

White Paper:

Parkway West Center for Design and Innovation

Executive Summary

The role of Career and Technology Centers needs to change in order to meet the needs of consortium members and the students in those institutions. In today's world, design and innovation have become more than buzzwords. They are operative terms that open new doors of opportunity. The Parkway West Career and Technology Center (PWCTC) enlisted the help of LUMA, an educational consulting company in Pittsburgh, to come up with a series of recommendations to guide PWCTC in its future course. LUMA and members of the Parkway West Center for Design and Innovation's planning team met with students at PWCTC and consortium schools to learn more about their ideas and vision for a new direction. (see below) The survey of students highlighted the need to consider the following:

- Opportunities to showcase emerging technologies;
- The need for partnerships, including business and community groups;
- Recognition for student work in the form of credits or digital badging;
- The need for real-world projects and activities with competitions and showcases to develop an entrepreneurial or competitive spirit.

This paper will attempt to address these key issues by focusing on:

1. Possible partnerships with organizations such as the Energy Innovation Center (EIC) that share a similar vision and purpose;
2. The use of digital credentialing and opportunities with local universities and post-secondary institutions;
3. Work with local and regional groups like Energy Innovation Center and local entrepreneurs to develop a new entrepreneurial focus at PWCTC with a series of competitions, summer camp, and showcases for student projects as well revenue generating projects and programs;
4. Other issues, such as staffing, funding, and necessary space for the Center of Design and Innovation (CDI).



LUMA Findings

The students are excited by emerging technologies, like fabrication. The students discerned a need for new directions and greater collaboration with local companies and businesses. Students want to be better prepared for success in any post-high school work or opportunities. Students want to showcase their work and in some cases create their own businesses. This white paper will use the LUMA findings as the basis for a series of recommendations that touches on the teaching and learning, the remaking of learning spaces, the possible partnerships, and the staffing necessary to make the vision for a Center for Design and Innovation possible.

Insight #1: Most students wanted a fabrication lab (13 out of 18 students voted for it). This particular card received the most votes and based on the comments of the students and the cost placed on that feature (\$500 but still the top vote getter), it is apparent that this is a baseline requirement for the program.

Next Step #1: We would recommend you begin some brainstorming/concept development on what the fabrication lab should specifically contain. Certainly doing some research on existing innovation labs such as TechShop would be very beneficial.

Insight #2: Partnerships with local business, non-profits and colleges were critical. 3 out of the top 6 vote getters were around these partnerships. 16 out of 18 students selected at LEAST one of these). Given that 3 of the 4 features under the Partnership Development cards were selected within the top tier, that says a lot about how important this is. This should also provide great support and leverage as you approach the community with how they might support the program. Lots of directions this could go. Interestingly, the feedback for the last Partnership Development card (Partner with member and non-member school districts got one of the worst scores). So, that clearly was not part of the students big picture.

Next Step #2: Build a more detailed and vetted Innovation Program Brochure (but still a prototype) to put in front of these local businesses/schools and get their feedback on it. (second, and more developed, round of participatory research).

Insight #3: Ancillary benefits are important. There was some pretty good action in the area of additional benefits outside of just the learning & development itself from the program. College credits and internships both scored fairly well. Again, this combined along with insight #2 really shows that the students strongly want to engage with the real world and start to advance their skills in light of potential future careers. Sounds right up Parkway West's alley!

Next Step #3: Similar to Next Step #2, create a more refined prototype and start to explore conversations with local business/schools.

Insight #4: Students like competition and showcasing their work. While two cards (showcase work and student competitions) both scored well, there was also a lot in the notes around kids expressing their desire to compete and be able to demonstrate their successes. And based on the feedback around working with



Parkway West Center for Design and Innovation - DRAFT 9/24/2015

member and non-member schools (not working with them really) these competitions clearly need to be based on the member schools.

Next Step #4: Consider a brainstorming activity with the students (round robin?) to answer the question "How might we create competition and rewards to encourage excellence in innovation?"

Emerging Technologies

Robotics

One possible direction for the CDI would be the world of robotics. Pittsburgh through the work originating at Carnegie Mellon University (CMU) has become a global leader in robotics. BirdBrain Technologies LLC was founded in 2010 by Tom Lauwers. For the last five years, Tom had been working on a Ph.D in the Carnegie Mellon Robotics Institute's [CREATE](#) lab. His work there focused on the creation and design of several robots, robot kits, and other electronic devices. His [Ph.D](#) describes a design process for how to align the capabilities and interface of these devices to a specific educational context. Birdbrain now has two robotics kits - the Hummingbird and Finch - that are used by schools throughout the world. The Hummingbird provides an introduction to robotics through an integration with design activities. Students can build robots using scrap materials to solve multiple problems across every discipline. What is missing right now is a competition to bring students together, similar to the FIRST League, to demonstrate their creativity, content knowledge, coding skills, and ability to collaborate. The CDI has the opportunity to partner with Birdbrain Technologies to create a "Petting Zoo" competition. The initial example for this display of emerging technologies occurred at the 2015 South by Southwest Conference. (<http://fortune.com/2015/03/18/robots-sxsw/>) Birdbrain Technologies will offer its first Makeathon in September leading to a public display in October at the Maker Faire held at the Children's Museum.

