Teaching Creativity through Interactive Workshops

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Abstract

This paper introduces hands-on activities that foster the development of creative thinking in local and international workshop settings. Creativity is a fundamental part of the youth’s entrepreneurial mindset. Students in various disciplines from Penn State Berks served as mentors for a group primarily consisting of middle and high-school students, during service-learning workshops conducted in inner city Reading, PA, Nyeri, Kenya and Cusmapa, Nicaragua. After an introduction to creative problem solving, the participants were able to devise innovative ideas for the creation of a business. Students collectively worked on a series of creative problem solving activities and found innovative solutions for the problems in their communities. The feedback obtained from the participants noted that the workshop was effective in teaching them how to develop and expand their entrepreneurial mindset through creativity and creative problem solving activities.

I. Introduction

A variety of complex issues, such as reducing poverty both locally and globally, sustaining natural and economic resources, and dealing with climate change, are facing today’s college graduates. Solving these complex problems requires technological and social innovations. Therefore, many traditional Science, Technology, Engineering, and Mathematics (STEM) programs have embraced concepts, such as “innovation”, “entrepreneurship”, “social entrepreneurship”, and “humanitarian engineering.” Creative problem solving is about being insightful and recognizing connections among concepts; some of which may appear unrelated. Unlike analytical thinking, creative problem solving relies on flexible and dynamic mental processes using the whole brain. Therefore, creative problem solving demands divergence from the usual patterns of thinking, and it is accomplished most effectively within a team. The STEM disciplines seek to solve the World’s problems with a well-rounded education and motivation by addressing challenges through the brainstorming of solutions, product development, testing and implementation. The engineering discipline, in particular, has become aware of the environmental issues and the need for more sustainable solutions.

Students’ early exposure to technology or entrepreneurship makes a significant difference later in life by building self-confidence. Therefore, we developed K-12 Creativity and Entrepreneurship workshops thought of by undergraduate college students as mentors. Innovative thinking was essential for the workshops as the program includes teaching middle and high school students how to create an effective business model for the success of a new venture. The main objective of incorporating creative problem solving activities into the workshop program was to encourage participants to think as broad as possible while designing their product or service ideas. We
encourage students to think divergently and be less critical of others’ ideas at first, which helps students to understand the value of alternative viewpoints because solving many of the problems usually requires looking at them from a different perspective.

II. Description of Workshops

In this paper, local and international K-12 workshops fostering the development of creative thinking will be introduced. Undergraduate college students in various disciplines from Penn State Berks served as mentors for primarily middle-school and high-school students, during service-learning workshops conducted in inner city Reading, PA, USA, Nyeri, Kenya and Cusmapa, Nicaragua.

Penn State Berks Educational Partnership Program (PEPP), Reading, PA, USA

These Entrepreneurship and Creativity workshops were organized to influence students’ entrepreneurial self-efficacy and to provide a successful example of having student mentors teach. The participants of the workshops were inner-city Reading middle and high school students, who are part of the Penn State Berks Educational Partnership Program (PEPP), an early-intervention collaboration between Penn State Berks and the Reading School District. The mission of PEPP is to enhance academic preparedness and motivation levels in its Reading School District participants to pursue higher education. The Reading School District has a significant number of Latino and African American students (83.5%) as well as low-income students (87.2%) eligible for reduced or free lunch. The workshop program was jointly created by the Penn State Berks faculty and Entrepreneurship students. The Entrepreneurship students teach and mentor the middle and high school PEPP participants, during the workshop.

This semester-based program has continued since Spring 2012. Middle school or high school students visit Penn State Berks for a day-long workshop, where we welcome them with a 3-D Printing showcase. The main objective of this session is to stimulate creative thinking of participants using the printer as an idea catalyst with the following questions: “If you had a 3D printer, what would you make? What are your interests? What do you think you can use this 3D printer for in the future?” Students are then introduced to the idea of “Painstorming”, in which they are expected to identify problems or “pain” of common products and make creative recommendations or design changes to ease the user’s pain. The last component of the workshop includes mentor-taught business model lessons. This session usually covers the afternoon part of the workshop. Participants are then grouped into teams, and each team is coached by a Penn State Berks Entrepreneurship student (Figure 1). At the end of the session, the teams present their business concepts and models, and a winner is selected.
Figure 1. Students developed their business model and were coached by a mentor.

