Designing for Learning in an Interdisciplinary Education Context

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Abstract

This article presents research done in an interdisciplinary educational context at VIA University College in Denmark. The research is based on a learning design approach for the design of digitally mediated learning to be integrated in educators' teaching practice. Action learning and action research sustain the learning design methodological approach. The authors have focused on the factors that influence the educator's and the developer's engagement and creativity in participating in a learning design process and development of digitally mediated learning materials.

The authors will reflect upon the interdisciplinary interactions that materialize in/engender a joint research agenda, where researchers from different domains collaborate with educators and developers across VIA. Furthermore, reflections are offered on what has been learnt during the research process in relation to investigating the learning design process in an interdisciplinary educational context. Insights into which factors need attention in general and more importantly in an interdisciplinary context have been drawn from the research and the reflections on this are made.

Keywords: *Learning design, digitally mediated learning, interdisciplinary education,*

1. Introduction

VIA University College (VIA), Denmark has a generally strong focus on integrating digitally mediated learning in its educational settings (Schaarup, Hansen, and Jeppesen 2018; VIA University College 2014). When designing for digitally mediated learning in educational settings, there is a need to facilitate the design processes that educators engage in (Buus 2012, 2015), and at VIA, this has been done by the 4 faculties independently of each other. In the Research Centre for Learning and Digital Technologies, which has a strong tradition for engaging in projects with an interdisciplinary focus and works across faculties, disciplines and institutions, researchers formed an inter-disciplinary team to

carry out an internal investigation of the way in which the integration of digitally mediated learning in the educational context is managed at VIA. Some of the researches have positions where they facilitate learning design processes. What we saw as interesting was to investigate in more depth these learning design processes and the factors that influenced the creativity and learning processes of the educators and developers. In the article "To Learn through Learning Design" (Buus et al. 2019), the authors briefly present the research done. This article will further unfold and offer reflections on the research and try to be explicit about the way the research was designed.

The authors will present three cases from three different domains 1) health, 2) construction engineering and 3) continuing education. These three cases will be unfolded further in section 3. The three cases, as well as reflections on the dilemmas involved in acting both as a researcher and as a developer or learning designer will be touched upon.

In the research presented, the authors combine design and research through learning design building, on an action learning or action research approach, as unfolded in section 4. The theoretical foundation. Section 5. The Analysis presents reflections on these approaches. We will expand on the reason why we believe that action learning and action research are important approaches which can support the interdisciplinarity in learning design processes.

Following the methodology and analysis, section 6. Reflection on the research process will present a discussion of the process of working interdisciplinary as researchers with educators and developers from different domains. Furthermore, reflections are presented regarding what has been learnt during the research process as related to investigating the learning design process in an interdisciplinary educational context.

During the article, the authors will touch upon the *why*, *what* and *how* regarding interdisciplinarity in research and design.

- *Why* VIA strategical include interdisciplinarity in designing digitally mediated learning?
- *What* defines interdisciplinarity in an educational context in VIA?
- *How* does interdisciplinarity enhance digitally mediated learning in VIA?

2. The methodological foundation for the research

The research which forms the basis of this article is designed as a qualitative case study based on interviews and observations. For each case, interviews are carried out with the participants who were responsible for the learning design and the development of the digitally mediated course; both learning designers and educators. The purpose of the interviews was 1) to create insight into which impact factors the developers experienced as important in the work with the learning design and 2) to create insight into the experiences with the testing of specific product that the design process has led to. Furthermore, the research is based on case descriptions from the researchers' interaction with the educators and developers. An point of attention is the fact that the researcher also interacts with the participants, and in one of the cases, the researcher *is* the participant.

As Bryman (2012) emphasizes, case study is characterized by the researcher seeking to make visible the unique "features" of the case (Bryman 2012) and by the case offering an appropriate context for answering research questions within this context.

Inductive work was done with the three cases based on the understanding that cases are particularly relevant for generating concrete, context-based knowledge that contains a number of potentials for researchers *learning* something as opposed to *proving* something (Flyvbjerg 2004). Flyvbjerg (2004) also argues that, in contrast to the otherwise common assumptions, the case study is useful for generalization and thereby supports the possibility of the generation of theory; in this article, this will consist in looking for important factors in the educators and learning designers' interactions in the learning design process of rethinking and redesigning courses as digitally mediated ones.

