
Video Design Games: Training Educators in Teaching Design

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Abstract

We introduce Video Design Games to train educators in teaching design. The Video Design Game is a workshop format consisting of three rounds in which participants observe, reflect and generalize based on video snippets from their own practice. The paper reports on a Video Design Game workshop in which 25 educators as part of a digital fabrication and design program were able to critically reflect on their teaching practice.

Author Keywords

Video Design Game; design education; digital fabrication; design thinking

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI); Miscellaneous; I.5.2 Design Methodology.

Introduction

A turn towards design thinking has been emphasized in current literature on digital fabrication in education [1], [2]. A recent study of the educator's role in these processes of digital fabrication and design thinking reveals significant impediments as educators express and experience challenges in understanding complex problem solving when teaching design processes in upper primary and lower secondary education [3]. In the FabLab@School.dk project, we train teachers to

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engage students in complex problem solving as part of design processes involving digital fabrication. This demands an understanding of design theory and design thinking. Design thinking provides a language for complex problem solving, but according to Schön [4], and Iversen & Buur [5], design literature encourages students to understand design in theory - not to practice design. In this paper, we outline a technique for training educators in aspects of teaching complex problem solving by use of a Video Design Game. Here educators use video from their own teaching practice to develop new principles for engaging students in explorative design projects. Using video to support reflection in both pre-service teacher training and in-service teacher training (INSET) is not new (see e.g. Fukkink et al.[12] for a review). Video for teacher training has been studied in various ways [13] including self-confrontation and self-modelling [14] scaffolded by annotation software [15] and used in teacher's video clubs [16]. In this paper, however, we describe a different approach to using video for teacher training. Namely that of a video design game. Further, we explore this within the setting of teacher training in design processes and digital fabrication.

FabLab@School.dk is a three-year research project studying how children develop "design literacy" through processes of digital fabrication and 'making' in curriculum-based education [2]. We have previously discussed how teachers' lack of training in design and teaching complex problem solving is one of the primary impediments for implementing elements of digital fabrication and design thinking in education [3]. In this paper, we will show-case how we work with Video Design Games to train in-service educators as part of a 5 ECTS master program to understand their role as

teachers and facilitators when teaching digital fabrication and design thinking to primary and lower-secondary students. The technique can be used as a reflective and collaborative tool for understanding and developing aspects of such an educational practice.

Video Design Games

Design games have proven to be successful tools for engaging designers in collaborative learning activities in Design ([6],[7],[8]), and for teaching design students design thinking and designer roles ([9],[10],[11]). Design games provide an engaging and playful way of collaborative learning by providing game rules (e.g. turn-taking, moves and roles) while keeping the learning process open and explorative [5]. The game is unlike conventional board games not about winning – but sharing concerns and reflections among the participants. Binder et al. [6] describe how video from real life design activities is used as material for design games. This study is furthered by Iversen & Buur [11] stating "not only does video allow us to examine design practice 'off-loop', i.e. outside the given context, it is also a soft media in which participants can manage ambiguity and tentatively grasp points of interest" (ibid, p.2). Video material in design games provides a structured – yet open way of collaboratively reflecting on situated practices.

As part of the FabLab@School.dk initiative, we have developed a Video Design Game to support in-service educators in facilitating and guiding students in complex problem solving. We have added to the existing body of literature on Video Design Games, by basing the game on video materials from the educators' own practice, in order to collaboratively explore and develop principles for good teaching practices. Using

video materials from the educator's own practice provides the educators with a practice-near and highly situated understanding of their own role as educators. In the following, we will present in detail how a 3-hour Video Design Game provided 25 educators with principles for teaching complex problem solving.

Playing the Video Design Game

The Video Design Game is a 3-hour workshop format in which educators (in groups of 3-4 participants) go through three game rounds in which they observe, reflect on and generalize on a three-minute video clip. We use the game metaphor to underline the roles, rules, turn-taking and rounds known from conventional board games. This particular Video Design Game was played in an office setting for design and tech entrepreneurial start-ups – not on school campus (Fig. 1).



Figure 1. The Aarhus group of educators working through the Video Design Game.

The teachers worked in groups with colleagues, with whom they also worked closely in study groups through the course. Beside study groups and seminars, the course involved developing and carrying out a practical design and digital fabrication course with students in their own school environments. Each participant was asked to bring a 3 min. raw video clip of dialogue and actions from an informal feedback situation between an educator and a group of students engaged in the process of digital fabrication and design thinking.

Preparing for the game. As a collective assignment to all the teachers, the participants were asked to discuss examples of dialogues from two teacher-student situations. The course organizer selected these. One dialogue was taken from Schön's textbook example of dialogue between an architect student and her teacher, Petra and Quist [4][4], the other from one of the participants' own practice in the school, previously observed and transcribed. The participants collectively reflected on the two dialogues based on prior readings and discussion of Schön's concepts for reflective practice [4]. In this activity, the educators combined theoretical concepts of design (reflection-in-action, reflection-on-action, design moves, etc.) with their own experiences from teaching design and digital fabrication (Fig 2.).

