

**Working with educators in Poland and the US to
infuse making into formal and informal education**
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Preferred Format: It seems that another on-site meeting in Warsaw will help to catalyze the ideas for potential collaboration and so an in-person talk in Warsaw would be best. Ideally, this would be also streamed to connect with makers from the US and recorded for asynchronous viewing.

Indication of Accompanying Paper for Online Discussion (encouraged but not required):

We think it is likely that the best outcome from this will be two pieces. First, we plan to use these data (and potentially others from similar groups in other countries) to produce a research paper about the findings, particularly how STEM educators navigate between coverage of standards, best practices based on results and theory, and interest in innovating their curriculum to improve engagement and learning. Second, we plan to build some professional development opportunities from these results where researchers and practitioners engage in dialog about how to best navigate these challenges.

Abstract (100-150 words)

In the last few years, there has been a lot of attention focused on STEM education as a way to increase innovation. More recently, this focus has also included the maker movement and inclusion of play/playfulness as an educational strategy. The main issue we are trying to understand is: How do educators use strategies for implementing STEM learning through making and play, while also addressing standards and expectations for student proficiency. We seek to explore this through a study of educators in the US and Poland. We plan to share results through research venues and through professional development for educators.

Description of Study

I may have misinterpreted here, but I framed this as more of a study that I/we (speaking for collaborators in US/Poland) want to pursue in the next few months.

Brief Background and Research Direction

STEM education has increasingly gained importance on an international scale as a way to develop a globally competitive workforce in a technological world (Maltese and Harsh 2015; Denson et al. 2015). The premise is that producing graduates with expertise in technical fields will lead to innovation and skills capable of solving current and future challenges (Wagner & Compton, 2015).

Maker education is a new label being placed on educational programming being offered to youth that consists of hands-on making, creating, and designing, and includes subjects like textile craft, robotics, cooking, electronics, and mechanical repair and creation (Dougherty 2013; Pepler and Bender 2013). The maker movement is being pitched as a driver of creativity, excitement, and innovation for inquiry-based learning and pursuing STEM careers (Bevan et al. 2015). At the same time, researchers argue that play is key to creative and innovative thought (Bateson & Martin, 2013). However, given the traditional focus in many countries on theoretical knowledge,

the goals of nations and the best way to attain them through education seem to be at cross purposes.

Based on this apparent contradiction, we are interested in how educators implement activities and curricula toward improving the innovative capacity of the young learners they work with. This interest is based on other research we're conducting and recent discussions with educators in the US, EU and in China related to these topics. At the crux of the issue we are trying to understand is: How do educators use strategies for implementing STEM learning through making and play, while also addressing standards and expectations for student proficiency.

Methods

Sample

In terms of sample, we plan to connect with educators from formal (schools), informal (museums and clubs) and hybrid/semi-formal contexts. Given the nature of the exploration, we are not seeking a generalizable sample from which we can make national comparisons, but rather a sample that includes individuals from a variety of settings (i.e., urban, rural), content focus (arts, science, robotics). We will be focusing on those who engage with younger learners (elementary and middle), since most have told us they think it's 'easier' for these educators to engage in less-traditional practices because there is less of a focus on standards and test performance at those ages. This is something we hope to inquire about.

Approach

We plan to begin this investigation with a survey of educators across countries. After negotiating on a set of questions in English, we will work with our collaborators to translate a draft of the survey into Polish and collect a bit of pilot data from educators in each country to improve the wording and response options of the items. We are not aware of any internet restrictions, so we will host the survey on Qualtrics, which will allow for users to complete the survey in English/Polish based on their preference. With regard to STEM, making, play, innovation and creativity we will ask questions related to:

- How they define these constructs and in what ways they assess them in their context
- What role these play in their curriculum
- How they design to include these in their activities
- What struggles they have in planning or enacting these activities
- Their typical interactions with youth during their activities
- If they look to others as models of innovation and creativity

Of course, asking questions in survey format about practices and nuanced definitions has obvious limitations. We plan to ask participants for lesson plans, kids' products and possibly video of their activities, if feasible. Beyond this, in future steps, we plan to visit with some of the educators we connect with to observe their contexts and practices and discuss these issues further.

Potential Contributions

Based on two trips to Europe, one to China and a few years of related research in the US, we are confident that there is interest from educators on how to pursue strategies toward improving STEM

education and increase the innovation-potential of the youth they work with – however, implementation of these ideas is a definite challenge. We think that the work outline here can establish a strong foundation from which to advance this work and to assist educators with these challenges.

Potential Areas of Future Collaboration with Faculty from UW SoE

This proposal involves work that we have started, but plan to move forward with in the next few months. It is part of a larger investigation we're undertaking beyond the US and Poland, but the focus here will be on these two countries.

The roots of this collaboration were sewed during the visit of scholars (the three Magdas: Magda Krawczyk-Radwan (Program Director of PAFF and UW's School of Education. Educational researcher), Magda Swat-Pawlicka, and Magda Jurewicz) from UW in spring 2017. During this visit the scholars explored the MILL and a Secondary Science Methods class and discussed with Adam ways they might incorporate more making in Polish schools and in the training of Polish teachers. From this seed, Adam communicated with Alicja Pacewicz online and then in June 2017, he visited Warsaw to meet with researchers from UW, and educators from local schools and also from Warsaw's Copernicus Science Center. The meetings culminated in a day-long workshop and seminar with makers and educators from around Poland where discussion centered around the opportunities for making to enrich education in both countries and the challenges that exist. Many challenges are similar across countries – how to connect making to the educational standards, assessing the products and processes of making, helping teachers learn new technologies, etc., and these definitely go beyond just the US and Poland. Based on this, it makes sense that collaborating to advance research on these issues can lead to initiatives and professional development for educators that can increase the likelihood that strong practices for maker education can be shared and implemented. Additionally, based on our prior international work, we know that it is critically important that the collaboration involves partners who understand the national and local nuances of the educational landscape.

References:

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