It should be noted that the three cases can hardly be described as atypical or extreme, which should lead to reservations concerning generalization (Flyvbjerg 2004). The three cases may instead be categorized as representative or typical cases (Bryman 2012) which, according to Yin (2009), aim to capture the terms and conditions of an everyday or general situation (Bryman 2012). Bearing this notion in mind and considering the nature of the research question, the authors find it relevant to use case study as a method.

All the interviews were recorded and subsequently transcribed. Based on transcriptions, the researchers' observations during the interviews, and the case descriptions prepared by the learning designers, an analysis was made. The analysis is based on a meaning-condensation of the data and links the three cases in order to investigate the research question (Kvale and Brinkmann 2008).

3. The three cases

The three cases are all located in an education context, and they all focus on the design and testing of a specific intervention. In relation to this, based on the participants' affiliations and roles in the interventions, follow-up research was undertaken, which this article seeks to present. The three cases represent different concrete design and development processes, which the authors have been involved in at different levels: as researchers, educators, learning designers, and/or developers.

What is important to know about the three cases are, that the selection of cases is based on interventions or projects, which the participants have previously worked with within the framework "Design of digitally supported courses". To be able to work with a common goal, a comprehensive survey was prepared across the three courses

Common to the three cases is the focus on the educators' own learning process when they participate in learning design processes based on the development and setup of various digital learning objects and learning activities.

The understanding of learning objects links to the taxonomic understanding of the development process from content to learning design which Conole (2007) describes as "learning assets". Learning assets can be defined as single files (units), that are incorporated into a coherent learning process along the levels in the taxonomy, thus ending in a learning design (see figure 1).

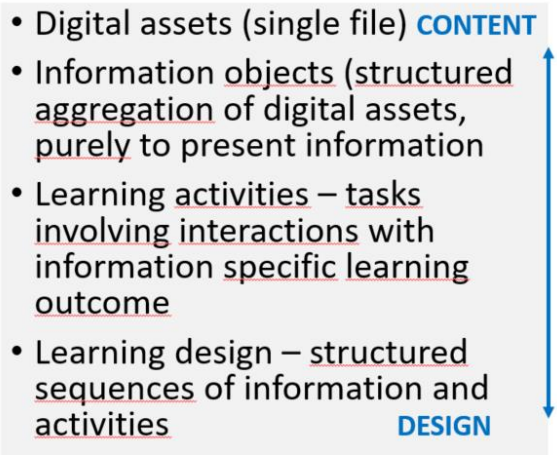

Figure 1: Conoles taxonomy (Conole 2007:82)

Delving into the three cases will show that the educators' approaches represent different levels in Conole's (2007) taxonomy on learning design. As case 1 will only be at the "content level", case 2 will be inbetween the "content" and "design" levels, and case 3 will be at the "design level". In section 6. Reflection on the research process the authors will get back to discussing and reflecting on this, as it is important for the research output.

Table 1. The three cases

Case 1	Case 2	Case 3
Development of clearly defined learning objects for integration in a blended course	Development of theoretically based video material to be used in digitally mediated teaching	Transformation of an standard course into a blended learning course with few face-to-face interactions

Case 1 is a clear bid for the development of learning objects, and at the same time, the challenge was that the developers did not have to use the material themselves, but develop it with a view to integration into the teaching of other educators. In cases 2 and 3, it was an overall learning process, which had to be designed and developed. Here, the challenge consisted in a certain coincidence between the people who were to design, develop and use the material. In all three cases, one or more learning designers were associated, each of whom was responsible for supporting the learning design process, but in one case the problem of the learning designer being the same person as the teacher and content developer arose,.

3.1. The first case

In case 1, two educators, in collaboration with a learning designer, developed digital teaching material in the form of learning objects for two selected topics in a course on theory of science. The learning designer chose to involve a future workshop (Jungk 1987) as a creative method to scaffold the educators in the topic selection process. A future workshop supports creative idea generation, and by establishing a free space through a future workshop (Duus et al. 2012), the intention was to decide on the order in which learning objects were to be developed.

