Educational materials as collaborative design space?

Teachers' remix practices through designing, sharing, redesigning and resharing materials in CourseBuilder

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Abstract

The study presented constitutes the first step in a research project aiming at gaining more insight into the processes of creating educational materials through a collaborative design space. Additionally, it focuses on the possibilities of and challenges involved in creating valuable and meaningful educational materials drawing on teachers' remix practices. The purpose of the study is to investigate how teachers' collaborative interaction with educational tools may influence ongoing improvement of the courses and materials included in design of contextualized learning paths.

By taking our point of departure in existing theories and knowledge, we designed a triangulated methodology using a combination of questionnaires, interviews and user behaviour data focusing on the use of the CourseBuilder as a collaborative space. The article focuses on the possibilities and barriers of developing a collaborative design space that enables a (re)design of digital educational materials which looks at teachers' interest in: 1) designing their own teaching materials, 2) working professionally with the redesign and remixing of materials from many different sources, and 3) adapting them to the many contexts in which materials of this type are included.

This article should be seen as a step towards a deeper understanding of opportunities and challenges within teachers' cooperation on designing, sharing, redesigning and resharing teaching materials. It shows that there is a high degree of acceptance of digital teaching materials among teachers of upper secondary schools in Denmark. Furthermore, there seems to be a collaborative culture, where the majority of teachers indicate that they already collaborate professionally regarding course planning and they see advantages connected with these practises.

In prior research, factors promoting the adaptation of virtual collaboration are mentioned. These include teachers' digital skills, professional development through courses, allocated time and integration of tools that allow teachers to enter into re-design networks with colleagues. All the institutions participating in our study show a supportive environment regarding the use of CourseBuilder. However, several factors were identified indicating that CourseBuilder is not the ideal version of a design collaborator. Although the necessary factors for a successful collaborative environment are present, somehow there seems to be a missing link in the fulfilment of CourseBuilder as collaborative design space. Put differently, there are collaborative supportive environments at the specific institutions - but the *productive remix practices* are not facilitated by CourseBuilder, despite the design intentions and layout.

Introduction

Research within professional teacher development shows that teacher collaboration concerning the development of educational materials in groups or networks - through processes of designing, sharing, redesigning and resharing - shares many of the same potentials and benefits as collaborative learning processes (Voogt et al., 2011). One way to create opportunities and frameworks for teachers in order to increase the benefits of collaborative and network learning is in the form of collaborative (re)design of educational materials (Dohn et

al, 2020; Voogt et al, 2011; Handelzalts 2009; Simmie 2007). Through what we call *teachers' remix practices*, teachers design, share, redesign and/or reshare educational materials.

Within collaborative design spaces this is primarily done in face to face collaboration or based on internal sharing of local materials within a teacher collective - sometimes supported by experts such as educational designers, technologists or researchers. By (re)designing educational materials in collaborative design spaces teachers are provided with opportunities 1) to shape their own teaching practices through designing and redesigning educational materials, 2) for professional development and reflection through engagement in collaboration and remix practices, and 3) the production of reflective, meaningful and valid educational materials through designing and redesigning them to fit different educational contexts in the form of iterative collaborative design processes (Voogt et al, 2011; Penuel et al, 2007; Borko, 2004; Parke & Coble, 1997; Clandinin & Connelly 1992). However, according to Conole & Fill:

> Research to date shows that it is difficult to encourage authentic virtual learning or collaboration; discussion board use, for example, often shows a pattern of peak use directly related to teacher intervention or responses to particular 'hot' topics. Collaborative group work needs to bare carefully set up and orchestrated to achieve desired results [...] Integrated learning environments are still predominantly used as shells for displaying web pages and rarely get beyond basic information, dissemination and administration (Conole & Fill, 2005, unpaged).

A primary reason for this is the lack of necessary e-learning skills (Conole & Dyke, 2004), inadequate support and training (Oliver et al., 2002), no easy-to use tool-kits, guidelines and frameworks, and the absence of methods for understanding, unpacking and repurposing existing technology-enhanced educational materials (Conole & Fill, 2005). The availability of the above-mentioned factors also provide teacher with the opportunity to integrate learning activities that effectively utilise technology-enhanced learning materials that are shared, adopted and adapted. Ten years later, however, Kali, McKenny & Sagy (2015) still call for more knowledge on and experience with how teachers can be supported in sharing, designing, and collaborating around educational materials in ways that make these materials better through teacher involvement:

> While the benefits of teacher involvement in designing technology enhanced learning are acknowledged in the literature, far less is known about shaping that involvement to yield those benefits. Research is needed to understand how teachers learn through design; how teacher design activities may be supported; and how teacher involvement in design in various ways impact the quality of the artefacts created, their implementation, and ultimately, student learning. (Kali, McKenny & Sagy, 2015, p. 173).

