

DIDAKTIK FOR DISTANCE EDUCATION IN SECONDARY AND ADULT EDUCATION

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ABSTRACT

This article presents secondary and adult education teachers' perceptions of their distance teaching practice in Sweden. The teachers participated in a professional development program from 2019–2022. A Didaktik theory was used to analyse factors for distance education on structural (e.g., content, intentions, methods, media, students, sociocultural contexts) and faculty (e.g., organisational, curriculum) levels. The primary empirical material is group interviews with distance teachers and coordinators during a Design-Based research process. The analysis suggests that the teacher groups developed professionally as distance teachers by reflecting on and testing different ways to communicate (synchronously, asynchronously) and teach online. The article suggests Didaktik principles to improve distance education at structural and faculty levels.

Keywords: Distance teaching, Didaktik, Design-Based research, professional development

Introduction

There is a growing interest in developing distance education in secondary and adult education (Corry et al., 2017; Barbour & Reeves, 2009; Lindfors & Pettersson, 2021; de la Varre et al., 2014). Reasons for this interest include opportunities to expand educational access and provide high-quality learning and more student study choices. Previous research claim that successful professional development processes address distance teachers' different views, experiences, and needs and offer them opportunities to collaborate on developing curriculums in online distance education settings (Baran et al., 2011; Bradshaw, 2002; Hicks, 2014).

Baran et al. (2011) studied how to transform the online teacher role in a review of 11 studies. Their results suggest that online teachers should be encouraged to pursue pedagogical inquiry and creative solutions while being introduced to new technologies. Teachers need faculty support to transform their teaching practice by collaboratively reflecting on and questioning their past experiences and beliefs. Baran et al. (2011) confirm that teachers need time to reflect on previous teaching experiences while learning about and testing new teaching methods (cf., Bradshaw, 2002; Hicks, 2014).

According to Miyazoe and Anderson (2010), distance education theories focus on different interactions relevant to instructional design and distance education delivery. Anderson (2003) based the theory called *Interaction Equivalency Theorem* on previous models by Moore (1989) and Anderson and Garrison (1998). The theory suggests that student learning is supported by one of three interactions (student-content, student-student, student-teacher). Anderson and Garrison (1998) drew upon the possibilities with digitally networked environments. Digitally networked environments may provide different ways for teachers to collaborate with other teachers by sharing or developing materials. Teacher collaboration in digital spaces may improve distance teaching as teachers can share and learn from colleagues facing similar issues (cf., Baran et al., 2011; Bradshaw, 2002; Hicks, 2014; Miyazoe & Anderson, 2010). Digital content that automatically updates itself without teacher involvement could reduce the teacher's workload and, thus, the cost of delivering distance courses (Miyazoe & Anderson, 2010). Information about student learning can be collected digitally, further supporting distance teachers in analysing and evaluating effective instructional designs (ibid.).

The current study explores teachers' perceptions of developing distance teaching practices in Swedish secondary and adult education. The study aims to develop theoretically and empirically based principles for online distance education, sometimes referred to as e-learning (Guri-Rosenblit & Gros, 2011), through a theory of Didaktik and Design-Based research as a methodology. It is a qualitative inquiry into a research and development program in Sweden and Finland during 2019–2022. The organisations and the teachers wanted to develop high-quality distance education to offer education to upper secondary school students in rural areas and adult students who could not or did not want to attend onsite study programs for different reasons. The teachers raised questions about planning distance courses, structuring content in digital learning environments and establishing relationships with distance students to avoid dropouts. However, the teachers also addressed faculty issues when developing distance

teaching practices. These instructional and faculty topics made us consider a theory of Didaktik, which enable the analysis of the empirical material on several layers.