The future workshop method was developed by the Austrian futurist Robert Jungk (Jungk 1987; Jungk and Müllert 1987). Jungk perceived the future workshop to be a tool for creating alternatives to expert-managed social change. The method is often used today to promote democratic influence in innovation and change processes. The working method consists of three phases:

1) The critical phase, where the participants describe problems - the negative elements in relation to innovation

2) The utopia phase, where participants develop ideas on fantasies and desires for the future in relation to innovation and change

3) The completion or realization phase, where participants plan ways to realize the wishes extracted in phase 2 (Jungk and Müllert 1987).

Based on the idea generation, the specific topics were selected. The developers were subsequently lead through a design process where the teaching content was turned into digitally mediated learning objects. The digital mediation consisted of screencasts of Powerpoints with follow-up questions in the form of quizzes, and together, these constitute the learning objects to be integrated into a broader teaching setting by other educators than the developers.

Generally, the developed learning objects are accessible to a broad target group within the entire organization, but the starting point of the production has been a health science approach. A realistic view of this is that no one outside health science will be using this, as domain knowledge is essential when designing for learning. The motivation for the development of this learning object was an organizational pressure based on the organization's digitization strategy (VIA University College 2014).

3.2. The second case

Case 2 is related to a comparative analysis of the learning outcome of two groups of 15 students each (Falbe-Hansen 2017), where, in one group, the teaching of theory was supported by presence and lectures, while in the other group, it was digitally mediated.

The design process took place in connection with the concrete production of the digitally mediated teaching material. In this case, there was one educator, who also had the role of learning designer, and additionally, she also had to develop the material herself. Furthermore, the educator was responsible for implementing it into her teaching practice. The material consists of video tutorials containing presentations of theoretical content. This was combined with articles. In addition, tasks and tests were developed as part of the learning design

in order to allow for the assessment of students' learning outcome. The focus was on the theoretical part of the teaching, as this was where students were believed to be able to gain benefits from having the theory digitally mediated in the form of videos, since it would allow them to watch and replay the videos as much as they needed.

One of the big challenges in this case was the need for sparring with colleagues and/or having a learning designer to collaborate and interact with. With only one person carrying out both development and design, there will not be enough room for creativity and reflections in the processes.

The motivation for making this learning design was an interest in investigating potential consequences of digitization for learning outcomes , and at the same time, it was aligned with the organization's digitalization strategy (VIA University College 2014).

3.3. The third case

In case 3, the design process was based on the transformation of an standard attendance-based course of 14 weeks into a blended learning course covering a corresponding number of weeks. In the blended learning course, the educator's presence was greatly reduced, and the course consisted of the digitally mediated learning material primarily with no educator present.

For the development and production of this material, four educators were grouped. The invited educators had different roles as some were course coordinators, others were not presently involved in teaching the standard attendance-based course, but had time to develop it into a blended learning course, and others were supposed to teach the blended learning course, so the engagement and motives in designing and developing the blended course varied among the participants. All of them were familiar with teaching in the ordinary course setting.

Furthermore, a project manager and two learning designers were affiliated: one with a focus on technology and pedagogy, the other with a primary focus on production. As part of the learning design process, the learning designer initiated a learning design workshop, where the participants were to discuss the different phases of the course: what is going on online, and what should attendance days be used for. This aimed at giving the participants a notion of the blended learning course from a holistic perspective, and it meant that the course gained a somewhat different course design structure than the standard attendance-based course. The learning design consists of various online learning objects covering several topics supplemented by literature readings, various exercises, and a general student portfolio.

The motivation for the learning design was the desire to contribute to the development of a teaching format that could offer greater flexibility for both students and educators.

3.4. General reflections

Carrying out this kind of interdisciplinary research within three different domains gives different challenges when researchers are to identify a common research design, which meant that among the researchers there communication

and negotiation of meaning according to the cases was necessary. There were an important issue in identifying a mutual research question to provide a shared focus for the observations and the interviews.