To pursue these ambitions, we investigate *how teachers' collaborative interaction with educational tools may form a part of the ongoing improvement of courses and materials included in their design of contextualised learning paths.*

For this purpose, teachers' use of the Systime CourseBuilder was selected as a single case study. The CourseBuilder – is a novel digital tool and framework for designing, sharing, redesigning and resharing educational materials (see presentation of CourseBuilder below). If collaborative interaction is in fact not taking place, what might be potential reasons for this that could serve as the outset for new design moves and research activities?

Users' interaction with CourseBuilder has been analysed based on the following research questions:
1) How is collaboration in learning networks included in the functionality?
2) To what extent do teachers use CourseBuilder as a collaborative design space?

In the context of Design Based Research, educational product development serves as a case of that which is being both researched and developed. Research and design knowledge may contribute to both product improvement and knowledge production simultaneously. McKenney & Reeves (2019, p.83) have developed a model for design research in education that explicitly integrates research activities and design moves by connecting research and design practice.
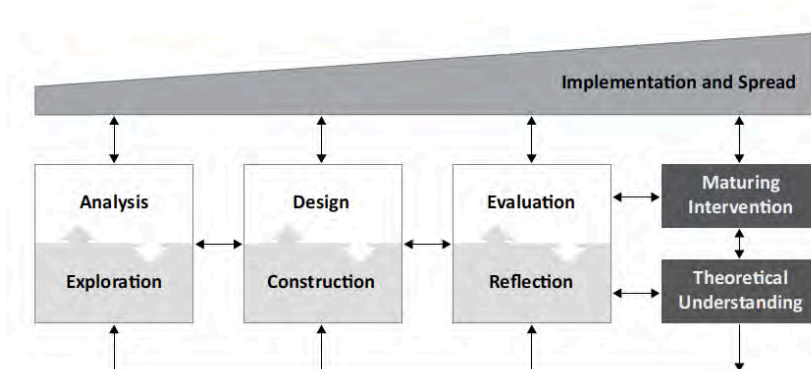
Figure 1: McKenney & Reeves' (2019) model for design research in education

The squares in the model represent the three phases of research and development activities, whereas the rectangles represent the two main outputs of the design based research process. Finally, the triangle represents the interaction with practice that increases over time through research activities and design moves. The present article engages the above challenge through *analysis* and *exploration*, as it is located in the first phase of a three-year project focusing on educational materials as collaborative design spaces.

Kali, McKenny & Sagy (2015) summarise knowledge in this area by emphasising three main areas which show potential for achieving this goal. The first area provides teachers with the tools and resources to become re-designers or co-designers of technology enhanced educational materials. The second area opens up technology enhanced educational materials to re-design and co-design and to increase teacher ownership, practicality and commitment of implementation. Finally, the third area provides teachers with support in the form of courses, competencies and professional development in teams so they can gain the knowledge to structure re-design and co-design processes with the tools provided to them (Kali, McKenny & Sagy, 2015, p. 174). The support mechanisms include collaborative work and work planning, facilitating team meetings or courses, and/or structuring tasks through templates or pre-selected source materials (Huizinga et al., 2014). Given that these areas are provided, will the goal now five years on be achieved?

Collaborative design of educational materials amongst teachers

According to Goodyear (2015), teachers' design practice is part of what he calls *pre-active teaching*; a distinctive planning mode of thought, tools and methods put into action to create designable things or design components e.g. educational materials. The most beneficial outcome often concerns the selection of existing materials and their configuration into new assemblages (Goodyear, 2015, p. 32). Thus, teachers' design of educational materials can be seen as a 'self-directed journeying through a pre-existing landscape' (Goodyear, 2015, p. 34):

> In recent times, this process of consumers or end-users [or teachers] taking over, reconfiguring, adapting, personalising and embellishing designed products [or educational materials] has been given a wider recognition in the design community - there is now a strong sense of co-production or co-configuration , with a concomitant sense of design as being fundamentally s communicative process (Goodyear, 2015, p. 36).