Didaktik is a German and Nordic concept that refers to different theories for teaching and studying (Hopmann, 2007; Uljens & Ylimaki, 2017). Didaktik assumes autonomous teachers who reflect on different factors (e.g., aims, content, methods) concerning the students and contextual matters when teaching (Jank & Meyer, 2006). Teaching takes place within specific organisations, societies and cultures that shape the conditions for teaching; therefore, Didaktik also addresses normative (e.g., the curriculum) and sociocultural (e.g., the context of the school) factors of teaching (Uljens & Ylimaki, 2017). The Didaktik theory provided a structure for analysing the empirical material on two levels: structural (i.e., instructional) and faculty. The research questions are as follows: *What didactical factors are highlighted by the teachers? How do the teachers didactically describe how they have developed their distance teaching? What needs to be considered when organising distance education on a structural and factor level?*

The six schools in this study worked with variations of synchronous (in real-time) and asynchronous (delayed) distance education (Hrastinski, 2008; Watts, 2016). Three schools offered distance courses that students individually completed asynchronously or synchronously online. Three schools offered synchronous courses to other schools via a video conference system¹. Some teachers were physically present with one group of students, and the rest of the students joined the lesson from their school. Some teachers taught all students synchronously online. The teachers all taught secondary level courses. Three organisations were upper secondary schools. Three schools were adult education providers offering upper secondary courses. All six schools followed the same curriculum, although contexts and student populations varied.

Findings from this study contribute to the knowledge about distance education didactics as it offers theoretically and empirically based principles that can support future teachers, faculties, and school leaders. The theories of Didaktik offer frameworks for reflecting on and developing teaching practises (Hopmann, 2007; Jank & Meyer, 2006; Uljens & Ylimaki, 2017). The teachers in this study expressed a lack of teaching and learning principles (i.e., Didaktik) specific to distance education which further supported the theoretical and methodological decisions.

Teaching-centred Didaktik as a theoretical framework

Paul Heimann (1901–1967), Gunter Otto (1927–1999) and Wolfgang Schulz (1929–1993) developed the Didaktik theory used in this study (Jank & Meyer, 2006; Keiding, 2013). We refer to it as teaching-centred Didaktik, as Keiding (2013) suggested. Heimann et al. developed the theory to help teachers analyse teaching structures and conditions on two levels (Keiding, 2013). The first level of reflection and structural analysis (see figure 1) includes six interrelated factors (Jank & Meyer, 2006, p. 203–210): the *intentions* of the teacher, the chosen *contents*, *methods*, *media*, and relevant information about the *participants* (for example, age, special needs, expectations) and the *sociocultural conditions* for teaching and learning (for example, school culture, social relations within a group). Teaching-centred Didaktik separates teaching methods from the chosen media, something other similar models do not (Jank & Meyer, 2006; Keiding, 2013). In this study, media covers different modes of digitally networked distance education (e.g., synchronous and asynchronous technologies).

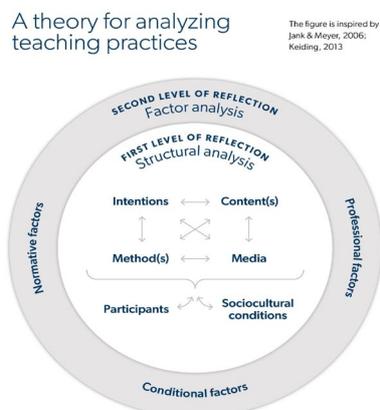


Figure 1. The model was used to analyse the empirical material. The model is inspired by Jank & Meyer (2006) and Keiding (2013).

¹ In Sweden this form of distance education is referred to as remote teaching in legal and policy documents (Lindfors & Pettersson, 2021)

Reflections on the second level are called *factor analysis* and include contextual and sociocultural aspects of teaching. These are *normative*, *conditional*, and *professional factors* that affect teaching. All teaching is *normative* because it strives for specific goals (e.g., democratic citizenship). Teachers also carry implicit or explicit values (e.g., view on students, philosophical approach to teaching) (Keiding, 2013). In Sweden, the national curriculum offers normative guidelines regarding content, but teachers execute the curriculum autonomously. *Conditional factors* may include political decisions, funding, and faculty decisions that affect teaching. Only a few upper secondary schools legally may offer distance courses in Sweden. Adult education providers can choose how they deliver their studies, such as 100% distance, partly distance or onsite courses (The education act, 2010, Chapters 21 & 22). Professional *factors* include teachers' subjectively perceived possibilities and challenges in organising and developing the teaching practice when considering relevant research, personal experiences, normative and organisational factors, and structural factors.