Therefore, the different approaches, which were implemented to scaffold the developers in the design and production processes, make up the focus in the collection of the data.

4. The theoretical foundation

When talking about design and learning processes, it is important to define our understanding of learning design, but also what is used here to inspire and draw attention to the design process, namely action learning and action research.

4.1. Learning Design

Methodologically, learning design can be defined as an approach that makes it possible for educators and learning designers to integrate digital learning activities and interventions into their teaching on a more informed basis e.g. in relation to pedagogically appropriate and effective uses and combinations of resources and technologies. A key principle of learning design is that the method makes the design process more explicit, evident and divisible (Buus and Georgsen 2018; Conole 2013). In their introduction to "The Art & Science of Learning Design", Maina et al. (2015) describe how learning has the role of changing human relations in various ways through education. Mor and Craft (2012) further expand by saying that learning design supports creative processes due to the design of new or different practices based on activities, resources and tools. These will support specific learning goals in a given educational context (Mor and Craft 2012).

The relations between learning designs and learning activities can be seen in a structure of nested hierarchies, as also briefly presented in Conole's taxonomy in section 3, The three cases, and in this representation, a learning design consists of several learning activities (Conole 2007; Maina et al. 2015). Learning design as a methodology enables educators to create or co-create, design or re-design, and most importantly to share effective pedagogically thoughtful designs and practices.

When using learning design as an approach in designing for digitally mediated learning and learning in general, the learning design approach should be qualified by four aspects: 1) knowledge of the subject matter, which educators bring in, 2) knowledge of pedagogical theory, where both the educator and the learning designer have a great influence, 3) a minimum level of technological know-how by educators is important, but the learning designer could supplement, and last but not least, 4) experience within the field of practice, which the educator also brings into the design process (Buus and Georgsen 2018).

Learning design processes should create room for unfolding innovative processes, for rethinking learning practices, and for creating a learning process for the educators, facilitated through various methods from the field of learning design. The educators and developers participating should benefit from working with learning design as a design method in terms of the time they invest in

participation, and in terms of their efforts and aims (Buus and Georgsen 2018; Maina et al. 2015; Mor and Craft 2012).

4.2. Action Learning

In order to support the learning design approach as well as the methodological work on design and learning processes that intends to create room for rethinking, developing, testing and evaluating digital learning designs, the authors have chosen to draw inspiration from action learning and action research.

Action learning is a method that aims to create learning based on actions in practice and thereby improve practice (Revans 2011). The method, which initially focused on management development, was developed by R. W. Revans in the mid-1900s (Madsen and Birkelund 2015; Revans 2011). The method has since been developed and updated, among other things with a view to competence development among professional practitioners (Madsen 2013). In action learning, there is a duality that is learned through action in practice (the action), while at the same time improving its practice through learning (Madsen 2013). Action learning can be regarded as reflected learning in professional communities (action sets), committed over time, with voluntary participation. Fuel for learning is real-life actions in relation to the participants' own practice. Learning is mediated by a learning group characterized by study and reflection (Madsen 2013).

Action learning usually consists of several phases, through which it aims to promote learning (Coghlan 2005; Dick 1997; Duus et al. 2012; Plauborg, Bayer, and Vinther Andersen 2007). In the different phases, participants:

- Examine practice, by being curious and exploratory and by asking questions of practice.
- Experiment with and test actions in practice and through this get the opportunity to break patterns and habits.
- Knowledge base their practice through reflection and conversations with colleagues, where tacit knowledge and values are verbalized, and
- Refine practice, which means developing, i.e. rethinking or redesigning.

Working with learning design and pedagogical development requires the participants to work, in exploratory and experimental fashions, with areas of knowledge within technology, pedagogy (e-pedagogy), and their own subjects in order to support a qualified, academic, e-pedagogical use of the technologies (Koehler, Mishra, and Cain 2013).

Action learning is one way of supporting the developers who have played with different learning designs in which, with the assistance of a learning designer, they have examined, developed, and tested learning designs. These actions and experiences are reflected on and thus form the basis for a knowledge-based approach that leads to further development of, in this case, pedagogy and learning designs.

