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Published in:
Proceedings of the 19th conference on E-learning

Publication date:
2020

Document Version
Publisher's PDF, also known as Version of record

Link to publication from Aalborg University

Citation for published version (APA):
Hautopp, H., & Buhl, M. (2020). Teaching Visual Facilitation and Sketching for Digital Learning Design in Higher Education. In C. Busch, M. Steinicke, & T. Wendel (Eds.), *Proceedings of the 19th conference on E-learning* (Vol. 19, pp. 235-242). Academic Conferences and Publishing International.

Teaching Visual Facilitation and Sketching for Digital Learning Design in Higher Education

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Abstract: This paper reports on the relation between sketching, visual facilitation and design processes when master students develop digital learning designs. The paper builds on a previous study that investigated students' use of self-produced visualisations during the design process. Although the study did not deal with visualisation, and students were not trained to draw, the participants made extensive but unacknowledged use of visualisations. In the present study, a new group of students from the same master programme were taught how to draw as a central component of the design process in order to investigate how this might expand their use of visual facilitation and sketching to drive collaborative processes, design decisions and theoretical reflections. As design practices enter new interdisciplinary domains, in this case digital learning design, the aim was to explore how humanities students can act as designers by adapting different design approaches and visual methods in particular. The empirical data, including teaching observations, students' visual productions and interviews with 27 students from nine groups after completing the course, were drawn primarily from an explorative case study in which masters students developed digital learning designs to solve a problem framed by an external stakeholder. Students' ways of producing visualisations in the different phases of their design process were analysed in terms of four design genres (explorative, investigative, explanatory and persuasive). This sociomaterial analysis traced how drawings and drawing activities unfolded during collaborative group processes. The findings confirm the potential of drawings as a means of developing ideas, collaborating in different design phases and presenting and discussing design ideas with target groups and external stakeholders. Furthermore, findings revealed that drawing activities became a significant pedagogical consideration in the students' digital learning design and data collection, but also that the students lack an academic terminology for articulating these processes.

Keywords: visual facilitation, sketching and drawing, collaboration, digital learning design, higher education

1. Introduction

Western culture has consistently privileged the spoken and written word as the highest form of intellectual practice while regarding visual representations as second-rate illustrations of ideas (Mirzoeff, 2000; Bowen and Evans, 2015). Nevertheless, all scientific disciplines employ visualisations, and each discipline is characterised by a visual culture (e.g. Pauwels, 2006). For designers and architects, the act of drawing or 'sketching' is a familiar element of the iterative process of developing design products (Goldschmidt, 2003). Sketches are used both to reflect on and discuss ideas in design groups and when presenting design ideas to others (e.g. Tversky and Suwa, 2009). As design practices enter new interdisciplinary domains such as learning design and communication design, researchers address a need for students to adapt concrete design methods when developing ideas (Hansen and Dalsgaard, 2012; Ejsing-Duun & Skovbjerg, 2019). Visual facilitation is one example of how drawing and visual methods are used to support group processes in organisations (e.g. Sibbet, 2008). They are based on the 1970s concept of *graphic facilitation* formulated by a group of organisational consultants in California (Qvist-Sørensen and Baastrup, 2020) who were inspired by how designers and architects utilize visualisations and sketching to present their ideas to clients (Sibbet, 2008). In the same way, visual facilitation can be understood as a point of entry to new organisational domains for design practices. However, there is little empirical research on the use of visual facilitation as a formal learning method (Hautopp and Ørngreen, 2018).

Visual facilitation involves the structured use of pen and paper methods to '*facilitate interaction in a group of people, using structured visual content. It is a systematic way of drawing together with others*' (Qvist-Sørensen and Baastrup, 2020, p. 20). As the method has its origins in design, the teaching approach described here draws on various design theories (e.g. Goldschmidt, 2003; Olofsson and Sjölen, 2007). Previous studies of the use of visual methods in higher education in other domains of knowledge and practice (Gelting, Friis and Bang, 2015; Hautopp and Ejsing-Duun, in press) showed that students from the design and art fields benefit from using sketching and visual facilitation as academic practices as these methods are familiar to them.

The present study investigated the potential of visual facilitation among humanities students who were not familiar with drawing practices compared to design and art students. The aim was to explore how teaching visual

facilitation can empower humanities students as digital learning designers by adapting visual methods for group work. The course introduced the students to theories of learning and education (e.g. Beetham, 2013) as well as design theories and methods (Kolko, 2010). As one important element of the course, students were taught sketching and drawing methods and visual facilitation techniques for use in the design process.