Heimann et al. developed the theory in response to other traditions of Didaktik, namely Bildung oriented Didaktik and activity oriented Didaktik (Jank & Meyer, 2006; Keiding, 2013). Bildung-oriented Didaktik, as Wolfgang Klafki initially developed it, was concerned with the aims of teaching and content to be learned and possible self-cultivation processes (i.e., Bildung) among students (Klafki, 2010). Klafki suggested five questions for teachers related to the content (for example, why is the content chosen, and what future relevance does the content hold for the student?). Heimann et al.'s critique was that Bildung-oriented Didaktik was too abstract compared to the practical realities in the classroom, nor was it empirical. Klafki has developed the theory since and now calls it critical-constructive Didaktik by including empirical studies and highlighting different interactions during teaching (e.g., teacher-student, student-student) (for an elaboration on this, see Klafki, 2010).

Heimann et al. were also critical of the ideologically informed and activity-oriented traditions of Didaktik that highlighted student activity to create meaningful learning situations that, among others, John Dewey represented (Keiding & Wiberg, 2013). These strands of progressive pedagogies often focus on teaching methods to educate competent citizens, products that students produced, and potential competencies gained through these, often collaborative, processes. Other debates include the relationship between the traditions of Didaktik and Curriculum and how they have influenced each other (Hopmann, 2007; Tahirsylaj, 2019), but that is beyond the scope of this article.

The contributions from Wolfgang Schulz and Gunter Otto after Heimann's death lessened the differences between teaching-centred Didaktik and critical-constructive Didaktik (Keiding, 2013). Arnold and Koch-Priewe (2011) have combined the approaches into one. Keiding (2013) references Gündüz (2011) when discussing why the successor to teaching-centred Didaktik, Hamburger-Didaktik, did not establish itself the same way as Klafki's critical-constructive Didaktik. Schulz and Otto made Hamburger-Didaktik more normative and Bildung-oriented. They also included interactions and collaboration between teachers and students. They made it learner-centred to the point that students should be actively involved in the teaching practice. Something that may be utopian when other factors are considered, such as the national curriculum's contents and aims. Teaching-centred Didaktik provides a straightforward structure to analyse relevant factors for this study.

Design-Based research as a methodology

A design-based research (DBR) approach (Barab & Squire, 2004) was used to increase knowledge about distance teachers' practises. In the research and development program that informs this study, the researchers wanted to support and create conditions for teachers to develop their teaching and strengthen them professionally as distance teachers. The researchers worked closely with the participants in an iterative process to design and develop areas of development that the teachers themselves have described as challenging. DBR offers the opportunity to work closely with the teacher's practice and create a partnership (Anderson & Shattuck, 2012; Mor & Winters, 2007). In this partnership, the teachers and the researchers have different roles where the researchers lack knowledge about the complexity of the practice, technologies used and the local organisation. The teachers often lack time to research rigorously (Anderson & Shattuck, 2012). In this study, the teachers have defined problems, themes, and issues; they have been involved in designing themes in the program and their teaching practise.

A total of ten groups of teachers were followed while they developed distance- and remote teaching between 2019 and 2022. In this study, six groups were selected. The approach was deemed relevant as the organisations that participated in and funded the program *Digital learning environments* were interested in an iterative process to develop the schools' distance and remote education. The teachers expressed an interest in networking with others in similar situations, and they frequently asked for research and support from the program leader and researcher (author 2) and the program researcher (author 1). Design-based research inspired the program in the following

ways. The researchers established specific topics the teachers deemed essential through a survey in the Spring of 2019, which focused on social relationships in digital learning environments as a first focus area.

The research and development program Digital learning environments

The presented study was part of a more extensive research and development (R&D) program, *Digital learning environments* (2019–2022). The R&D program was led by the Swedish non-profit organisation Ifous. Eight municipalities in Sweden and Finland participated in and funded the program, including around 65 participants from fifteen different units and schools (K-12 and adult education). The participants were organised in process groups led by a process leader. Four researchers were involved in the program.