Action learning processes are most often iterative, new actions being developed on the basis of curiosity and knowledge acquired in earlier iterations

. This is not the case here, but could be relevant for further design and development. When an action learning approach is applied to learning design processes, the involvement of a learning designer has a strong impact on the

process as (s)he can act as a digital learning expert and process supervisor, scaffolding and inspiring the educators in their rethinking. The learning designer can support the enhancement of the participants' action learning processes both in relation to technology, pedagogy, their own academic domain, and a fusion of these (Buus 2015).

4.3. Action Research

In contrast to action learning, action research is characterized by the researcher engaging in knowledge sharing with practitioners, and practitioners (here the educators) are assigned the role of co-researchers (Duus et al. 2012).

Lewin (1946), the father of action research, was engaged in research that promoted democratic education. His was a normative research perspective that aimed to work with the involvement of employees in organizational change, and hence, the democratic learning process plays an important role in the basic nature of action research (Duus et al., 2012). The participants will be learners and co-researchers, and the research processes will be governed by democratic normativity, where the researcher, in collaboration with the participants, systematically tests different possibilities for change through experiments.

Lewin (Duus et al., 2012) describes a systematicity in the principles of practitioners' work on experiments that can be equated with the iterative methodology of action learning, in order for participants to formulate 1) the direction of change processes, 2) the implementation of an experiment's practice design and 3) evaluation of experiments for new experimental change processes.

In action research, the action researcher typically adopts a very active role in supporting the implementation of the change that is to be created. It is also important that the change agenda is well known and owned jointly by both the action researcher and the co-researchers.

4.4. Theoretical reflections

Looking at the cases, the authors have identified that at least two different perspectives on action occur:

1) An approach where the learning designer is different from the developer and the practitioner. This approach has similarities to action research, where the researcher actively creates an intentional space, which the practitioner is invited into - the researcher has, so to speak, an intention for the practitioner, who is to perform an action or be part of an intervention. In this space, it is thus significant that the intention is handed over from the action researcher to the practitioner;

2) An approach where the learning designer is the same person as the developer and practitioner. This approach has similarities to action learning, where the learner has an intention (e.g. to learn about own practice, etc.) and improves both process and product through an iterative and reflective process.

Furthermore, in the cases, the learning designer has a prominent role in ensuring that the intended changes, which should be brought about through more use of technology, are actually also made possible. It also means that it is important to create a common language between the learning designer and the developers so that they become confidential and together create a sense of

change. At the same time, a new language also allows for the opportunity to use the language to analyze and develop practice (Høpner et al. 2007).

5. Analyzing the data

Based on the data collected, deductive work was done to analyze the data, investigate, and identify the impact factors when experimenting with learning designs. Not surprisingly, some of the factors identified are time and motivation along with digital competences and the reconsideration of how to actually organize one's teaching and how to structure the learning objects and learning activities in a digital context – be they single files or a holistic learning design.

5.1. Creativity and engagement needs time and motivation

One of the factors that had a huge impact on the ability to be creative and engaged in the design process is time and motivation, often in combination. The experiences in the individual cases are quite different (both positive and less positive) when it comes to the time spent along with the motivation for playing around with a learning design.

In case 2, the informant had the experience that the redesign and rethinking of her teaching practice was a task that she wanted to solve:

"... I've had the desire, so I didn't think it was annoying. I would have liked to spend more time on it than I was allotted" [Informant C – author translation[1]]

In the interview, it soon appears that the informant wanted to spent more time and work more intensive with the learning design process. Time is thus highlighted as a prerequisite, but also an issue that has solutions:

"But I spent a lot of time on it. Oh, and the time I spent was also outside the project" [Informant C]

Again, it should be noted that in this case, the informant is both the learning designer, the developer, and the educator, which gives some engagement, but she lacks the sparring and negotiation that occur, through discussion. At the same time it can be said that this case has similarities to action learning, since the educator has a clear intention with the course, and acts, reflects, and learns a lot during the learning design process. The educator thus herself established a project in which she worked with the design, and in the interview, she notes that it was her desire for change that drove the flow.