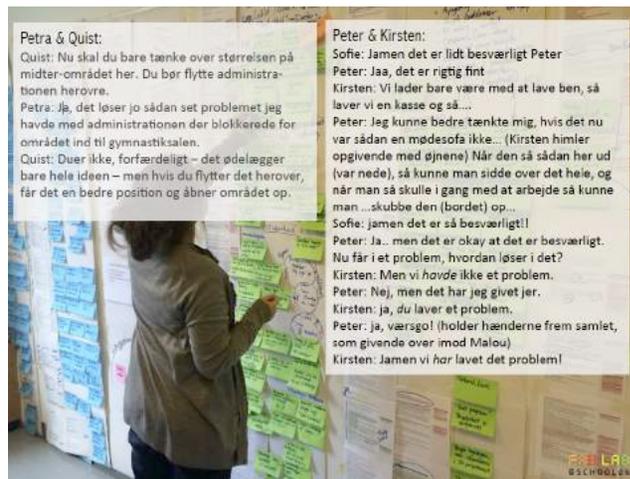


Figure 2. Framing the game between theory and practice.
Ppt. slide of two types of teacher-student dialogue.

A discussion point from the two dialogues was the visible contrast between design as a practice taught by professionals to e.g. architect students, and the specific educational context of the teachers who had little or no training in teaching design to larger groups of young students. Another interesting discussion point was the use of authority in the teacher's way of articulating and framing the 'problem' in the conversation, as well as the distinct lack of language and concepts used by the teacher and students in the school context. Framing an initial discussion in this way, the participants discovered how the situated and concrete dialogue reflected their own practice and mindset when engaging in teaching digital fabrication and design. Moreover, the detailed reflections on the dialogue trained the educators for the upcoming three rounds of the Video Design Game.

Round 1: Situation. The first round of the Video Design Game focused on analyzing a concrete situation of teacher-student engagement. Each group viewed the participants' videos consecutively without discussing the content. They chose one video of interest to work collaboratively with. While viewing the video clip again, they noted down on post-it notes everything they saw and heard, relating to the questions:

What is happening in the situation? Who is doing what? What are they saying? Which object and materials are involved?

Using their own collection of Post-It notes as playing cards, each participant placed a Post-It on the table introducing what he/she had seen or heard. Participants took many quick rounds presenting one Post-It at a time, stating their observation, and grouping themes on the table at the same time. Together the teachers then selected a smaller number of 4-6 points of interest based on their observations. Framing the game in this way supported a directed conversation among the participants, focusing directly on *observations* rather than discussions of their practice.

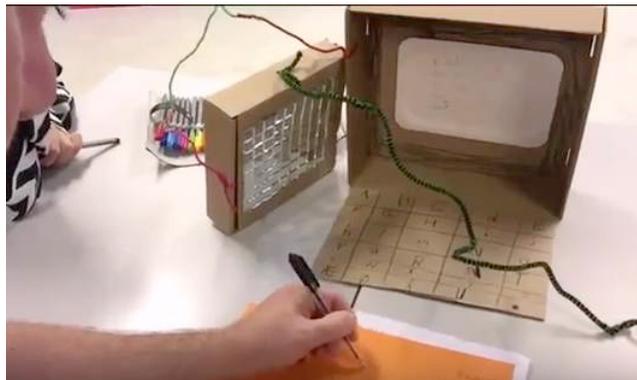


Figure 3. Video-capture from teacher-student feedback situation, and teacher drawing summary of the conversation.

One group, the Aarhus group, had selected a video clip from a 4th grade in a Danish primary school. The points of interest that fed onto the poster focused on two aspects. First, a student took control of the situation in the group, while explaining the mock-up. Two other students remained silent, listening and sometimes correcting the front-runner. Secondly, the teacher asked clarifying question about the students' idea by going into detail with parts and functions of their design. He used a pen and paper to draw the connected parts of their idea (a television, a button, audio or visual materials), while questioning the students about possible directions and developments for their design.

Round 2: Reflection. Based on the selected points of interest (see Fig. 3), the group reflected on their observations, responding to questions:

*Which types of dialogue or reflection are happening?
Which role(s) and positions do the teacher take*

(facilitating, intervening, observing or dictating)? Is help or feedback positive or not, and why?

The participants discussed through the various points for 20 minutes while noting their reflections on the poster.