The overarching aim of the R&D program was to find ways and develop methods to use digital learning resources and create and enhance equal education opportunities in rural areas through providing remote- and distance education. During the program, the participants focused on challenges in their practises, formulated as three themes during the three years. The three themes that have been in focus were 1) social relations in distance education, 2) digital learning environments and 3) assessment in distance education. Twice each year, the participants were invited to participate in a two-day seminar to discuss and share ideas and experiences and receive lectures from researchers in the program or guest lecturers related to one of the themes. The seminars were held both physically and digitally. Between the seminars, the process leaders meet regularly in Zoom² to discuss their work and get input from the researchers (cf., Ifous, 2022). Webinars (Åkerfeldt & Hilli, 2021) and literature seminars have also been arranged. The work on social and teaching presence was presented in an article by Hilli and Åkerfeldt (2020). Additional material has been developed, such as a guide on working with and developing social presence and two surveys that explore student perceptions of social presence in remote and distance education.

In 2020 the Covid-19 outbreak challenged the schools and their teaching. The schools were closing, and there was much pressure on the teachers who regularly taught online. Due to the pressure, the teachers' development work was slowing down, and in 2020 the program was prolonged by three months to make room for the process groups to further work with the development. Interviews during 2019 were done at the schools by one or both researchers. The interviews were planned to be digital during 2020 and 2021 despite the Covid 19 outbreak.

The contexts of the participating schools

The groups of teachers interviewed were from six different schools. The teachers taught upper secondary school courses, albeit in different contexts. School A worked in a distance organisation with upper secondary school students from different parts of Sweden. They offered synchronous online lessons with asynchronous assignments on the school's digital platform (Google classroom), and students chose if they wanted to participate in synchronous activities (Google Hangout). School A did not meet their students face-to-face or offer onsite introductions. Before the program, the school had developed different support systems for their students; mentors introduced new students to the digital platforms used and the general outline of the courses. Schools B, C and D offered upper secondary school courses to adult students. They worked with combinations of synchronous and asynchronous distance courses. Students met the teachers onsite during a course, or they could participate in synchronous online lessons or watch recordings of the lessons later. Students completed assignments asynchronously on digital platforms (itslearning, Teams) and could take part in courses partly or entirely online. The teachers had developed distance courses to offer adult students flexible study options as most of their students worked full or part-time. Schools E and F comprised upper secondary school teachers who taught courses offered at several schools. The teachers and one group of students were physically located in one school, while the other student group was in another school. Schools D, E and F, offered synchronous lessons transmitted via video link (Zoom, Teams) between two locations. Students completed assignments on the schools' digital platforms (Teams, Moodle).

We chose to study these schools because they worked with similar issues during the program and taught the same curriculum content. They struggled with planning distance courses that supported social relationships (teachers-students, student-student) and content knowledge among students. The adult education providers had flexible course outlines and asynchronous aspirations related to how and when they communicated with students, structured course content, and provided feedback. The organisations had developed their distance education depending on legal restrictions and the needs of students and faculty. Schools A, B, C and D were free to deliver distance education in any way they wanted if they followed the curriculum. Schools E and F had national laws and regional guidelines that affected the outline of their courses; for example, they were obliged to offer synchronous lessons.

² Zoom is a videoconference system that allows parallel sessions to be created (breakout rooms). Breakout rooms were used for discussions in smaller groups during the process leader meetings.

The schools shared a worry about declining student populations, and distance education became a way to maintain the school. All schools had developed distance education for years before the program and had relevant digital infrastructure. Most of the teachers had previous distance education experiences as distance students themselves, and many were inspired by what their teachers had done. They had not taken part in professional development in distance teaching. The program Digital learning environments was necessary because it offered them networks of practitioners and research to support their teaching practises. The participating researchers suggested the Five Stage Model by Gilly Salmon (2013), and the groups used it as a basis to support digital competence and social relations early on in their courses.