Children and Youth Empowerment Centre (CYEC), Nyeri, Kenya

Four Penn State Berks students (two from Engineering, one from Business and one from Information Sciences and Technology) and their professors formed a team called the Creative Minds. These students virtually partnered and developed project ideas with a group of students from Jomo Kenyatta University of Agriculture and Technology (JKUAT) in Kenya, during the Fall 2010 and Spring 2011 semesters. Creative Minds team visited Children and Youth Empowerment Centre (CYEC), Nyeri, Kenya in Summer 2011 and worked with vulnerable youth skills which help lead them to a sustainable future. In particular, Creative Minds taught the youth how to design and make crafts out of electronic waste (e-waste) as well as dismantling the e-waste properly and effectively, while increasing the awareness for sustainability

The first e-waste workshop showed the children how to disassemble computer parts in a proper and effective manner. Twenty students voluntarily attended this workshop, they were excited to learn and participate. Children became very attentive and creative. In the second workshop, children were able to make crafts from the computer parts dismantled during the first workshop. The e-waste crafts were made from keyboard rings, wires, CPU holders, RAM chips and ribbon cables. The team then led the third workshop by focusing on designing crafts and breaking up another junk computer by naming parts and managing tools. In the fourth workshop, the children brainstormed and drew ideas about what should be cut using circuit boards. Examples included a map of Kenya, the shape of Africa and a heart. Creative Minds team considered this workshop to be quite different from the first three workshops, in terms of the tempo and the internal environment. The fifth workshop was dedicated to training the JKUAT students, who are responsible for the e-waste workshops after Creative Minds returned to the United States. At the end of the fifth workshop, Creative Minds presented the JKUAT team a hard-drive clock (Figure 2). During the final workshop, the designs were cut out from the circuit board. At the end of the last workshop, participants filled out a survey about their experience. The survey results revealed how excited the children would be, if they could continue the e-waste craft-making project. They overwhelmingly expressed how practicing being creative was their favorite part.
Figure 2. A hard-drive clock.

Fabretto Center, San José de Cusmapa, Nicaragua
Developing students’ global engagement has been prioritized in many disciplines including those from the STEM fields, as is the case of humanitarian engineering\(^5\). Similar to the other workshops in Reading PA and Nyeri, Kenya, a unique feature of this workshop is that most of the instruction and mentoring was carried out by a multi-disciplinary team of undergraduate students. These students, also, developed the workshop curriculum and educational materials under the supervision of their professors. The objectives of this delivery model are to engage undergraduate students in interdisciplinary and international teamwork, as well as to foster a sense of responsibility for the welfare of others, locally and internationally. Four students majoring in various disciplines (Business, Information Sciences and Technology, and Global Studies), enrolled in a course titled, “Creativity and Innovation Workshops”, in Fall 2015. During the semester, professors and students developed activities and strategies for week-long service-learning trip workshops in San José de Cusmapa, Nicaragua. The workshops were organized in collaboration with the Nicaragua-based nonprofit organization, the Fabretto Children’s Foundation, with the objective of helping rural area students and teachers elaborate on new ventures based on a product or service to address their community’s needs\(^6\).

Research suggests that problem-based instruction and active learning strategies improve students’ overall problem solving skills\(^7\). The total number of workshop participants consisted of 20 students and 5 teachers. Although we had previous workshop experience in the United States on the topics of idea generation and business plan development, adaptations to various workshop content and examples were made in order to assimilate the Nicaraguan culture and better engage participants. The workshops were mainly conducted in English, but two Spanish translators facilitated the communication and all workshop materials were also translated to Spanish. The business model canvas\(^8\) was used as the framework of this four-day workshop, and the workshop mentors adopted a project-based instruction approach. In order to have an enjoyable day for the participants, we had a nice balance of creative problem solving activities as well as the introduction of important business concepts each day. In order to foster the use of creative thinking, the following four main activities were used 20 Circles Challenge (adapted from 30 Circles Challenge developed by Bob McKim\(^9\)), the Nine Dots Problem\(^10\), the Ball and Pipe Problem\(^11\), and the Newspaper Tower\(^12\) (Figure 3). Based on the survey that was administered at
the end of the workshops, the participants’ overall passion in starting or maintaining their own business as well as gaining useful skills increased.

![Figure 3. Students built a newspaper tower.](image)

### III. Conclusions

In this paper, we presented three different settings, involving a national and two international creativity and entrepreneurship workshops. The essence of the workshops was to increase K-12 students’ interest in entrepreneurship and sustainability concepts, while teaching them creative problem solving and innovative thinking skills as well as the steps for starting a new business. One implicit goal of PEPP workshops in Reading, PA was exposing students to the college environment where they work with role models. It is very encouraging that out of seventy-eight Penn State Educational Partnership Program (PEPP) students, fifteen students accepted offers to Penn State campuses; eleven of these students chose STEM majors. The workshops conducted in Kenya by the Creative Minds team revealed how e-waste can be transformed into crafts, which can help the economy to grow as well as encourage creativity and innovation. The e-waste workshops continue to succeed in the local community through the CYEC. Participants of the workshops became well aware of sustainability. The workshops conducted in Nicaragua were unique due to the fact that the workshop mentors were not able to directly communicate with the participants because of the language barrier. However, overwhelmingly positive feedback from the participants showed that the importance of creativity in the entrepreneurial mindset was well received by the participants hoping to apply creative problem solving skills for daily problems.

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V. References