The present study builds on previous research with other students on the same master programme (Buhl, 2018) which showed that, after finishing the course, students struggled to recall their use of visualisation when developing ideas, design drafts and mockups. For instance, they had difficulty explaining their actions between the emergence and selection of design ideas and were able to recall the actual practices documented in their report only when the interviewer persisted in requesting examples. The diversity of visualisations identified in the study supports earlier evidence from elementary school settings (Meyer, 2016) showing how digital media support new visual practices, prompting new uses and representations of existing materialities. That study exposed the limitations of students' ability to articulate and reflect on their own visualisation practices, which were nevertheless identified as learning resources at all phases of the design projects.

In the present study, students from the same master programme was selected, as the aim was to explore how teaching *visual facilitation and sketching* might enhance collaborative processes by directing students' attention to the material aspects of drawing practice. Thus, there was an explicit focus on drawing practices in order to promote visualisations as a more active participant in the students' meaning making processes.

2. Research design

The present study involved the redesign of the master programme course 'IT, Learning and Organisational Change' (hereafter ILOO) in the Faculty of Humanities at Aalborg University, Denmark. Thus, the context is western culture where spoken and written language traditionally has been privileged over other modalities (cf. Introduction) The ILOO master programme addresses research, development and implementation of digital learning designs in a range of organisational and educational settings. ILOO master students typically have a bachelor degree in pedagogy, teaching or computer science. Thus, they are skilled within those areas, but are not specifically trained in using drawing as an academic tool. The aim of the study was to explore the implications of providing an intensive introduction to drawing as a pedagogical intervention to extend existing oral and writing practices.

The intervention was implemented during the eight-week course 'IT and Learning Design', in which groups of masters students were tasked to develop a digital learning design based on a case provided by an external stakeholder. The work was organised as a *design-based research* process (e.g. Barab and Squire, 2004), involving iterations that included context research, design development and interventions, as well as theoretical reflection and documentation. Seventy students were enrolled in the course at the University's Aalborg and Copenhagen campuses. The drawing exercises were recorded by a document camera and live-projected to a wide screen as well as through video-conferencing systems at both campuses.

To equip the students with tools for the different phases of the design-based research process, the intervention included two workshops introducing the students to *visual facilitation* through drawing exercises, design theories and feedback sessions. The first workshop focused on initial *idea generation* (Goldschmidt, 2003; Tversky and Suwa, 2009) while the second workshop focused more on the *presentation* of design ideas (Qvist-Sørensen and Baastrup, 2020). The two workshop designs were based on Olofsson and Sjölen's (2007) mapping of four distinct design genres: *investigative, explorative, explanatory and persuasive.* These describe different modes of entry to the design process. The *investigative and explorative* genres are used to examine the design problem and to share design solutions within the design team. The *explanatory* genre is used to present and communicate a design concept to stakeholders outside the design team, and the *persuasive* genre relates to selling the concept in a marketing context (Vistisen, 2016). In the present study, the teaching intervention prompted students to use drawing in the different genres to gain hands-on experience as active participants by pragmatically testing and reflecting on (Hansen and Dalsgaard, 2012) the potentials and challenges of using visual methods in the design process.

Workshop 1: investigative and exploratory. At the outset, the phrase '*From head to paper—no need for fancy art*' was used to emphasise that sketching and visual facilitation are about the act of developing, reflecting and communicating ideas rather than artistry (Valenzia and Adkins, 2009). As design proceeds from pragmatic ways

of working (Hansen and Dalsgaard, 2012), the teacher first introduced drawing exercises involving the use of simple icons and elements to illustrate *people, places and processes*, using *speech, text, colours and effects* to highlight key words and elements (Qvist-Sørensen and Baastrup, 2020).

Figure 1: Wide-screen projection of teachers' hand drawings by document camera (left) and students' drawings (right)

Afterwards, the students were asked to *investigate* the design problem through drawings—first as a 10-minute individual assignment, and then as a collaborative *explorative* exercise, in which they shared their drawings with each other and discussed ideas, potentials and barriers.

Workshop 2: explanatory and persuasive. As a point of departure, this workshop elaborated different theoretical perspectives on the use of drawings in educational settings, beginning with an introduction to visual facilitation (e.g. Sibbet, 2008; Valenza and Adkins, 2009) and how drawings and visual methods can be used for knowledge construction and representation (Bowen and Evans, 2015) in university teaching (Bang, Friis and Gelting, 2015). These theoretical concepts were combined with examples from the teacher's own empirical research and teaching in design and the humanities to show how drawings can be used as data collection tools for field notes (Causey, 2016) and interviews to elicit informants' visual imagery (Qvist-Sørensen and Baastrup, 2020). In the present case, the students were guided to use drawings in the different phases of their projects. After presentation, they were prompted to draw more specific visuals related to aspects of their design problem (e.g. collaboration, digital devices, learning barriers, innovative and creative processes). In both workshops, the students were encouraged to offer feedback and to reflect on their hands-on drawing activities, relating these to theories and methods of applying visual techniques in academic practices.