Empirical material and ethical considerations

Focus group interviews with the teacher are the primary data analysed. Interviews with the teacher groups once a year during the R&D program (2019–2022) were conducted. In the first year (2019), the researchers (authors 1 & 2) visited the schools and interviewed the teachers at the schools. In the following years (2020 & 2021), interviews were conducted through Zoom. The number of participating teachers varied through the years, as shown in Table 1. Some teachers had left, and some new teachers joined the groups. In the first year, 28 teachers and three coordinators participated. In the two following years, there was a decrease in the number of teachers to 18. The drop was since School C did not participate in the 2020 interviews, and the following year the teachers in the group were reduced to four. Over the three years, 64 teachers and ten coordinators participated in the focus group interviews. We constructed a thematic interview guide that consisted of three sections 1) background, 2) reflection about the current situation 3) looking ahead. Depending on the theme they were working on, the focus shifted slightly during the interviews, especially in section 2. The interviews lasted for approximately 1 1/2 hours. The longest was 115 minutes, and the shortest lasted 53 minutes.

Table 1. * Interviews were conducted at the schools. ** Interviews were conducted via Zoom.

School	No. of teachers (T) and coordinator (C)						Subjects
	2019*		2020**		2021**		
	T	C	T	C	T	C	
A	7	0	6	0	6	0	Social science, Mathematics, Media studies, Science
B	6	1	7	1	3	1	Swedish, Mathematics,
C	10	0	0	0	4	0	English, History, Science, Mathematics, Social science
D	1	1	1	1	1	0	Swedish
E	2	1	2	1	2	1	Natural science, Modern languages
F	2	0	2	0	2	0	Psychiatry, Health and Social care
Total:	28	3	18	3	18	2	

All participants in the program signed an informed consent form to participate, and the materials they produced or collected about them were to be used for research purposes. The participants could retract their informed consent at any point. The data is analysed on a group level to avoid the identification of specific teachers. Even so, the program schools were public on the program web page and given the structure of the organisations, the schools can still be identified. The teachers shared their development processes in webinars that became public after the program, further complicating anonymization.

Analysis

The systematic analysis occurred during the Fall of 2021. The material was transcribed verbatim and read through as a whole. We removed information that could identify the schools or the teachers. All interviews were conducted in Swedish, and quotations used in the article were translated to English by the researchers. After the first reading, the Didaktik theory discussed above was decided upon as it allowed analysis on two interconnected levels (Jank & Meyer, 2006; Keiding, 2013). The *structural analysis* identified concerns in digital learning environments regarding content, intentions, methods, media, participants, and sociocultural contexts when teaching. The *factor analysis* identified possibilities and challenges with developing distance courses in digital learning environments, the importance of faculty support, and the teachers' workload. Normative and subjective factors were curriculum guidelines and previous subjective experiences among the teachers.

Findings

The following section presents excerpts from the data and answers the research questions of the study: *What didactical factors are highlighted by the teachers? How do the teachers didactically describe how they have developed their distance teaching? What needs to be considered when organising distance education on a structural and factor level?*

Conditional, professional, and normative factors were: *Digital technologies and faculty support as conditional factors, digital technologies as professional factors, and the curriculum as a normative guideline.* Structural factors were: *Content and timely digital communication, intentions and structures in digital learning environments, digital media, methods and intentions, participants' needs as distance students, and sociocultural contexts of the schools.*

Factor analysis

Digital technologies and faculty support as conditional factors

The digital technologies used for distance teaching were conditional factors for several reasons. Schools B and C developed asynchronous communication strategies with distance students (email, comments, chats). Schools A, D, E and F developed synchronous (videoconferences, onsite meetings) and asynchronous (email, comments, chats) communication with students. These developments on a structural level had bearings on an organisational level. The teacher groups expressed concerns about how time-consuming communication with students was. Their organisations did not recognize asynchronous communication outside class. These comparisons with onsite teaching were difficult as teachers did not have fixed class time when communicating with distance students. Some teachers answered emails and chats during their free time to keep up efficient communication with students when they needed to communicate with them. The teachers managed the time spent individually communicating with distance students after school hours. Some groups expressed a need for faculty decisions on time frames for communicating with students (for example, between hours 8–18). The flexible outlines of distance courses made the workload of the teacher unpredictable. Schools B and C decided that teachers should communicate each week with students, which was a significant development to lessen dropouts. It also created new digital administration as teachers had to follow up on the communication and keep track of students who replied and those who did not.