This process is precisely the central premise of one of the core Scandinavian design traditions: participatory design – to get people involved in design processes which concern them as well as give them the ability to impact and shape the future uses of what is designed (Jalowski et. al., 2019; Knutsen & Ramberg, 2018; Bannon & Ehn, 2013; Muller, 2003). The teacher as a designer of educational materials in participatory design focuses on collaborative technological development (co-operative design practices). The focus of the educational design is on democratisation, discussions of values in design and the co-development of organisations, resources and work places (Gregory, 2003). It is important to note that teachers should not *become* professional designers, but, rather, develop designer-like competencies which allow them to collaborate on, co-construct and take control of the educational materials they use in their teaching. The functioning of teachers' collaborative design space may be explained through the concept of *design collaboratorium* (Buur & Bødker, 2000). According to Buur & Bødker design collaboratoriums:

are supporting collaboration between a variety of persons, groups and competencies in the design process. The voices of the users [teachers] are represented in this, either through actual participation of users or through previous work in the users' sites. It is important for the design collaboratorium that it supports joint action through access to prototypes and other tangible means of "doing" [educational materials] (Buur & Bødker, 2000, p. 302)

Building on the work of Buur & Bødker (2000) and Bødker & Buur (2002), CourseBuilder may be characterised as an online design collaboratorium supporting teachers' collaboration on and remix of educational materials. Buur and Bødker see the design space as a semi-permanent room which exists throughout a project's lifespan. However, the design space can be re-configured and moved to new projects/sites over time (Buur & Bødker, 2000, p. 302). Simultaneously, the design space accumulates teachers' design knowledge over time as they design, share, redesign and reshare educational materials. Thus, the design collaboratorium reflects the history of the projects and materials. In this context, the collaboratorium functions as a room where teachers can find each other and themselves 'at home' together in the design process of developing educational materials. However, such spaces are not enough in themselves. Teachers also need to organise and carry out a series of design activities or *productive remix practices* that move the educational material through a series of 'design moves' of design, sharing, redesign, resharing.

In Knutsen & Ramberg (2018), teachers themselves point towards 4 central obstacles that prevent the collaborative design space from happening: 1) The need for courses, training and knowledge sharing, 2) The need to dedicate time, resources and personnel 3) The need to develop frameworks, constraints and processes for the use of technology, and finally, 4) The need to take care of and support practical and technical issues related to the use of technology (Knutsen & Ramberg, 2018, unpaged). Among the four obstacles, number 2 is considered to be the most important. These circumstances are also highlighted in Tremblay (2018) and her studies on teachers' networked learning and collaboration in communities of practice.

In relation to the above, Voogt et al.'s review of research on teacher design teams and collaborative curriculum design prompts them to make the following four recommendations: 1) Collaborative teacher design teams should not solely focus on creating materials together (design), but also on testing them and integrating the results in the educational materials (redesign), 2) Participation in collaborative design spaces is important for teachers to develop reflective educational materials and professional development, 3) This, preferably, requires external facilitation and professional resources and tools, and 4) Clarity within the teacher design teams and in the collaborative design space regarding the goals and design tasks is crucial. Here existing materials (sharing) can serve as concrete artefacts for understanding the tasks at hand (designing) (Voogt et al, 2011, p. 1243).

Goodyear (2015), however, argues that the greatest obstacle may actually be the teachers themselves as they have been 'notoriously reluctant to use other teachers' educational products' (Goodyear, 2015, p. 43). In Judy et al.'s (2018) study of teachers' participation in online knowledge construction in networked learning communities it was evident that the majority of online knowledge constructions were at the level of sharing and comparing information. There was extensive sharing of resources and artefacts and some affirmation of forum posts. However, there was limited interaction that built on the sharing of resources or that led to higher levels of knowledge construction (Judy et al., 2018, p. 376). Thus, Goodyear's and Judy et al.'s research show that another central challenge for creating a collaborative design space is to move teachers' participation beyond the first level of sharing and comparing educational materials and towards higher levels of joint knowledge construction, collaborative inquiry and a culture of designing, sharing redesigning and resharing (Judy et al., 2018, p. 377-78). For this particular purpose, many researchers highlight and emphasise the importance of having a shared set of resources, tools or methods, or what Tremblay (2018) calls *common baggage* that facilitates and support the exchange and adaptation of educational materials (Tremblay, 2018, p. 281).

