Creating Great Educators Using Maker Education

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Innovative Idea Poster

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Introduction/Need for Innovation

According to Kaila (2005), formal education has been blamed for "killing" creativity. Students have been "spoon fed" (Parnes, 1970) and discouraged from developing their own knowledge. Within constructivist theory, individuals develop their own knowledge and understanding of the world through personal experiences and reflection (Bereiter, 1994). An obstacle within education is the inability to transmit information to students, rather students have to develop knowledge within their own minds (Olusegun, 2015). Constructivist approaches enhance student creativity and students are more likely to retain information (Olusegun, 2015). Agricultural education uses constructivist approaches to teach key agricultural principles. It is important for pre-service agricultural teachers to be provided with methods to enhance learning opportunities resulting in increased student creativity and retention within the classroom. The Maker Education Model is a constructivist approach taught to and used by pre-service educators at the University of Kentucky to increase creativity and retention within agricultural education.

The Maker Education Model focuses on utilizing student innovation and uses creation-based learning as the primary learning style (Xianmin & Jihong, 2015). The model consists of five detailed stages to enhance student retention and creativity. The five stages are known as the stages of "making". The stages are a form of scaffolding, building from copy (lowest stage) to create (highest stage). The following model guided by Gerstein (2014) shows the stages in the figure below:

Figure 1:

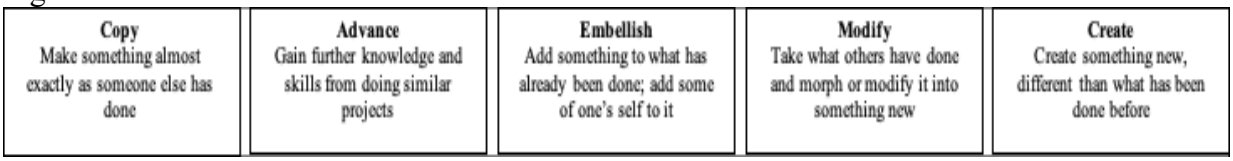

Figure 1. Stages of Making. Adapted from "Becoming a Maker Educator," by Gernstein, J., 2015. *Techniques,* (p. 17).

Following the model, pre-service educators are presented with a lecture on how to properly utilize the Maker Education Model to encourage student creativity and building upon knowledge and experiences through the process of "making". This research aligns with the National Research Agenda (Roberts, Harder, & Brashears, 2016), "Priority 5: Efficient and Effective Agricultural Education Programs" (p.43).

How it Works

In 2017, the University of Kentucky pre-service education students began using the Maker Education Model during their sophomore-level early field experience course within the agricultural education major. This course is designed to create a deeper understanding of the education profession. Students observe formal and informal career and technical instruction to recognize how the characteristics of effective education and principles of teaching and learning are utilized. As part of this class, students are tasked with observing school-based agricultural education teachers. The students record their observations and time spent observing the teacher within a university provided tracking database. At the beginning of the course, pre-service educators are introduced to the Maker Education Model through readings and in-class activities.

Within groups, students must outline the five steps of the model and present to the class. The in-class activities build to the final Maker Education project.

The final Maker Education project requires students to observe a lesson taught by their assigned secondary agricultural educator. The task of the pre-service teachers is to take the lesson taught by the school-based agricultural educator and utilize the steps of "making" to re-teach the lesson to their peers. Tasked with re-teaching this lesson, pre-service teachers have to understand the steps of making, their audience, and the methods of the observed educator to create an effective lesson. Pre-service teachers have 30 minutes to teach their maker lesson to their peers, graduate students, and the instructor of the course. The Maker Education lessons are graded on their use of the Maker Education Model, teaching methods, and appropriate delivery of content. Pre-service teachers receive feedback to utilize in future teachings. The assignment provides the opportunity to dissect the pedagogy of school-based agricultural educators and experience with differentiated instruction methods to increase creativity within their future classrooms.

Results to Date

The sophomore-level field experience course is finished another year of Maker Education in the Fall of 2019. Pre-service teachers have participated in learning the stages and conducting new methods of teaching. The assignment has seen success through Maker Education concepts being utilized within teachings in the senior-level teaching methods class and other post-secondary teaching experiences. Maker Education has increased confidence and creativity within pre-service teachers. A University of Kentucky senior reflected on her experience by stating, "The maker educator lesson helped me to not only reflect on emulating experienced educators, but to challenge myself to take leadership of my own teaching abilities and try new things." Pre-service teachers have challenged themselves to create lessons where their students/peers can create tangible items to teach these concepts. The creation of posters, models, and utilization of research has expanded student thinking aside from common lecture methods. Lessons taught utilizing the framework of the Maker Education Model has increased creativity as students are utilizing concepts through creating items rather than rather than just remembering content.

Future Plans

Observing the success of the Maker Education project so far, warrants the continuation of the project into future field experience courses. The Maker Education Model provides unique and valuable learning experiences for pre-service agricultural teachers. The Maker Education Model has met success when implemented into classrooms. The agricultural education program plans to see pre-service agricultural teachers utilize the model within their classroom as part of differentiated instruction. Instructors at the University of Kentucky plan to continue to provide unique methods of teaching for future educators.

Costs/Resources Needed

The cost of this project is within the travel to the schools to conduct observations. Additionally, costs of materials to teach the lesson to their peers is present. Students need to have detailed observations of the lesson to re-teach the lesson with a "maker" mindset. Resources needed to carry out this project are classroom space, detailed observations of classroom, necessary materials to teach the lesson, and knowledge of the Maker Education Model.

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