The digital platform allowed sharing and comparing of different teaching practises within the faculty. Teachers from schools B and C used the digital platform itslearning. They discussed course structure and communication on that platform with colleagues—new updates on itslearning created incentives for faculty discussions and didactical reflections.

Let us put it like this; we never saw any updates on our old digital platform. We can see that itslearning adds new functions. We might not be able to apply them all straight off, but we can tell that it creates discussions, like "have you seen this? How can we use this?" (Teacher from school B, first interview in 2019)

Faculty support was vital for developing teaching practises in digital learning environments. Organising distance courses meant that most teacher groups developed joint course outlines on the digital platform to make it coherent for the students. This process required the faculty to discuss several questions relating to course outlines to avoid, for example, chaotic course structures, complicated outlines or too many digital features. In school C, one of the teachers had time allocated to create introductory materials for itslearning that all teachers could use to let the other teachers focus on teaching their courses. Joint decisions on how to teach on the digital platform were perceived to reduce teacher workload and create better distance courses. The teacher groups generally described a lack of faculty discussions about digital platforms as problematic when developing digital courses.

Moreover, many things need to be implemented and established here. We are in the middle of implementing Microsoft Office 365, which we thought would be joint, collegial work, and now we have been told to watch instructional videos on our own. It will not be a joint work to develop courses according to what supports learning or building structures in courses. (Coordinator from school E, second interview in 2020)

Digital technologies as professional factors

The schools' digital platforms were considered professional factors as they prompted what the teachers could develop, how they communicated and how they structured their courses. Knowledge about digital platforms was professionally significant for teaching and developing the teaching practice.

We do not have professional training. When itslearning came, we had to learn how to use itslearning. Moreover, that became a start for us to find a joint vision of how to teach online. It is straggly but still more unified than when we were using Fronter. (Teacher from school B, first interview in 2019)

Distance teaching seems to require an initial focus on digital technologies before didactical questions come into the foreground. When the program started, many teachers were less focused on developing their digital competence and more on how to establish social relationships with distance students. Teachers new to distance teaching spent more time learning how to use digital technologies provided by the organisation. The teachers acknowledge that they were focusing on how to use digital technologies before they could professionally reflect on student learning on a structural level.

When you start working here, you know many new things to learn, professional training or competence development is needed even if you know some things. Now, it's not as important to know how I use the microphone or a specific technology. Instead, how do I reach the students when teaching at a distance? What kind of assignments are best? Or how do I engage them? (Teacher from school A, first interview in 2019)

Schools D, E and F offered synchronous courses in two locations meaning that the teachers could face issues with the digital infrastructure in the classrooms that they could not solve at a distance leading to feelings of frustration and unprofessionalism.

As a distance teacher, you can feel pretty unprofessional. And that is the worst feeling. You can have a good plan; you know how you want to execute it, and then you are stopped by, "oh, they can't see your shared screen because they have the wrong cable connected, and I can't see where the cable goes because I'm here." It's frustrating because you want to share your great ideas. However, it is something to work on. I believe it truly that open doors and open discussions will better the quality of our courses. It's what we should be known for. (Teacher from school D, first interview in 2019).

The R&D program provided research and collegial discussions for three years that affirmed what the teachers had struggled to verbalise before about teaching in digital learning environments. The teachers developed a professional capacity by combining their previous distance teaching experiences and research in distance education. They could discuss issues and possibilities professionally and felt empowered by this.