Methodology, data collection and case

In order to investigate the research question presented in the introduction, the following data collection, methodology and case have been used. The quantitative documentation is based on surveys sent to 49 K12-schools with access to CourseBuilder (213 teachers responded to the survey) and platform data on teachers' use of educational material. Furthermore, qualitative documentation was used in the form of interviews with the developer and the project manager of the system and paid content providers, who have been involved in 50 teacher workshops since 2017. The study does not provide a statistically generalisable insight into teachers' cooperation with course design and teaching material development. But as shown in Table 1, a triangulation of case study data sources have been ensured a as well as employing method and analysis integration as described by Frederiksen (2013, pp. 21–24).

Method	Type 1	Type 2	Purpose
Survey	Quantitative	Qualitative	To obtain different but complementary data
Interview	Internal	External	Qualitative data are collected to explain the quantitative findings
Platform data	Number of shares	-	Quantitative data to control the findings in the survey

Figure 2: Methodology - The study triangulates findings from survey, platform data and interviews

As mentioned in the beginning, the aim of the case study is to gain insight into the teachers' collaboration in digitally based course planning and their background for selecting and deselecting specific online collaboratoriums or platforms as collaborative design space. This article focuses on the quantitative sources of data whereas the qualitative aspects are used as steppingstones for future research in the concluding remarks.

Case: The CourseBuilder

All K-12 teachers in Denmark, Greenland and on the Faroe Islands have free access to the teaching resources distributed by the educational publisher Systime. As part of the publicly listed Gyldendal Group, Systime is the leading supplier of educational materials to this specific target group.

If teachers chose to become members of Systime's 'My Account' they are given unlimited access to materials in Systime's *iLibrary* and they can create and share courses in the CourseBuilder. The iLibrary has more than 500 online publications covering all subjects taught in the Danish K-12-system. 16,600 teachers (e.g. almost all K12-teachers) have chosen to use this opportunity, and therefore they also have the possibility to participate in remixing courses in CourseBuilder. The development of the iLibrary and the CourseBuilder should be seen in connection with the national program on digital literacy (The Danish Government 2016a+b) but at the same time it can also be interpreted as an attempt to promote the iLibrary as a new concept. Since CourseBuilder was launched in 2017, Systime has arranged more than 50 workshops focusing on the use of iLibrary and CourseBuilder.

Systime's CourseBuilder is a tool, which enables the teacher to become an educational designer or learning architect. In other words, teachers can tailor courses and learning paths for his/her pupils. By using the CourseBuilder the teacher can combine elements from various internetBooks or other types of digital material, so they constitute an entire course, which can be shared with classes, groups of pupils and colleagues. (Systime.dk). The intention of the CourseBuilder is to diffuse the knowledge of the iLibrary amongst teachers and make them use the online publications from the commercial publishing company in their teaching. Access is only a no costs if you are a teacher. The schools must pay if they want the students to use the Teaching Resources and learning paths that their teachers have designed in the CourseBuilder. But all the 50 schools in our survey have chosen to buy a flat rate access to iLibrary and CourseBuilder so in these cases there would be no additional cost for the school if the teachers choose to use the CourseBuilder.
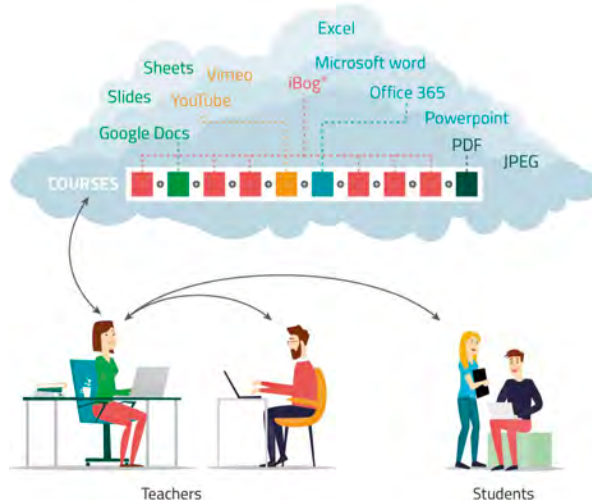

Figure 3: The logic of the CourseBuilder enables teachers to integrate content from the iLibrary (text, video, questionaries' etc.) with contend from other sources. When designed, the course description can be distributed using the school LMS.

