

The MOOC-ability of Design Education

Martijn Stellingwerff¹

¹ TU Delft, Faculty of Architecture and the Built Environment

¹ <http://www.bk.tudelft.nl/en/>

¹ m.c.stellingwerff@tudelft.nl

In the past three years, Massive Open Online Courses (MOOCs) have become an important new way for universities to reach out to possible matriculates, life long learners and alumni. Although MOOCs already cover a vast amount of subjects and curricula, it is remarkable to ascertain the lack of Architectural Design courses on the main platforms like edX and Coursera. Online courses do cover design aspects, e.g. about styles and building materials, but 'design as activity' is an exceptional subject in the portfolio of available MOOCs. In contrast, the CAAD community was one of the first to develop Virtual Design Studio's (VDS) and experimental predecessors of MOOC platforms, such as the AVOCAAD course database system (Af Klercker et al. 2001). Yet, the query 'MOOC' still does not ring a bell in the CUMINCAD publication database (per May 2015). In this paper I will explore a palette of design education settings, in order to find a fit to what a MOOC platform can offer. I will compare the 'MOOC-ability' of Design Education to chances in Virtual Design Studio's and developments in ubiquitous mobile platforms.

Keywords: *MOOC, VDS, Structured course, Explicit knowledge, Educational setting*

Introduction

This paper draws from a number of key references that shed light on the early developments of VDS (Bradford et al. 1994; Kvan 1997), contemporary reflections on VDS (Achten et al. 2011), social aspects of VDS (Ham and Schnabel 2012) and pedagogical insights on design education (van Dooren 2011).

Another inspiration for this paper came from my Delft colleagues at the Faculty of Industrial Design & Engineering. They started an edX MOOC on the 'Delft Design Approach', which is akin to but still different from architectural design approaches. Their vast efforts can be seen as the first successful attempt

to cover design activities within the framework of a MOOC.

Finally, participating in a MOOC, as a student, was a marvelous experience. I enrolled for the course "The Search for Vernacular Architecture of Asia, Part 1", by the HKU on edX. The insights, from a student perspective, were very interesting. After this first MOOC experience, I long for spare time to enroll for many more online courses.

Different design education settings

The studio and the classroom, the blackboard, the visiting expert, a talk between tutor and student, a

public presentation or a chat in the café, all these elements and many more have contemporary parallels in digital platforms. Each setting allows for different focus, framing, type of communication and experimentation. In order to have the best learning experience, the most appropriate setting should be matched to the educational goals and the type of learning.

Regarding the brief history of computation in general and in education, we still see a lot of lag in developments. We use metaphors in computer interfaces that refer to blackboards, shelves and desktops. New concepts of learning need to be investigated quickly, because the old metaphors and concepts mismatch newly available sources of knowledge such as search engines, Wikipedia, blogs and instruction videos. Soon AI speech interfaces, VR and AR will be the channels through which students get, develop and present their information.

The institutional education setting is augmented with personal communication devices, cloud storage and all kinds of blended modes of learning. At our model and prototyping workshop tables, we increasingly see students sitting with a mixed toolset of laptops, mobile phones, scissors, glue, pen and paper. The mobile phone itself is a laboratory of sensors, cameras, BIM viewers, vectorize apps and 3d model repositories. One of our remarkable students (Daniel Aaron Bislip) even developed his own 3dprinter, because he wanted one that fits the dimensions of a campus locker, in order to work and interact with others at our institute.

The emergence of fab-labs and many new initiatives to enhance education with prototyping workshops, craft and material experiments, indicate that the vast digital developments require parallel, tangible, real world experiments. In that respect blended learning is not just an extension into the mobile / social and digital realm, it is also a counter movement, back to physical tests and real world collaborations.

Evolutions in online education

To further describe the developments in design education I will make a rough distinction into two education settings: the design classroom and the design studio. The classroom has to me some ancient connotations like: a closed space where one teacher instructs many students, a space in which well structured courses provide facts, methods and theories. The studio, in my view, can be associated with a more open space, where experts are in conversation with students, where courses take the form of assignments and where new ideas will be developed.

In digital versions I see a MOOC platform as a new sort of classroom, whereas a VDS obviously represents a studio setting.

The first VDS was introduced in 1992, in the year the WWW was born (Achten 2011). In the succeeding years, we can see VDS developments that closely follow the availability of techniques. Bandwidth is more confining than types of media. For example video conferencing software was available but limited bandwidth confined the use to some larger plenary discussions. File exchange was easier with structured CAD data than with large image files. The availability of websites allowed to exchange and present text and images in a more related way. Soon Virtual Reality applications and Collaborative Virtual Environments were explored. This all was done within a timeframe of five years.

AVOCAAD (Af Klercker et al. 2001) is an experimental predecessor of a MOOC platform. This course database had already many enhanced possibilities, but the new MOOC platforms iron out the experimental and custom made features, in order to get a stable set of generally useful functionalities. While VDS are focused on exchange of ideas and collaborative developments, a MOOC is focused on learning facts and evaluating progress.

Most intriguing in VDS and MOOC developments is the incremental insight that you can get. Similar to the stepwise and early VDS evolutions, based on observations from previous experiments, MOOCs provide insights from so-called '*learning analytics*'.

MOOC chances and challenges

At first sight MOOCs offer online education related to *facts*, while VDS are more appropriate to facilitate design *activities*. A VDS seems also more suitable for the training of open-ended skills compared to a MOOC. Therefore a MOOC seems not an appropriate choice for teaching design as activity. *But is that true?*

Elise van Dooren (2011) argues that performing a skill is an implicit activity, while learning and teaching are largely explicit actions. In that regard, I pose that tacit knowledge needs to be understood and should be made explicit in order to demystify design and creativity. A notable MOOC that takes steps into this direction is the edX MOOC on the '*Delft Design Approach*', by my Delft colleagues at the Faculty of Industrial Design & Engineering (IDE).