The workshops were not intended to deliver exact instructions for working with drawings but to introduce a visual repertoire to develop students' skills and awareness regarding the use of visual methods as a tool for design and collaboration in higher education. A further aim was to assess whether and how these drawing workshops would impact students' design activities during the rest of the course.

3. Theoretical framework

Analysis of the empirical data was informed by the idea of visualisation as part of a social learning process in which drawings and other materialities serve as agents of meaning making. Some scholars (e.g. Fenwick and Landri, 2012) have argued that, for a fuller understanding of learning processes, we must look beyond the dichotomy between human intentionality and non-human objects. Latour's (2005) actor-network-theory (ANT) has prompted some researchers (e.g. Meyer, 2016) to adopt a broader perspective on empirical learning situations as complexes of social and material agency. Fenwick et al. (2011) argued that ANT offers the potential to rethink existing practices and to reframe conventional views of pedagogical practices in the humanities. They contend that learning consists of social material processes involving both human and non-human agency in a continuous flow of events (e.g. schedules, access codes, desks, pencils, stories, chewing gum, electricity) that participate in meaning making. Rather than separate objects in a classroom, these are seen as collections of patterns of materiality that change and interact with human energies. Materialities such as textbooks, tablets, discourses and learning models offer different forms for participation in learning for a while and these practices will in time spread to other learning environments and then later disappear. In this way, learning emerges from a continuous social practice of materialities of 'doing', to which meaning is attributed. Fenwick and Landri

proposed the term *hybrid assemblages* to describe 'the continuum of materials, ideas, symbols, desires, bodies, natural forces, etc. that are always active, always reconstituting themselves' (2012, p. 3). In the present study, these hybrid assemblages served as the context for the empirical analysis of visualisations and their role in the design processes, tracing how drawings interact as active participants in the process. From this perspective, teaching, drawings and the students' acts of drawing are entangled in the hybrid assemblage that constitutes the design process. Our framework also incorporated Wenger's (2000) account of social learning, which emphasises that learning happens socially and is negotiated through collaborative processes. This approach enabled us to explore how students attributed meaning to drawings and the act of drawing when we interviewed them after completing the course.

Before presenting our data analysis, it is useful to briefly outline our approach to the empirical material. Visual research is not only *about* the visual but also involves working *through* visuals and visualisations (Pauwels, 2006). For example, while semiotic analysis and content analysis are primarily used to explore visual objects themselves, field research is more appropriate for studying practices, experiences and processes related to the creation and utilization of those objects (Pauwels and Mannay, 2020). By tracing the visualisations as participants in hybrid assemblages, the sociomaterial perspective adopted here focuses primarily on the students' practices and experiences rather than any thorough analysis of the *visual artefacts* themselves (e.g. composition, aesthetic qualities). The analysis concentrates on what Pauwels and Mannay (2020) describe as *production context* and *utilization context*, tracing the becoming of the drawing and its different uses as artefact in the four design genres (cf. Olofsson and Sjölen, 2007, Pauwels and Mannay, 2020, Fenwick and Landri, 2012).

4. Empirical data

The study data included observations during drawing exercises, post-course group interviews with 27 students from 9 groups of 2–4 students and the visual products of the group design processes. Interviews were conducted soon after students had presented their final design concepts to the external stakeholders using the *explanatory* and *persuasive* design genres (Olofsson and Sjölen, 2007) but before they had written their final reports. All interviews were scheduled to ensure that students could readily recall their experiences of the different modes. The interview guide was designed aligned with the *design based research* approach (Barab and Squire, 2004) as the overall structure of the course, inviting the students to reflect upon their design processes and use of visual facilitation and sketching throughout the different research phases. The interview guide was planned by the authors on the basis of their participatory observations of teaching (Cresswell, 2011) and students' visual productions. However, to encourage students to speak more freely about their experiences, the interviews were conducted by a research assistant. The interviews were video recorded and afterwards analysed by the authors drawing on thematic analysis (Braun and Clarke, 2006). As the empirical data were limited, the intention was not to generalise the findings to other settings, but to investigate these students' understanding and use of these methods in their design processes.