Case 1 is a contrast to this. Here the educators were appointed to be developers and allocated 20 hours to prepare digital teaching material designed as learning objects. Furthermore, the learning objects were not for them to integrate into their own teaching, but intended to be used by colleagues from the same program. For the two educators, the time factor of the 20 hours was of great importance as they had a low level of experience in digital learning design thinking and digital

[1] All informant quotations translated by authors

materials development. The time factor thus created a limitation on their design and creative thinking as well as on the efficiency of design development. Equally, they experienced difficulties in staying or being committed and motivated:

"It was a task to be done, and then it was sent off, and then there are others who have to work with it, so it is not that personal for me because I won't be teaching it."[Informant B]

In this case, one of the educators in particular experienced the process of producing the learning objects becoming an assigned task and not a creative design process. Furthermore, the educators experienced that the learning designer was perhaps too controlling and did not leave enough space for the educators to be creative, and therefore, the educators felt that it was the learning designer, who actually took responsibility for the task, which also affected the ownership.

In the last case, the four educators appointed as developers expressed frustration with how time-consuming the task had been and actually still was. This referred to a very untidy process with replacement of the learning designer along the process, change in the project manager along the process, too, and educators moving in and out of the design.

Consequently, some of the educators still felt deeply uncertain about the use of the most appropriate software tools they were expected to use to produce the digital teaching material. Moreover, the specific framework that the material was to be used in was unknown to the developers, which increased their frustration, which, in turn, affected their motivation:

"... progress has been very ineffective because you do not quite know what kind of frame it is to be applied in." [Informant F]

At the same time, the development process had actually only just started, when the interview took place, and for some of the educators, is had hardly begun as they were assigned to this learning design process later than the others. One of the educators states that there is a need to have enough time free from other work obligations to have the time to participate in a learning design process and develop digital teaching materials.

The experiences of time as a factor for creativity and commitment have been different in the three cases. Amabile et al. (2002) has, among other things, worked on the connection between time pressure and creativity. They emphasize that creative thinking can arise both with low and high time pressures, but that various other parameters play a role in making it happen. It is e.g. important that the people involved feel they are on an expedition (low time pressure) or have an important mission (high time pressure) At the same time, creative thinking is less likely to occur when people feel they are on autopilot or running a hamster wheel (Amabile et al. 2002:6).

In relation to the individual cases, this is reflected in the informant *"driven by the desire"* experiencing being on an expedition. The informant states, among other things, that there was a managerial assignment to *"mediate our teaching. But one can say that there was no pressure to go there"* [Informant C], which relfects a low time pressure. As the informant experienced being on a kind of

expedition based on her own motivation and own intentions, the likelihood of a more creative outcome increases. The experience of being on an expedition is reinforced by the fact that the informant herself had defined a project to re-design of her teaching to be more digitally organized and had taken the lead on this.

The case of the two informants who see their design process as an assigned task, whose importance/relevance they actually have difficulty seeing, is more a case of being on "autopilot". Their task is described as just another task to be done without *"reflecting very much on how I would then use it differently in my teaching"* [Informant B]. It indicates that the developers do not attach great value or importance to the process and task. The task was something they solved when it just fit in, which suggests that the time pressure was not really high. The likelihood of creative thinking in the task solution therefore drops drastically.

5.2. Digital competences have an impact

Another influential factor was the participants'/educators' digital competences or skills. All the educators lacked experience with the development of digital learning designs, and the digitalskills and knowledge that the educators had before the project started were reflected in the final, digital products. Without the assistance of relevant help in the production phase, it can be difficult for an educator to achieve a higher level of competence in the production of the learning objects, e.g. to learn how to solve technical difficulties with poor image quality etc.

For example, the educator who also had to act as a developer, did not have the necessary knowledge to merge video sequences, so that the sound was satisfying, which is reflected in the choices the educator has had to make along the way.

