define it.

All participants – 100% knew where the makerspace was located

Groups- BF, EF, FF- used the space for a verity of Maker projects. Classes included SPED applied skills, English 1, and Mythology. Activities included posters, catapults, board game design, and graphic displays. These faculty members assigned content specific projects, materials and gave brief instruction. Instructors did not supply any technical training. Students from FF were allowed to use the 3D printer if they had previous training. Students were given content specific rubrics but were able to add their own creative touch to demonstrate their learning. Students worked in teams or groups. Students made use of materials and hand tools in the room scissors, markers ,pencils, tape, hot glue and other craft type materials. Students were able to spread out along the workbenches and tables to work. Instructors work with students to solve and problems.

After the use of the space by community members there was a significant increase in interest for managing the space and times that the space would be open from 51%-65%. Instructors and students became more comfortable with the space and 97% of students were able to complete a Maker project in the designated amount of time. Instructors and students agreed that the space fit their needs and will return for future activities. The space and the equipment were not used to full potential by Instructors who were not familiar with those processes at this time, however students that had received training used their knowledge to employ some of the available equipment.

Members commented that the makerspace provided a unique experience for collaboration and allowed students to display their skills while demonstrating newly acquired understandings specific to the area of study. Students who working together had enough area to move about comfortably without interfering with the work of others. Having materials and small hand tools on mobile carts proved to be advantageous , students could gain access from a multiple angles. . Instructors enjoyed the space and commented on their ability to move from group to group easily without disturbing other groups. Safety concern were minimal, standards were established by the faculty members based on their comfort level and training in the space. Instructors felt that they had an opportunity to develop closer relationships with their students through their interactions while in the space.

Group DS- Students worked in teams, they were given basic instruction for 6 different mediums/processes (3D printing, logo creation, T-shirt design, green screen, Arts /crafts, and graphic design. They were then then asked to choose one and use it to promote a computer game they designed. Students relied on each others experience and understanding as they shared ideas. They work freely and made use of all of the technology in the room. Students were excited to try

something new and enjoyed the break from a traditional classroom setting. Technical understanding of many of the process increased, 3D printing was the top technology used with vinyl cutting a close second. When asked “ What did you gain from using the makerspace?” replies ranged from technically specific skills like 3D printing to freedom of choice to for a project and time for collaboration. Some students used the Makerspace during their off block to Make their own projects.

“How can I be more efficient in the Makerspace” Interviews, Post Survey, Post Activity Interviews

Since this is a community space that should be shared and explored by all, members were encouraged to make suggestions after experiencing the Makerspace. Group G wasn’t sure if the space was structured enough and felt that the work could be done in other lab spaces. They also felt that activities and projects should focus on a single technology rather than allowing students freedom to roam the space using materials and technology at will. Group G and Faculty members felt safety concerns could be reduced with some sort a certification process for students that could be easily identified by faculty members. Faculty members suggested an I.D. card or coin. Faculty agreed logistically there should be a better signup procedure, currently notifying the teacher or administrator in charge is not enough. They wanted to be able to see a real-time calendar so they could plan around it. It was also suggested that there be a running log kept in the space that would be filled in by faculty members using the space to track materials and maintenance issues. Some other equipment that is needed or could be purchased included a large paper cutter and a laser engraver. It was noted that having 1 or 2 pieces of a specific technology would limit the number of students able to use those pieces at any given time. They would also like some more technical training so they could use more of the equipment. Dust, wood dust covers everything, “is there a way to reduce or eliminate the dust?” A valid concern that was brought forward by the faculty member that uses the space daily as a woodshop was the period/blocks that the space is open. He needs to be in the space every day and would have difficulty sharing the Makerspace with other classes for that block.

Students had few suggestions other than they want more and more time to explore. They felt the space was adequate and they enjoyed the time to create. A few student expressed interest in managing the space possibly as a mentor if they could get credit for doing so. Others said they would like to use the Makerspace after school but so far there have only been a few. The rest of the student body needs to be notified that he Makerspace is open.

Makerspace Research Data Collection Schedule

Date	Makerspace Activity	Group	Data type
1/15/19-4/5/19	Discussion Throughout Study	1 Teacher 14 Students **JF/S**	(interview)
2/10/19	Discussion	Offsite teacher Group **G**	(interview)
2/12/19	Discussion Space/Setup	Local business Group **G**	(interview)
2/15/19	PD session	5 teachers-**Group AF**	(interview/Survey)
3/01/19	Demo/Student Activity	3 teachers 17 SPED-**Group BF/S**	(observation)
3/08/19	PD Session	2 teachers - **Group C**F	(interview)
3/08/19	CS 1 and 2 Pre Survey	28 Students -**Group DS**	(survey)
3/14/19	Maker orientation Pre Activity	2 teachers - **Group EF**	(interview/survey)
3/18-19/19	Maker Activity	2 teachers 15 students- **Group EF**	(interview/survey)

3/18-19/19 CS 1 and 2 Maker orientation 28 students orientation -**Group DS** (observation)

3/19/2019 Discussion Maker post 2 teachers - **Group EF** (interview)

3/25-26/2019 CS 1 and 2 Maker Activity 28 students- **Group D**S (observation)

3/28/2019 CS 1 and 2 Post Survey 28 students- **Group DS** (survey)

4/02-05/19 Maker Activity 2 teachers 24 students -**Group FF/S** (interview)