5. Analysis

5.1 Students' reflections on the drawing exercises and group design processes

Several students described the taught exercises as meaningful and applicable to their own design processes, as in this example: '*We implemented several things from the teaching, so I think, that this...I think it made a lot of sense'.* Others referred to how the drawings and visual facilitation guided their collaborative group processes: '*We realised that it was probably the lecture that was most beneficial...to guide us in the right direction and on the same path'.* '*It was simply an eyeopener as to how one could actually express one's ideas in another way that was obvious'.* From a sociomaterial perspective, the quotes generally confirmed how the entanglement of teaching exercises, drawings and discussions (Fenwick and Landri, 2012) became meaningful as the students reflected on how the act of drawing supported their design processes.

Echoing previous findings, other groups talked about how drawings concretised their ideas (Buhl, 2018) and functioned as participants in the negotiation of meaning (Wenger, 2000): '*It seemed like we were talking about the same thing, but when we visualised it, it turned out that we were not. It was the tool that helped us'.* Another group addressed drawing's explanatory mode (Olofsson and Sjölen, 2007): '*Just because one person has an understanding of it does not necessarily mean that everyone else has the same presuppositions'.* The drawings and the act of drawing also participated in group decision-making processes as the design elements became explicit: '*For each input, we talked about it and then sketched it. After it was sketched, one could see whether*

there was something wrong with it, or, well as soon as it was sketched, then one saw … if it was okay—does it work, or does it look confusing or stupid or something'. In this way, the students entered a dialogue with the materials (Goldschmidt, 2003), exemplifying the complex social and material agency of collaborative group processes (Meyer, 2016).

Students also elaborated on how the continuous peer-feedback was an important part of their design processes (e.g. feedback exercise from drawing workshop 2). A group showed how they produced and arranged different drawings as a prototype on paper, when using the *explanatory* genre (Olofsson & Sjöflen, 2007) presenting their prototype to the other student groups in a usertest session. The usertest showed that the drawings framed in a mobile telephone made the user experience explicit and easy for the test group to follow and comment on.
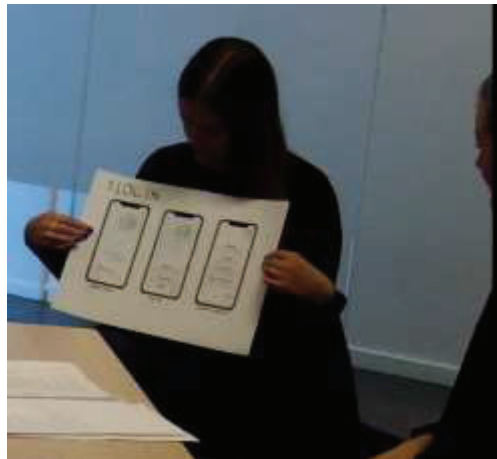
Figure 2: Students' prototype on paper showing a user experience of their digital learning design idea

These reported experiences indicated that the process of acquiring drawing skills and visualisation competences was many-faceted and unfolded in a jumpy and non-linear way that involved different material flows. As well as providing skills, the teaching workshops helped to maintain the students' focus in negotiating the multiple aspects of the design process.

5.2 Using one's own experience of visual facilitation in developing learning designs

Maintaining a focus on their own drawing experiences enabled the students to reflect on the possibilities of integrating drawings as a modality in developing their learning designs. One group described how they integrated experiences from their own drawing processes into a digital learning design to facilitate innovation. Their external case related to teacher education; the design question asked how student teachers could be supported when developing teaching materials for innovation. Emphasising the material aspect of learning (Fenwick and Landri, 2012), one student said '*You can talk about innovation, but how might you make a design about it? How can we make a product that supports [the process of innovation]? In other words, we can talk about it, but how should it look visually?*' The student explained how the group '*went through an innovative process*' in using sketching and visual facilitation, and they later included this in their design of an innovation app for others to use as part of their own learning process. In other words, this group used their own *production* of visuals to reflect on their target group's *utilization* phase (Pauwels and Mannay, 2020).

The above examples show how students reflected on and applied their own experiences of drawing in developing a learning design, and it can be argued that the drawings also prompted pedagogical considerations (Beetham, 2013) when the students took on the role of learning designers.

5.3 Using one's own experience of visual facilitation in data collection

In this section, we describe how drawing materialities were traced from group processes to participant involvement in data collection, with examples of how students used their own experiences of visual facilitation in the data collection phase. As mentioned earlier, teaching students to perform visual facilitation encouraged them to use drawing activities both as part of their design processes and for empirical research (e.g. Qvist-Sørensen and Baastrup, 2020). The interviews further revealed that some of the groups used drawing activities

in their initial field work, so involving their target group in the collaborative design process. One group of students described how they used various digital and analogue means to design prototypes in the exploratory and investigative modes (Olofsson and Sjölen, 2007) and later included drawing as a social activity in their field studies to involve participants in idea generation for the purposes of data collection: '*We had a user participant workshop in which participants made some sketches that we worked on in the Sketch programme later the same day. We included their sketches so that participants could see the process as well*'.