My most significant stress factor as a teacher has been students you can't reach. Students who fail and drop out are an ongoing frustration. I have gained much knowledge about how important social relations are, which means I have been able to give that my full attention without a guilty conscience and feel much more content as a teacher. (Teacher from school B, third interview in 2021)

The teachers deepened and nuanced how they expressed themselves about didactic considerations and technology used in the last interviews. An explorative way of using technologies was not predominant. The teachers reflected more about functions in the digital systems, how to teach on the digital platform and how it might affect the student's enrolment in the course. One teacher emphasised that she gained increased insight into the student's individual needs. The teachers made conscious didactic choices based on how the digital system worked and the effect a function might have on the students and teaching. In some cases, teachers started to override a function in itslearning where the students could automatically enrol in courses. The teachers in School C chose to enrol students manually after first contact. This way, they also established first contact with the student and from the start, they could build a stronger relationship.

The curriculum as a normative guideline

Many teachers referred to the curriculum when reflecting on their roles as distance teachers. In schools A, E and F, the curriculum was one reason to develop collaboration among students in their upper secondary programs to enhance social and collaborative skills necessary in a democratic society. The curriculum also stipulated specific knowledge requirements students were supposed to gain. The teachers reflected on ways to include collaboration in their courses and digitally assess student knowledge.

In religion, I test students on all knowledge requirements at least once, and they receive a kind of formative assessment, and at the end of the course, they write something I call a final exam. All knowledge requirements are tested in the final exam, including ethics, science, religion, and world religion. They turn it in either in written, oral, or video format. (Teacher from school A, third interview in 2021)

School C struggled with competition from other local adult education providers, and the teacher group expressed concerns about assessing students' content knowledge at a distance because of the demands in the curriculum. The teachers' professional values and the knowledge requirements stipulated in the curriculum clashed with the sociocultural realities of the school. It was challenging to demand onsite assessments when competitors offered students online assessment methods. It forced the teacher group to consider other options for assessment to attract students.

We still maintain that students must come to school for exams. However, other distance education providers in our municipality allow students to write tests and assignments at home. We lose quite a few students because of this; the students say, "thanks and goodbye!" and leave. Furthermore, that forces us to discuss what we demand compared to what the Swedish National Agency for Education³ expects us to teach and assess. What are our options to keep our students, and what can we expect of them? (Teacher from school C, third interview in 2021)

Structural analysis

Content and timely digital communication

The teacher groups reflected on the content they taught and communication with the support of the Five Stage Model developed by Gilly Salmon (2013). The model suggests that digital competence, communication with the teacher and students being at ease in the digital learning environment are basic requirements when starting a new course; otherwise, students may have difficulty studying the content. All five teacher groups described this as an essential part of their professional development process as they previously focused on immediately teaching content in courses.

I invite students to the lessons immediately to get a good start and ensure every student can get on with their courses. I am very quick in the chat; immediately, when I get a question, I answer it, just to establish a relationship in the beginning. I know that the questions will become less with time. Nevertheless, you need to be alert at the beginning of the course. (Teacher from school A, third interview in 2021)

During the last interview in 2021, teachers in School C reflected on how they, systematically and sustainably, could establish a way forward in their teaching, depending on their conditions and students. The group discussed how their teaching conditions change due to technologies being updated, replaced, and added to their working environment. Depending on the students, digital technologies used, subject and assignment, the teachers need to adjust their course and teaching. The teachers concluded that they tried things out and quickly adjusted the courses according to the student's needs. They learned while developing distance courses that there is not one solution but many different solutions. They expressed a need to find ways to do these changes more systematically and sustainably. It was a collaborative reflection in the teacher groups towards the end of the R&D program. They started to question structural and conditional factors and the need to develop didactic toolboxes for distance education. The focus kept shifting between factors like content, students, methods, digital media and contextual conditions, and the future of their distance education.