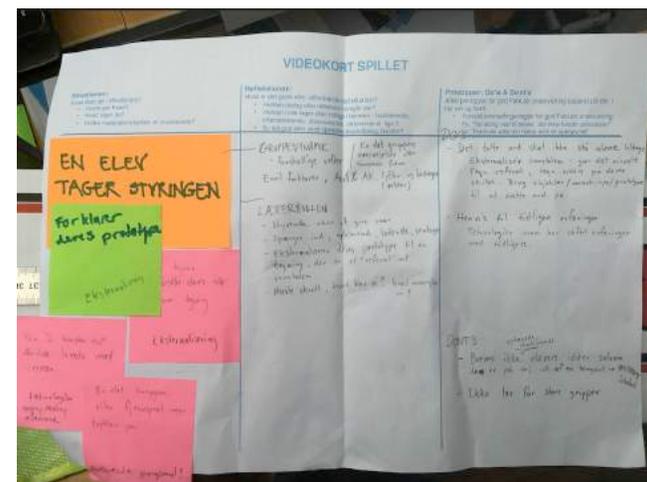


Figure 3. The Video Game poster, divided into three phases; Observation, reflection and generalization.

The Aarhus group discussed mainly two aspects based on their observations. The first point, they named "group dynamic" from which they reflected on the different roles that the students took in the situation. In their practice-based design process, they had invested much effort into pairing different types of students into each group, and where interested in finding out if this had paid off. This spurred reflections among the educators about the 'narrative' that was presented for the teacher: was this actually the groups reflection of their idea, or mainly one persons' perspective', and

what the teacher might have done differently in order to engage the other students in the conversation?

The second point of reflection for the group, was the “teachers’ role” noting how the teacher directed the group in the situation, by posing open-ended questions and making visible the students’ ideas and process through drawing. The teacher directed the conversation but without taking control or ownership away from the students. He repeated questions and the answers from the students in order to emphasize different aspects of the situation and the mock-up. But he did not provide the students with specific answers. He also created a visual summary or externalization of their ideas, which assisted the students’ understanding of their own position in the process, and which tasks and decisions needed to be made, e.g.; *How where they going to create the interaction? Could they find ways of using audio material, or would the feedback be visual? How where they going to go about finding possible solutions for the next steps?* In this way, the teachers’ role was facilitating, exploring the students’ ideas and decisions in the process, through both dialogue and sketching. This spurred positive reflections among the educators, about the benefits of combining different means of materials engagement, feedback and dialogue to scaffold the students’ design process.

Round 3: Principles. In the final round of the game, the participants worked on generalizing the insights from their observations and reflections, developing principles or rules of thumb for their teaching. The task in this round was to:

Create principles for good design and digital fabrication education (rules of thumb for the do’s and don’ts) based on what you have seen and heard.

The rules of thumb had to be directly linked to the educators’ own practice and reflections, but generalized as common practical principles for their design and digital fabrication education. As an example, the Aarhus group developed a principle based on their video snippets and their collaborative reflections, called: *“The spoken word should never stand alone.”* This was explained in more detail by: *“One should always externalize the conversation, e.g. by making it visual through drawing a summary – or using objects/mock-ups/prototypes to put things into words or make demonstrations”.* This externalization of the students’ ideas and design process, through parallel dialogue, reflection and material engagement, was linked to Schön’s concepts of reflective practice, (e.g. reflection-in/on-action, design as a conversation with the materials of the situation) and the case of Petra and Quist. Through the design game these reflections had been linked to actions in the educators’ own practice and contexts.

Based on the three rounds, the principles were presented and discussed with the whole class and listed on the blackboard. The principle *“the spoken word should never stand alone”* was a common theme across several groups. One group had discussed the extent to which they relied on ‘talking’ to the students using merely words and questioning. Even if the students’ prototypes were placed in front of the students and teacher, they had merely ‘talked about’ the idea, but without using the materials and objects to engage in the conversation. Also, this group of teachers noticed

that their way of asking the students was phrased as “what do you *think* about..”, focusing on the thoughts and minds of the students, rather than directing them towards their own actions (“what have you *done* with“..) or their concrete ideas and materials (“show me how this detail functions, or the like...”). The common discussions of such issues made the participants reflect upon their own practice and to collaboratively develop a range of guiding principles for supporting and facilitating digital fabrication teaching and complex problem solving in schools.

Discussion

Studies have shown that educators experience challenges when teaching digital fabrication and design thinking in schools [3]. These concerns are related to their roles as educators when addressing complex problem solving through explorative processes of design. In our research we found that Video Design Game may provide a beneficial framework for educators to reflect on their role as communicators and facilitators of digital fabrication and design thinking. Our research indicates that the Video Design Game offers a framework in which educators can train their abilities to facilitate digital fabrication and design thinking. The technique offers several benefits:

- Provides an open-ended framework for interpretations and discussions.
- Enables groups to collaboratively develop principles and aspects of new practices of teaching for which there is currently no developed guidelines available.

- Combines aspects of theory and practice into reflective thinking through a game frame.
- The game is easy to set-up and facilitate, and it requires little preparation from facilitators. It is, however, difficult to predict the outcome of the game.
- The format is flexible and allows for a bottom-up approach based directly on the focus and interests of the participants.

Instead of creating a set of general principles for teaching complex problem solving in design and digital fabrication, the Video Design Game allows these to be created bottom-up based on the participants’ own teaching practices. This is in line with a general approach to teaching design as a reflexive practice, through exploratory and collaborative processes of trial and error.

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