"... to merge such recordings... then there is something about the sound that is not the same, so all the acoustics, I was not able to solve" [Informant A]

"On the content page, I also had ambitions [...] and also had some unattractive lessons that were to be cut. I just don't think it worked very well when I put it together, so I ended up reducing... "[Informant A]

In some cases, besides providing inspiration for pedagogical choices, a learning designer may also be able to help solve certain technical and production issues in the learning design process. However, educators are not always ready to receive the facilitator's advice and guidance. An educator's prior experience or lack thereof is clearly reflected in each educator's experience of the processes and the products they develop. The process is far more manageable and easier to deal with when the educator has done a similar job before, and a learning designer scaffolds the process. Some familiarity with the technical aspects also makes it easier for educators to be creative and actually embed their ideas in the learning object.

Educators with no competences for preparing digital learning material are also challenged in terms of harboring realistic ideas about the expected results. Therefore, the involvement of a learning designer is an advantage, e.g. concerning the introduction of concrete examples that can form the basis of visualization of the learning design process. The competences and key skills

identified during the learning design process, when educators design learning objects, learning activities, and learning designs, is their ability to use their imagination to anticipate the outcome of the learning activity. This is also a point in Conole's taxonomy (Conole 2007). They need to engage themselves in a design thinking approach, have a clear teaching and learning philosophy, and be deliberate about which learning objectives the learning activities should support. Furthermore, it is important that the learning designer, together with the educators and developers, can create a common language with which the learning design process can be verbalized. It can also create confidence in the creative design and development process if the learning design process is based on group collaboration. However, such an approach is also perceived to be more time-consuming, since more group negotiation and consensus-seeking meetings are required. On the other hand, it provides security, sparring and some degree of holistic thinking among the developers in such a process, who, in many cases, are also the educators.

It is therefore important that learning designers be aware of their roles and potential impact. At the same time, it is also important to be aware of the digital competences and preconditions that the educators and developers bring to the design process, a factor which is important for both process and product in a learning design.

5.3. What were the outputs of the learning design processes?

In terms of the development and production of the learning objects, the educators thought very differently, pedagogically speaking. Some of them gained a greater awareness of the pedagogical basis of their teaching in connection with the preparation of the digital learning objects and their inclusion in teaching that could be blended or presence-oriented. The design of the learning objects was based on a new or rethought digital learning design, which for the educators contributed to a dialogue about how teaching should be organized:

"Exciting with blended learning, because it also poses questions about the way we have categorized teaching as being the right formula, IT glasses on, so you might well ask what is the benefit of it? So we might be sharper on that. And I think that as blended learning, such a course gives some really good tools as a supplement to what actually occurs inside a classroom". [Informant F]

For the developers, the process created some attention and perhaps even an awareness of how the teaching methods of blended learning and classroom teaching may be weighted. The learning design and development process as well as the final outcome have created a basis for inspiration concerning how teaching can be structured and how educators may be helped in the creation of new ways of teaching. From a developer's point of view, playing, experimenting with the learning design of new digital material can bring focus on choices related to the inclusion or exclusion of topics in e.g. a presence-organized course.

The design and development process has also meant that the educators have become aware of the opportunities that arise in relation to using and reusing learning objects. The possibility of reusing the digital material means that the educators can use their presence with the students differently, and that the

educator does not have to repeat himself. Furthermore, it means that students can access and review the digital material as needed.

When the educators are part of learning design processes, where they have to rethink and re-design as well as contribute to the development of digitally supported learning pathways, the experiences of educator but also the experiences of the learning designer will be important factors for how it progresses. During the interviews, it turned out that it is only in one of the three cases that the developed learning design and learning objects have been used in concrete teaching practice. The experience is based on the educator's assessment that a greater contact between students and educator is achieved and the educator gains more insight into the students' level of knowledge through tests included in the course and as a result of the introduction of these tests. However, the educator points out that it is important to pay special attention to the students who find it difficult to get started in the digital context so that they are not lost [Informant A].

6. Reflecting on the research process

Looking at the learning design process, which the learning designers, educators and developers have been through, it is important to note the different levels of power relations that also occur in the relationship between the researchers' different roles (researcher and learning designer or developer) in the interaction with the educators. Especially in an action learning and action research approach, the researchers need to balance these roles and the power they hold in that relation, and therefore they must be very aware of this in their interaction with the educators, and need to be aware of when which role. The researcher's role also needs attendance in the collection and validation of the empirical data. It becomes important for the researcher to know when to take on which role.