The teacher must create a (verified) teacher's account with Systime to use CourseBuilder, Subsequently, the teacher identifies specific digital materials to be included in the intended course. On the individual page, the teacher presses "Share page", and now "Add to CourseBuilder " can be activated. When the desired pages have been selected and added, the rest of the course construction takes place within CourseBuilder. After naming the course, relevant elements must be selected and placed in a systematic order. Under the item "Content from internetBooks", the teacher must then select the specific page in the internetBook. If the teacher wants to add elements from other Internet sources, self-produced materials or assignments, these types of elements can be added by selecting "Type" and then inserting, for example, a link to a video, an external website, an assignment or other types of content.
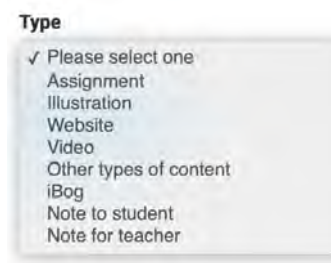
Figure 4: My Courses - An overview

Figure 5: Types of content

After having created a course, the teacher can then share the course with the students via a unique link. The students' view differ from the teacher's view and gives the students an overview of the course. The teacher may also choose to share the course - either globally (the entire institution) or with specific colleagues. Sharing a course involves clicking the "Share course" icon at the lower part of the page.

Figure 7: Share a course in the CourseBuilder
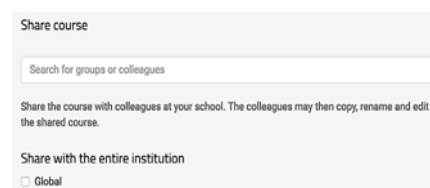
Figure 6: Overview of the course

Teachers can also reuse and redesign courses using courses already made by the publisher or courses shared by colleagues. The shared course plans can be reviewed, cloned and redesigned with the teacher's own course design elements and then shared with students and colleagues.
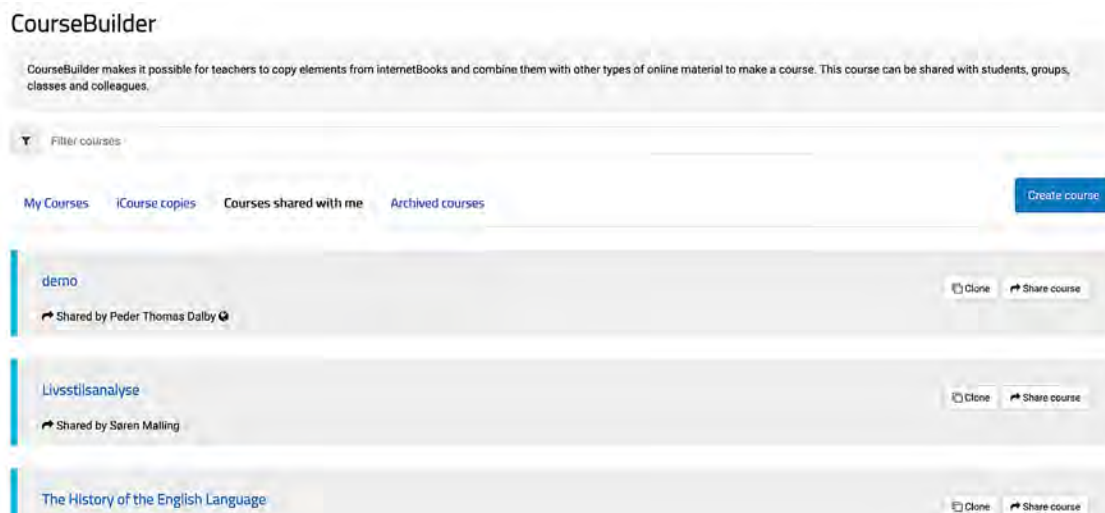
Figure 8: Sharing and cloning

In summary, the functionality of CourseBuilder: 1) Enables teachers to collaborate in course design through the iterative process of sharing, cloning and redesigning, 2) Invites teachers to form professional learning networks to make course design easier and to share inspiration, and 3) Serves as a systematic collection of existing educational materials that can be reused in various contexts subsequently.

A collaborative space for teachers' remix?

The workshops with professional instructors were held (partially) to introduce teachers to the use of the CourseBuilder as a tool for designing, sharing, redesigning and resharing educational materials. Thus, part of the workshops' intention has been real-life-testing the potential benefits from an asynchronous collaborative design space supporting, framing and inspiring remix practice.

