

The New IU9 STEAM Lab

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Overview

This plan reflects the plan that I have recently initiated at my Intermediate Unit. It is a project that has been on the back burner for over a year, always finding something else that needed my attention more urgently. The last assignment from this class got me thinking and after completing the assignment, I discussed with my Supervisor the idea of converting one of our conference rooms into a STEAM lab. Suffice it to say that this project is a little different from the last one, but in my case and for this class, I decided to focus my assignment on this development process.

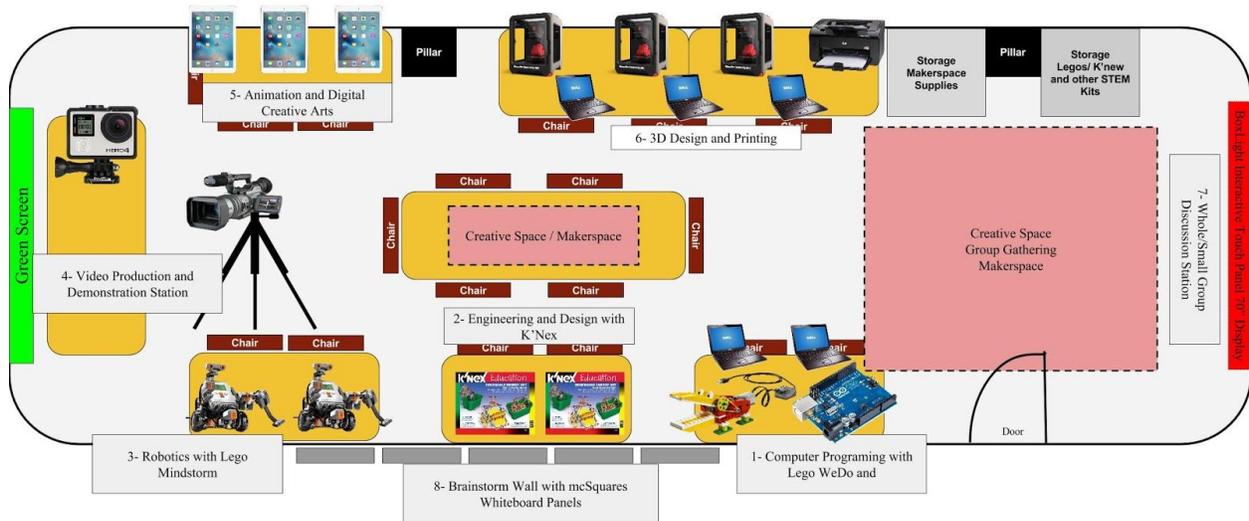
Currently, many of the schools we service are beginning to or in the last few years have created, STEM labs in their buildings. One of the disadvantages of being such a rural area is an inability to collaborate with teachers outside of your school in a personal setting, not just facebook groups and twitter chats. It was with this in mind that I wanted something at our center where teachers could collaborate; somewhere they could go to ignite that conversation. STEAM labs truly ignite that spark of curiosity and inspiration.

Much of what we needed to begin a small lab was already available. We were given three 3D printers from another program, in exchange for allowing their adult ed teachers to come train on occasion. We also have 20 Lego WeDo kits, 6 K'Nex Challenge kits, 12 Arduino micro computers, 30 plus computers, all of which are old and in dire need of retirement. We were able to purchase two Lego Mindstorm kits recently and are planning to purchase 3-5 chromebooks. We were also gifted 3 iPads that employees never used.

The setup of the STEAM lab was purposefully thought out, keeping in mind that this is also a conference room that 12 times out of the year is host to meeting that aren't STEAM related. It was with this in mind that I set out the stations. The 3D printing stations and the cabinets are permanent fixtures, so I had to make sure the all the stations along the opposite wall are moveable for when a meeting has to be setup. I believe that there is still a good flow and enough room that collaboration can happen without being too distracted. It isn't the largest area and would reach capacity at 25, but ideally keeping it below 20 would be the best bet. We have other conference rooms that can accommodate overflow and stations like WeDo and Arduino are easy to set up outside of the STEAM Lab.

If you click the graphic below it will take you to an interactive map which will allow you to view the different station pages. As of right now it is sparse, most only have the description of the station and pictures of students engaging in them. My plan is to have these pages be the guild for each station so that teachers and students can take them home and back to school. full of resource.