Another interesting issue that became clear to the authors during the research process was the awareness of terminology in the collaboration among the researchers doing collaborative writing. The researchers involved as learning designers acted within their own educational faculties, when facilitating the educators and developers. In the research design, the research team distributed the interviews so that each learning designer (researcher) became associated to another case than his or her own. When bringing the different results into the research team it became clear that there was a need for dialog about terminologies in the different educational faculties and the researchers' understanding of e.g. roles, theoretical approach, definition of learning design, etc.

Initially the research question or aim was to deduce a learning design model, but during the research process and the dialogues, it became clear that the cases were at different levels as also briefly touched upon in section 3. The three cases and in connection with the introduction of Conole's taxonomy (Conole 2007) from content to design. From that dialog, it became clear that the data collected and the learning design processes in the three cases did not form the optimum basis for the formation of an interdisciplinary learning design model. There would be a need for a research design that would facilitate more research on the

different cases, include new cases, and have the time and opportunity to follow the cases more systematically and for a longer period of time.

The Research Centre for Learning and Digital Technologies comprises researchers from various educational faculties at VIA, which enables an interdisciplinary approach to the research done at the center. Furthermore, the research center is the first, officially cross-organizational strategic initiative at VIA. In a new organizational structure, VIA is strategically focusing even more on the digitization. There will be a focus on digitization both pedagogically and related to administrative processes, just as more collaboration across VIA and between research and education has been initiated. This new organizational structure also illustrates the importance assigned to interdisciplinary education and research that needs to balance theory and practice in our educational context. However, as the analysis in this article also illustrates, various factors will be claiming attention in an interdisciplinary educational context, and in an interdisciplinary research design focusing on digitally mediated learning design in general. It should be stressed that this may become even more important in an interdisciplinary research context, because communication and negotiation become essential for success in such a context.

7. Conclusion

When looking at the findings from the analysis, the influential factors identified may not be surprising. They have to do with time, motivation, organisation and competences, but all to be seen in a digital context. On the other hand, what might be worthy of note is the learning processes that the educators went through by being creative, explorative and experimenting with learning designs and digital production.

In all three cases, the learning design process was reliant on the competences of each individual educator and the digital designers, their prerequisites, commitment and the time factor, which has been decisive. Moreover, the influence that the learning designers had on the learning design, the development process, and the course in general is also a decisive factor in two of the cases. Participating in the design and development process is key to the educators' motivation, ownership and future digital skills. As also stressed, the educators necessary competences identified is the ability to use their imagination to anticipate the outcome of a learning activity. They need to engage themselves in a design thinking approach, have a clear teaching philosophy, and be deliberate about which learning objectives the learning activities should facilitate.

The individual approaches have also had different aims for the experience of the design process and the results of the developed digitally supported learning pathways. One of the factors that has created a certain impact on how VIA can work with the development of digitally supported learning design processes in the future is the role of the learning designer. The fact that a learning designer is involved in the learning design process for technological and pedagogical sparring has had a positive impact. He or she needs to navigate in the interdisciplinary area of design processes. Furthermore, the cases have shown that the involvement of a learning designer adds some creativity and redesign/remediation to the design process, but it also there also needs to be an

increased focus on the importance of the role of the learning designer. Only when the learning designer engages in the learning design process with the educators and developers can he or she make the learning design process easier for educators to interact with. In the cases, we see that was a lack of scaffolding of the learning design process when no learning designer was involved to support and interact with both the pedagogical and technical perspectives. Being alone in the process was shown suppose a great challenge with regard to technical competences, whereas having the opportunity to cooperate, be mutually inspired, and have significant technical and pedagogical sparring was shown to have a positive impact on the educators' experience and learning. Still, it is important to emphasize the importance of the link between learning designer, educators and developers being established at the start of a learning design process to ensure support for the progression of the design process.

The authors believe that there are great opportunities in having more research done in relation to the impact this new organizational structure will have on interdisciplinarity in the educational context of VIA and similar institutions, when digitally mediated learning is integrated into the standard programs. If learning design as a method were to become a streamlined approach to digital, pedagogical development, this might result in another interesting investigation into our organisation.

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