In September 2019, online questionnaires were distributed to participants of the workshops regarding their use of CourseBuilder. The survey showed that 95% had used some kind of digital learning materials in their teaching in a period of two weeks prior to the survey. 90 % of the teachers replied that they generally use digital teaching materials in more than half of their teaching. The survey also showed that almost 70% had used courses developed by other teachers when planning their own teaching. As several comments indicated, using materials from colleagues was *not seen as copying or uncritically taking over colleagues' course plans. The colleagues' work was a source of inspiration.* Out of the 213 respondents, only *one* person replied that he/she had reused courses from CourseBuilder when planning his/her own teaching.
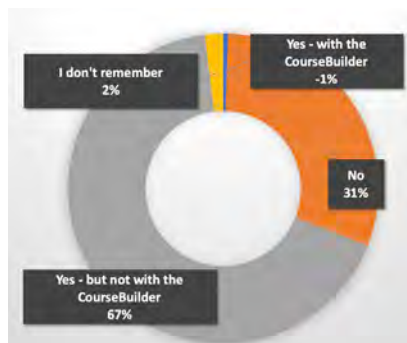

Figure 9: Answers to the question: Have you ever reused colleagues course plans in planning your own teaching? >0,5 % (one person) replied 'Yes – with the CourseBuilder'.

These results gave rise to the question whether the low proportion of educators using CourseBuilder may be due to a lack of knowledge of the platform? Apparently, this is not the case. A majority (60%) replied that they had knowledge of CourseBuilder. When focusing on the cohort of 17 respondents (8%) who had replied that they themselves had designed a course in CourseBuilder, only six of these (<3%) indicated that they subsequently shared a course with colleges or with the entire institution. The low proportion of teachers who created and

shared their own course designs - or Systime's prefabricated courses – might indicate a low interest in collaborating on designing and remixing courses. However, this conclusion was put to the test in the survey as 177 respondents (83%) replied that they share teaching materials on a regular basis.

Regarding the use of prefabricated course designs from publishing companies, 78% indicated that they had never used prefabricated course plans, and 6% answered that they had used one or more of the 80 prefabricated thematic course plans in CourseBuilder environment.

Most of the respondents wrote in-depth comments and described the benefits of collaborating with colleagues in course planning. Several teachers mentioned the opportunities for inspiration and efficiency. However, they also mentioned that it has become a mandatory part of the preparation of the teaching. One teacher stated that sharing courses is to be seen as 'Economies of scale' and that 'the school appeals strongly to this'. Another teacher wrote that increased teacher cooperation had positive implications: 'The courses become better and the work is easier'. Most teachers (64%) replied that in the future they would probably use a service such as CourseBuilder.

In other words, there was no general negative attitude towards collaborative course planning, but some responses showed a more critical view. As one teacher wrote, when asked for arguments for collaborative planning: 'Because we have to'. Another teacher formulated a similar point of view by writing: 'It is pure distress. With the constant reductions in preparation time, using course plans from colleagues is a last resort. […] The courses planned by others are rarely useful. A lot of them need to be worked on before they fit one's needs. The only situation where sharing courses can be an advantage is in the mandatory interdisciplinarity courses - and where it is time saving that a small group designs courses for all teachers - but the quality of shared courses is generally very poor' (our translation).

CourseBuilder - a collaborative space?

Thus, we can conclude that CourseBuilder has not been adopted by the potential users in any significant degree. This indicates that there is a possible mismatch between teachers' needs and the functionality of the platform. After almost three years and much effort used on development and communication about the possibilities, the offer of a collaborative design space has still not been adopted. Data shows that 80 prefabricated courses have been shared 517 times in total. Sharing was done by 256 unique users. These numbers may seem high, but they should be related to the number of workshops conducted in which sharing of courses has been included—and the fact that at least 16,600 teachers are members of the 'My Account' have free access to both *iLibrary* and CourseBuilder.

However, the fact that CourseBuilder is not being used as a collaborative space does not exclude that the platform has collaborative qualities. According to Henri & Lundgren (2001), one of the main prerequisites for collaborative practices is the commitment of participants to the task or community, as well as the engagement and motivation of teachers to work together as a group in a collaborative design space. To see CourseBuilder as a *joint enterprise* so to speak. However, as Tremblay (2018) points out few researchers have determined how exactly to nurture, scaffold and promote such commitment (Tremblay, 2018, p. 281). Based on her extensive research into informal and formal collaboration in communities of practice, Tremblay found that the most central sources for satisfactory participation in practices such as collaborative design spaces were the exchange and sharing of information and materials. But her research also highlights the importance of commitment, personal involvement and interest in learning from and collaborating with others.

