
What Do We Talk About, When We Talk About Digital Fabrication in Education?

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Abstract

With our interactive poster, we present a framework that aims to clarify and give an overview of approaches to making and fabrication in children's education. We have categorized six different research publications based on submissions to the FabLearn 2014 conference. From these, we have extracted seven categories: *main concern, philosophical underpinnings, research outcome, educational goals, activities, technologies, and artifacts produced by the students*. Based on this categorization, we invite conference attendees to discuss the abundance of different tracks in the emerging field of digital fabrication in education.

Poster is accessible at: <http://bit.ly/1XCfloA>
(the visual graphics will be polished)

Author Keywords

Digital Fabrication; Maker settings; Education; Design Literacy

Introduction

In the literature on maker settings in education, there is a scattered and perhaps even inconsistent collection of references to goals and outcomes of activities in such settings. Reference is often made to learning outcomes within Science, Technology, Engineering, and Math (STEM) [1], motivational benefits [2], design

literacies [3], digital literacies [4] etc. On top of this, the research rests on a very diverse set of philosophical underpinnings, such as constructivism [1], constructionism [1, 2, 4, 5] and pragmatism [1, 2, 3, 4, 5]. In order to gain more clarity, this interactive poster session aims at initiating a discussion of how to categorize activities, goals, outcomes and theoretical underpinnings of maker settings in education. What we offer is a preliminary draft for a framework that seeks to capture the diversity of the field of digital fabrication in children's education.

In our preliminary framework, we have included selected content from the last FabLearn Europe conference in 2014. This includes papers from the special issue on digital fabrication in education [2, 3, 4, 5], which was published in International Journal of Child-Computer Interaction based on submission to FabLearn Europe 2014. Furthermore, we have included a book chapter by Paulo Blikstein from 2013 [1], as the background for Bliksteins keynote address at the conference, and we have included a paper by Christensen and Iversen [7], which is based on a short paper [6] submitted to the conference, and which presents a distinct perspective on making in education.

In addition to the selected works, we have left room for participants to add other important works from the field of digital fabrication in education to the poster – including their own work. We thus present this preliminary framework on an interactive (albeit analogue) poster that invites colleagues from the FabLearn and IDC communities to participate in a discussion that can help further development of the framework.

The immediate aim of the framework is to provide researchers with an overview of different approaches and perspectives, and not least to create more clarity within the diverse and scattered field of digital fabrication in children's education. We base this overview on seven categories: *main concern, philosophical underpinnings, research outcome, educational goals, activities, technologies, and artifacts produced by the students.*

We define the main concern as the authors' overarching focus (e.g. Design thinking or STEM education). With philosophical underpinnings, we refer to the underlying (educational) philosophy and learning theories that the authors claim to base their research activities on. These can be contrasted to the following category, which includes the type of research outcome the authors' work has produced. Educational goals are the aims the researchers' hope to achieve with the activities which the involved children are engaged in. Activities refer to concrete examples of kinds of educational activities the authors use as their empirical data. We have included a category for the different kinds of technology used/referred to and one for the artifacts produced by the students in order to compare these to educational goals.

When the framework has been developed further, we plan to use it to explore the relationship between philosophical underpinnings, research outcomes, goals, activities, technologies and the artifacts produced by the students by applying these categories to future work within the field.

Our preliminary analysis suggests that digital fabrication in education can be used for many purposes

with many different theoretical and philosophical perspectives and in wide range of designs for learning. This diversity of approaches is in our view both problematic and beneficial. It is problematic in the sense, that one may get the idea, that it is to some degree random, e.g. which philosophies of education, the different research groups choose to cite. It is however beneficial with this multitude of perspectives in the sense that it broadens the scope of the academic research within the field and thus opens up new perspectives and possibilities in terms of cross-pollination between the groups.

Some categories such as e.g. the philosophical point of departure can be assumed to be highly influential of other categories such as e.g. the activities, goals and outcomes of the word referred to. The framework has the potential to make inconsistencies between such categories more visible – should such inconsistencies exist. Our aim at present is not, however, to make judgments about such inconsistencies. Rather, we wish to present our preliminary framework and a descriptive account of the included papers in order to engage in a dialogue with participants at the conference. The aim of this dialogue is to highlight different tracks within the emerging field of digital fabrication in education.

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