During the process, the students moved between materialities, using hand drawings and the Sketch programme as well as switching between the four design genres (Olofsson and Sjölen, 2007), beginning with their own exploratory mode when preparing the workshop. Next, they invited participants to draw their ideas, leading later in the day to a more explanatory mode, where different ideas were presented and discussed using the Sketch programme.

From a sociomaterial perspective, the drawings can be seen to play an important part in empirical knowledge creation. One student commented on the surprising insights they gained about the target group through the drawing exercises, as the drawing process opened a mutual space for reflection: '*I think that in every process shared with them, in every moment spent with them in a reflection space of some kind, there appeared some sort of groundbreaking new*'. For instance, the group initially thought about including gamification elements in their learning design, but the participants' drawings and the subsequent discussion made it clear that the focus should be on accessibility and social activities.

One group commented on the new insights they gained into the elements of their design during a user workshop: '*We found that there were icons we made for the prototype that they could click around in while some of the icons we had used had to be replaced because they sent a different signal*'. On that basis, the students adjusted the design to better suit the utilization context (Pauwels and Mannay, 2020). Another group reflected on how they integrated the participants' ideas in their final prototype*: 'From the physical sketches they made, we talked a lot about how we could include their ideas. (...) The logo we made—actually, one of the young ones from the club made the logo that we chose to take further'.* In this way, a participant's initial drawing achieved agency (Fenwick and Landri, 2012) as a central representation of the design concept.

From a sociomaterial perspective, the drawings could be traced from the students' design processes to the participatory workshop, where the design ideas were developed and redesigned on the basis of participants' drawings and joint discussions. In this way, the drawings spread from one learning environment to another (Fenwick and Landri, 2012). In these processes, the student groups showed a flexible approach to the four design genres proposed by Olofsson and Sjölen (2007), with an increased focus on participants' experiences and feedback.

6. Discussion

Our findings confirm that teaching visual facilitation and recall of students' drawing experiences helps to realise the potentials of visualisations for learning. Concretisation promotes clarity in the development of ideas, facilitates collaborative processes and supports idea generation and discussion. The very activity of drawing has the potential to stage processes in which presuppositions can be tested, rejected and replaced by an open mind to address actual problems.

When asked, the students lacked any terminology to specify what their experience achieved, and they used common language to narrate their actions. However, these narrations drew on the richness and diversity of visual materiality in driving social learning processes forward. For more theoretical reflections on the use of visual facilitation in academic practice, it can be argued that visual methods should be assigned a more prominent position as material participants on an equal footing with other materialities in the humanities.

By enlisting drawing as the primary materiality in this sociomaterial framework, this study can be understood as an instance of hybrid assemblage. Nevertheless, we find this approach productive to the extent that it requires us to focus on the actions occurring between the students and the drawings as a valuable encounter between human and non-human actors. In the interviews, the students demonstrated how the drawing processes themselves drive the design processes, as well as taking the collaborative work with the target group in new directions.

These findings also suggest that teaching visual facilitation as a pedagogical intervention impacts learning outcomes. Despite a lack of emphasis on visual education in Danish schools (Rasmussen, 2017), the students engaged with the workshop exercises and were able to reflect on them. If visual teaching activities are not continued as an integral part of their future courses, it remains to be seen to what extent students will continue to use drawing as a tool for learning, as the programme does not formally assess visual competences.

Finally, the study confirms that drawing activities became a significant pedagogical consideration, as students seemed more likely to use drawing as a tool for digital learning design and for involving their target group in the participatory workshops. Their flexible use of different design genres (Olofsson and Sjöflen, 2007) indicates an interesting direction for further studies of what emerges when design practices enter new interdisciplinary domains (Hansen and Dalsgaard, 2012).

7. Conclusion

This paper provides empirical examples of how academic practices in higher education can benefit from a combination of different design methods, visual facilitation and drawing techniques as a means of enhancing learning in the humanities. The study results are suggestive for researchers teaching design methods to students in educational contexts. From a sociomaterial perspective, the analysis followed students' drawings and the act of drawing through collaborative design processes and showed how these had implications for meaning- and decision-making. Drawings were seen to play an important part in students' pedagogical considerations as an element of learning design and data collection. Further research is needed to assess the long-term implications of teaching visual facilitation in such contexts, but the present study confirms that visual facilitation has the potential to provide valued and valuable learning experiences.

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