Though literature on the subject often points towards organisational support to participants as a success factor, Tremblay's research results indicate that most of the participants may not want more resources or training. Thus, findings suggest that training and support resources are not a key factor in the success of CoPs [Communities of Practice] as indicated in the literature (Tremblay, 2018, p. 285-86). Finally, Tremblay points towards the fact that even though there has been much research concerning informal communities of practice – often of a normative nature - less research has been done on formal communities of practice created by organisations for a specific goal (such as collaborating in CourseBuilder) as well as research of a more data-driven nature (Tremblay, 2018, p. 286).

Finally, Judy et al.'s research revealed six factors influencing members' participation in knowledge construction and networked learning communities: a structured approach, organisational support, conducive environment, shared ownership, culture of sharing, and the platform and tools as enabler (Judy et al., 2018, p. 377). Future research within the three-year project might provide insight into these factors when it comes to formal

organisational collaborative design spaces such as CourseBuilder. If shared ownership is an important factor in getting more teachers engaged in designing, sharing, redesigning and resharing educational materials, than how might CourseBuilder itself scaffold and facilitate such shared ownership and culture of sharing? Especially, if these factors might be more important than easy-to-use frameworks or organisational support in order for teachers' deliberate and collaborative construction of educational materials to take place.

Concluding remarks

The CourseBuilder case study has highlighted that availability was very high regarding factors that could be expected to constitute the basis for changed behavioural patterns in relation to teachers' collaborative course planning. Fulfilment of listed factors in research (Judy et al. 2018; Knudsen & Ramberg, 2018; Goodyear 2015; Voogt 2005) can therefore in itself not be seen as sufficient conditions for teachers' remix practices and the creation of a collaborative design space. Something else is lacking in the design framework of CourseBuilder to support, facilitate and promote teachers' collaborative design. Furthermore, these findings also call for a better conceptual understanding of how and why teachers collaborate concerning designing, sharing, redesigning and resharing educational materials in general.

The analysis of CourseBuilder shows that there is a demand for frameworks that support sharing and collaborating on course design at a deeper level than just offering tools and opportunities and giving resources and recognition. In addition, the institutional support for teachers' collaborative practice is already in place and is even becoming mandatory practice. All upper secondary schools included in the survey had allocated time and resources for group collaboration and workshops. In conclusion, we recommend that future studies[1+2] – as illustrated in figure 10 below – should aim for 1) a deeper second order understanding of access, knowledge, demand and support and how this can be used in design to promote collaboration at a deeper level, 2) investigations into barriers in teachers' remix practices and how such an understanding might help create sustainable, worthwhile and meaningful collaborative design spaces.

In the analysis of the qualitative interviews, it was also found that teachers often explained their lack of using CourseBuilder as a collaborative design space as related to the complexity of the platform and its lack of combability with the LMSs already in use at the institution. Finally, several respondents mentioned that there is still a high degree of cultural resistance, when it comes to collaborating on teaching materials and that some teachers are very sceptical when it comes to designing, sharing, redesigning and resharing each other's materials.

In CourseBuilder, teachers are invited to become involved as designers and co-designers of educational materials. According to Clarke & Hollingsworth (2002), this can be viewed as an area of teacher and teaching experimentation – a design collaboratorium – and thus can be said to belong within the domain of teachers' remix practices. Accordingly, CourseBuilder and its framework, tools and methods should perhaps be viewed as essential in facilitating commitment and shared ownership as well as supporting the enactment of such remix practices. Perhaps teachers should even, as suggested by Voogt et al (2005), be more actively involved in the design of CourseBuilder itself for it to achieve its goal. More critically – and with a focus on the dialectics between management strategies and demands for change at the institutional level – next step is also to investigate the cultural aspects underpinning teachers' absent collaboration, bearing in mind the critical remarks from a recent study by Tuhkala who concludes that 'the issue is that teachers are often seen as implementors but are denied the opportunity of influencing what is being implemented. Thus, teachers may perceive that they are being forced to adopt technology without proper cause' (Tuhkala, 2019, p. 1). According to Maarten de Laat and Rob Martens:

> we need to have teachers and researchers (and other identified stakeholders) working closely together in an atmosphere of mutual respect from the beginning of a project and start a research journey together to create new knowledge through a constructive dialogue (Maarten de Laat and Rob Martens in Dohn et al. 2020, p. 149)