In a presentation at IDE, Joop Daalhuizen shared his experiences about their new MOOC. Here I will paraphrase some of the notes I made during his presentation. The MOOC is based on the book: the 'Delft Design Guide', which describes many processes and views on design. The MOOC is intended to showing IDE 'gems' to the world and prepare students for studying in Delft. The MOOC resulted from collaboration between 12 experts from faculty and 6 professionals. Content of the MOOC:

1. Capture your own morning ritual
2. Deconstruct it.
3. Observe someone else's morning ritual.
4. Define a design problem and challenge.
5. Generate and select ideas.
6. Develop and evaluate concepts.
7. Prototype and test a concept.
8. Present a concept as answer to the design challenge.

What we especially can learn from this first MOOC on design methods is the educational quality you can get by using a general stepwise process to develop a personally chosen design theme. Guiding involves a lot of devotion from the education team. Feedback videos have to be made overnight and the edX platform requires all videos to get subtitles. Developing

this all requires effort and devotion.

A remarkable insight from the IDE MOOC was the advantage of using peer reviews. A peer review gives the students new perspectives on their own work and the work of others. If the peer reviewing is instructed as part of the course, good quality reviews can be made and those save the course developers a lot of work. Of course a second order review needs to be maintained by the course team.

My own positive experience from peer reviews came from participating in the course "*The Search for Vernacular Architecture of Asia, Part 1*", by the HKU on edX. We, as students, had to write about the heritage values in our own environment. I wrote about Delft. Then each participant had to review the descriptions of other students. I reviewed stories about Bath, Lithuania and Myanmar. At the same time I received feedback on my own text. The involvement and speed of feedback was unprecedented. The HKU MOOC proved to me that a structured course, with knowledge checks and peer-reviewed tasks brings a valuable online education experience.

An important step to assist students in their design development is the identification of a 'guiding theme', which is brought to expression regarding different domains, such as type, material, function, site and context (van Dooren 2011). These domains and the development of the guiding theme can be educated in an explicit and structured form, and this type of didactic is probably more suitable to a MOOC than a VDS.

What trends can be expected?

MOOCs are popular and belong to a wish to lower thresholds for people to be educated and to educate themselves. Universities see open courseware as an invitation and introduction to their expertise. Students and life long learners get easy access to high-end knowledge, delivered to their home. It can be exciting to get in contact with people with similar interests, while breaking physical and cultural borders. Such a well running trend can be easily extended to a near future with even more topics available.

The development of Virtual Design Studios closely followed the trends and the technological advances of web-based technologies in the nineties. Such a relation to contemporary technical innovations can also be expected in the further development of MOOCs.

I expect much enhancement in the educational insights based on 'learning analytics'. The data can be used in pedagogic research, in design research and the insights will direct the fine-tuning process of existing courses and enhance the development of new courses.

Another use of learning analytics is to find cues where students tend to drop out of the course. Currently MOOCs are often confronted with a so-called '*funnel of participation*', drop-out and non-completion rates are substantially higher than in more traditional education (Clow 2013). A real time analytical system could adapt the course in order to prevent students to drop out. For example the student can be confronted with better performing peers or peers from a similar cultural background. Current MOOC platforms are still relatively straight forward, but the real time adaptation of course elements and the add-in of virtual assistants and online AI help could enhance and adapt regarding the specific performance of a student.

Artificial Intelligence (AI) will consume MOOCs, but will also act as plug-in for assistance, encouragement and explanation.

Of course, there will be counter developments. MOOCs will be introduced in the classroom; the classroom will be a metaphor within a MOOC. MOOCs will be collaborating with world wide fab-labs.

And then?

Then another paradigm comes in view.

REFERENCES

Achten, H, Koszewski, K and Martens, B 2011 'What happened after the "Hype" on Virtual Design Studios?: Some Considerations for a Roundtable Discussion', *29th eCAADe Conference Proceedings / ISBN 978-9-4912070-1-3*, University of Ljubljana, Faculty of Architecture (Slovenia), pp. 23-32

Bradford, JW, Cheng, N and Kvan, T 1994 'Virtual Design Studios', *Proceedings of the 12th European Conference on Education in Computer Aided Architectural Design / ISBN 0-9523687-0-6*, Glasgow , pp. 163-167

Clow, D 2013 'MOOCs and the funnel of participation', *Third Conference on Learning Analytics and Knowledge*, Leuven, pp. 185-189

van Dooren, EJGC 2011 'Making explicit in design education : generic elements in the design process', *In N Roozenburg, LL Chen & PJ Stappers (Eds.), Diversity and unity: Proceedings of IASDR 2011*, Delft, pp. 1-12

Ham, JJ and Schnabel, MA 2012 'How social is the virtual design studio? A case study of a third year design studio', *Proceedings of the 17th International Conference on Computer Aided Architectural Design Research in Asia*, Chennai , p. 173-182

Af Klercker, J., Achten, H and Verbeke, J 2001 'AVOCAAAD - A First Step Towards Distance Learning?', *19th eCAADe Conference Proceedings / ISBN 0-9523687-8-1*, Helsinki , pp. 269-274

Kvan, T 1997 'Studio Teaching Without Meeting: Pedagogical Aspects of a Virtual Design Studio', *Proceedings of the Second Conference on Computer Aided Architectural Design Research in Asia / ISBN 957-575-057-8*, Taiwan , pp. 163-177