Possible Partnerships

After looking into possible partnerships based on the findings of the LUMA study with high school students in the consortium, the CDI opened up discussions with the the **Energy Innovation Center** (eicpittsburgh.org). EIC brings together sustainable energy, emerging technologies, a web of possible partners, and entrepreneuring opportunities. The partnership with EIC will work to bring real-world problems from companies and civic organizations to the consortium schools. The students will work in a consultative manner to provide solutions to the EIC partners. The EIC has its primary location at the former Connelly Trade School in an urban area, known as the Hill District in Pittsburgh. The EIC would be the "hub" of activities and resources and the Parkway West Career and Technology Center would become the first spoke of a regional network. Parkway West could become a model site along three dimensions:

1. Design Challenges - EIC will bring real-world problems for students to work in a consulting manner to solve the challenges. One possible project that the EIC has outlined would invite students to come up with creative ideas for the three facades of the



Parkway West Center for Design and Innovation - DRAFT 9/24/2015

building, outside spaces, as well as interior corridors. The CDI would take a lead role not only for the twelve school districts in the consortium, but for the region.

2. Food Design - Students would expand their understanding of the culinary arts by participating in design activities that could include - innovative food packaging, urban food gardens, food and water waste issues, the servicing for food industries, and food transportation. In addition this could lead to entrepreneurial opportunities for all students in the 12 consortium schools.
3. Environmentally Friendly Construction - EIC will host 18 trade unions on location. Students at Parkway West could have deep, immersive experiences at EIC and/or at PW through the partnership. The opportunities could impact PW students as well as other students in the consortium who have an interest in green or sustainable building technologies. In addition this could lead to entrepreneurial opportunities for all students in the 12 consortium schools.

According to the website:

Pittsburgh Gateways Corporation, the region's corporations, research universities, economic development organizations, and the U.S. Department of Energy's National Energy Technology Laboratory have collaborated to develop this new Center so that it will realize a vision for accelerating the Nation's transformation of its energy systems to achieve improved national security, competitiveness, and environmental stewardship.

Credentialing Learning

Grades and standard testing do not work well with project-based learning based on innovation and creativity. Through the efforts of the Remake Learning network in Pittsburgh there is a movement towards competency based learning using digital badges. The CDI could become a model for other K-12 institutions looking for alternative ways to develop digital portfolios that track student progress.

Entrepreneuring Opportunities

The CDI has three initial opportunities:

- create a home a summer camp on Entrepreneurship that could then lead into student business incubators;
- provide a center for the dissemination of learning strategies and projects for the region;
- become an entrepreneurial institution that generates revenue for both its consortium partners and for itself.

At this time there are no in-school or after-school incubators for student businesses in the Parkway West region. The CDI has the space to develop a home for student entrepreneurs. One scenario for students might be a competition, like Startup Weekend EDU, where students would pitch their ideas and build a team across the Parkway West Consortium, The top teams would then be provided with a space, mentors, and support for a semester. At the end of the



Parkway West Center for Design and Innovation - DRAFT 9/24/2015

semester the award-winning students would then be connected with the ThrillMill, a Pittsburgh incubator in the East Liberty section of Pittsburgh for an opportunity to take their enterprise to the next level. Another scenario would be to have a summer camp around the Entrepreneurship theme.

Other Issues: Staffing

Key to the success for the CDI program will be the hiring of a full-time coordinator or director. Here are some of the skills and experiences required/recommended for the candidates:

- Understanding of the key concepts for Human-Centered Design and Innovation;
- Insights into entrepreneurial opportunities;
- Strong track record for developing partnerships between schools, universities, businesses, and/or community partners;
- Ability to raise outside funds by writing grants and developing partnerships;
- Excellent communication skills including experience presenting at conferences and conducting workshops;
- Experience working with students and professional educators.

Other Issues: Funding and Space

As part of the partnership with the EIC, the CDI would provide 50% of the funding for a director. Together the EIC and CDI would search for sponsors for events that could include: regional and national foundations; corporate sponsors; and individuals with an interest in the vision and goals for the EIC and CDI.

PWCTW has a building on its campus that was previously used as an alternative school. This space will become the Center for Design and Innovation.

Action Plan for 2015 - 2017

2015 - 2016

Staffing -

1. The CDI and EIC will draft a job description and hire a full-time person to start January 2016.
2. The full-time staff person will coordinate all joint CDI/EIC activities for the February - June time-frame

Funding -

1. The EIC will seek funds for 50% of the project coordinator's role and will also seek partner funding for all necessary resources for CDI/EIC activities.
2. PWCTC will provide in kind contributions and receipts from member districts.



Parkway West Center for Design and Innovation - DRAFT 9/24/2015

Design Challenges -

1. As the initial activity with the Energy Innovation Center (EIC) students in at least three Parkway West school districts will participate in a Design Challenge where students working in collaborative teams across districts will work on one of the following two activities outlined by the EIC:
 - a. Establish the first kids owned “food brokerage” from farm to table;
 - b. Design the front green area of the EIC using water, light, sound, and horticulture elements.

Entrepreneurial -

1. The EIC and CDI will submit a grant proposal to the Sprout Fund for a 2016 summer camp at Parkway West and a Pittsburgh location (EIC or CMU). The camp would have two tiers of payment - a lower level for CDI school districts and a higher level for students from around the region.

Emerging Technology -

1. CDI would partner with EIC and Birdbrain Technologies to offer a regional Robot Petting Zoo exhibit at both the CDI and EIC in the spring of 2016. The event would be based on the Makeathon and Showcase at the October Maker Faire at the Children’s Museum.
(<http://www.hummingbirdkit.com/makeathon>)

2016 - 2017

Staffing -

1. The full-time project coordinator will work with the consortium of schools and the EDI to develop a series of activities for the 2016-2017 school year.

Funding -

1. The EIC will seek grants to pay for the project coordinator’s role and will also seek partner funding for all necessary resources for CDI/EIC activities.
2. PWCTC will provide in kind contributions and receipts from member districts.

Design Challenges -

1. Students in the PWCTC schools will participate in at least one activity developed by the EIC.

Emerging Technology -

1. CDI will partner with the EIC to develop a regional event showcasing sustainable energy.