In conclusion, based on insights from the *theoretical exploration* and *design analysis* that together constitute the first run-through of the first phase of the design-based research project, the project will actually move backwards in order to move forwards. That is, the project will carry out a second run-through to establish a theoretical exploration and design analysis of the second order. This is done to ensure a deeper understanding of both the conceptual and the design framework that align with the future studies[1+2] outlined in the model below.
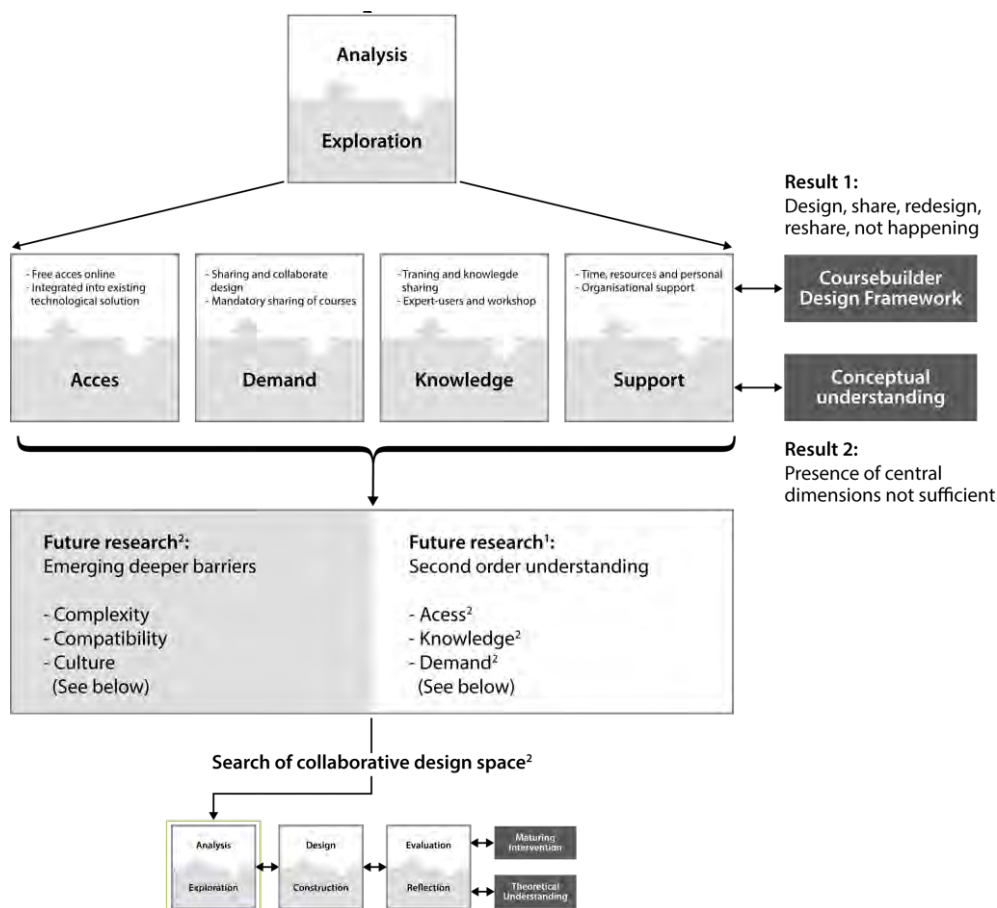
Figure 10: Results and outline for future research (inspired by McKenney & Reeves 2019)

Overall, there is a need to build both design theory and theory-informed designs, rather than just apply designs to practical problems or empirical studies (Bennett & Oliver, 2011). Future research carried out within the project seeks to theoretically and designedly explore teachers' remix practices and how they can facilitate the *learning of learning materials* as well as develop understanding and practice of collaboration platforms that not only support and promote teachers' design practice but also act as co-collaborators themselves. This aligns with Voogt et al.'s (2011) analysis of the literature on teacher design teams, which shows that research on (online) collaborative processes in teacher design teams is still very limited, and all have an exclusively qualitative research design. Additionally, research knowledge is lacking on the importance of designed spaces supporting and promoting teachers' professional communities, remix practices, and co-design teams (Voogt et al., 2011; Borko, 2004; Putnam & Borko, 2000). Something the project will also take into account when moving forward in the design process of CourseBuilder as a collaborative design space.

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