STEAM Lab Diagram



***Click on Diagram to link to the interactive site.**

Lab Centers Overview

Computer Programming with Lego WeDo and [Arduino](#)

The station is dedicated to the concept of Computer Programming. Students will use Lego WeDo kits to create simple structures that they can program using the WeDo coding program in conjunction with laptops. WeDo work very well with the elementary aged students, but is a great introduction to the drag and drop programming concept. Students will also engage in the Arduino microcomputer kits. These are small microcomputers that can be assembled with different input and output accessories which can then be programmed using actual code in the Arduino program. Students can also use this station to engage in the Scratch and Tynker computer programs, which are both programs to develop students computer programming skills. These are stand-alone tools that don't need any additional paraphernalia to use. Students can also choose to create an account in both of these programs which will allow them to continue their work outside of their time in the STEAM lab.

Engineering and Design with K'Nex

This station is based around the engineering toy, K'Nex. Students at this station will have various design challenges to choose from to construct K'Nex structures. Throughout the year there will be different design challenges which students can participate.

Robotics with Lego Mindstorm

This dedicated station is focused around robotics and how to construct and program your own creation using Lego Mindstorm. Students will be guided through how to program the codes to work the Mindstorm and will then be able to go off on their own creative quest. Or if they aren't so inclined, they could work through one of the many different activities provided.

Video Production and Demonstration-

To get the most out of STEM I agree that the integration of Arts into the Science, Technology, Engineering and Math design is an incredibly important element to the equation (Tarnoff, 2011). Students are inundated with media and the arts all around them and to be an effective communicator of your ideas it's vitally important that one can understand how to visually share these, and Arts is one of the ways that help to make this easier. The Art aspect in STEAM truly lends itself to each of the other elements. With that, in this station students and teachers will be able to easily capture experiences they have while participating with STEAM activities. Set up with a forward facing camera and a ceiling mounted camera, participants will be able to record demonstrations, tutorials, models, interviews among anything else they might want to produce. In the future I would like to add a production table where all the cameras can feed into live and would have a lot more of the features of a true production studio. For now it is just a MacBook Air running iMovie.

Animation and Digital Creative Arts-

Using iPads and apps like [Lego Stop Motion](#), [DoInk](#) and [Stop Motion Studio](#) students will create animations and other visual media. They will have different prompts to which they can complete different type of media. Throughout the year there will be different film festival like competitions to showcase student work.

3D Design and Printing-

Using the [MakerBot](#) and [TinkerCAD](#) software students will design 3D structures which they can then bring to reality using the MakerBot Mini 3D Printers. This station is used in isolation as part of different challenges that students will have throughout the year as well as in conjunction with the Makerspace as a tool to create parts that they might need.

Whole/Small Group Discussion Station-

This is one of the areas where we can meet together as a whole group for sharing of ideas, discussion, tutorials and brainstorming (works in conjunction with the mcSquare Whiteboard panels). In the future I would like to see added a BoxLight 70" Interactive Display. This is a powerful tool to engage students in discussion and brainstorming as well as participating in the plethora of powerful interactive models found online at sites like [Phet](#) and [ck12](#).

Brainstorm Wall with [mcSquares](#) Whiteboard Panels

In an effort to SCALE UP the lab and create additional "thinking space", I would like to use these panels along the wall (Horne, 2012). These are 1 foot by 1 foot whiteboard panels that attach to a wall and can be removed to record ideas. These are great tools for brainstorming and allow for students to be able to focus on their thought without having to be in the front of the room. These will be used for numerous projects that we will undertake throughout the year.



Makerspace-

This is one that really gets to the heart of the STEAM concept, giving students free rein to explore a solution to a problem (Schaffhauser, 2013). It has been fascinating to see what students are able to create and the reasoning behind whatever it is that they are creating. With this station students are given the opportunity to truly explore and create with things around them, many times these are just things that would otherwise be garbage, but given to students in creative mode and they become tools to solve a problem. This station is not in one fixed location and will be utilizing most of the creative spaces available.

Summary

What I have is a good start and I happily making progress. Some of the stations presented here have equipment that we don't yet have, but would like to see in the very near future. In fact after I finish this prepping phase, I'm going to use all of this information and try to seek out some grants to get the other equipment funded. So this is very much a living breathing project, that if one felt so inclined, could monitor our progress through the website (<http://mrmacer.com/steam/>) and on twitter [#iu9steamlab](#).

References

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