³ The Swedish National Agency for Education oversees the education systems in Sweden, prepares policy documents on, for example, knowledge requirements and visits schools to evaluate them. For more information see, <https://www.skolverket.se/andra-sprak-other-languages/english-engelska>

Intentions and structures in digital learning environments

The teacher groups expressed professional drawbacks of teaching distance courses online. According to them, uploading study materials to a digital platform was not teaching. They explained that actual teaching occurred in the relationship between teacher and student. Many teachers described it as challenging to identify knowledge gaps or misunderstandings among students at a distance. Following the students' course work asynchronously or synchronously became a conscious intention among many teachers during the program. The teacher groups reflected on becoming more visible and creating a sense of presence as teachers on digital platforms. At the same time, they transformed the intentions of the course into a digital platform to make them coherent for students. Two teachers from school A reflected on the intentions of distance teachers and course structures online:

T1: As a teacher in an onsite school, you plan for lessons every week. We must plan the whole module from the start. All parts need to be in place. The movie needs to be ready.

T2: It's not just one lesson a week; it's five lessons a week.

T1: I can use videos from YouTube, but you have an idea of what the students should learn, and it's important to plan. You need to think it through in detail. "Okay, what do I need to record? What kind of assignments do I need to create?" Then you need to consider how to evaluate so you don't get 15 000 pages from the students. (Two teachers from school A, second interview in 2020).

The teachers expressed a lack of spontaneity when teaching asynchronously, and their engagement was harder to convey digitally. During the program, some teachers started creating short introductory videos to welcome students to courses or to introduce new themes to the course. They realised that they could be less formal in the videos. The teachers accepted that the short videos might not be perfect, but they were good enough as complements to getting information across to students and establishing a casual relationship with them. Creating digital teaching content like videos meant the teachers produced them all through the courses. They adapted them to the different groups they taught and their intentions with different themes. Although the teachers felt the videos served didactic purposes, it was a time-consuming teaching method focused on content production rather than teaching content.

Nevertheless, creating digital material is ongoing all the time. It's not like you have a set of ready materials. You are never done. You need to add materials all the time. Make movies constantly. (Teacher from school B, first interview in 2019)

Digital media, methods, and intentions

During the R&D program, the teacher groups started to didactically reflect on their teaching methods, digital media, and intentions. They developed asynchronous digital feedback (video feedback) and intentional teacher-initiated communication (comments, chat sessions, video conferences) to follow the student's course work and, at the same time, maintain relationships with students. Before the program, many teachers had waited for the students to get in touch about their studies and inquiries. Now the teachers systematically contact the students. For example, school C had planned how and when they should contact the students in the first weeks of the course. It was also a development toward making them more visible as teachers on digital platforms.

The upper secondary school teachers wanted students to collaborate and considered what digital technologies they could use to support synchronous communication between students. Teachers from schools E and F also started considering asynchronous teaching methods.

We want to understand how to use asynchronous activities more. We feel it's tricky. How do you create practical asynchronous activities? Moreover, we have discussed that we want to continue reading Gilly Salmon's book and test a concrete asynchronous activity together. (Teacher from school E, second interview in 2020)

Many teachers began to reflect on why and how they used digital media during the R&D program. Their intentions varied depending on the functions of digital apps and the needs of the course participants.

The aims I had with using Padlet⁴ have been achieved sometimes, and sometimes it's gone completely wrong, which is also helpful to know. We became inspired to use Padlet from this program. I felt it was an excellent way to promote it to our faculty. Students who are quiet or do not dare to express much otherwise dare to write there. Sometimes they can write anonymously and sometimes use their names.

⁴ Padlet is an interactive discussion board where people can add content like questions or comments and other users can reply or add reactions. Padlet was used during the program several times to support collaboration between teacher groups during onsite and online seminars.

Sometimes they should comment on each other's posts. If I ask too complicated questions, the answers are too long, and no one reads them, so I have had to think about how to formulate myself. (Teacher from school F, second interview in 2020)

Participants' needs as distance students

The teachers spent most of the R&D program developing didactical methods to strengthen communication with distance students synchronously or asynchronously online. Through introductions, onsite or online the schools tried to learn more about the participants' backgrounds and interests. Most teachers developed asynchronous communication with students, which benefited all students, especially those who rarely spoke during synchronous lessons.

As a teacher, I have thought about communication via Teams; by chatting, I get in touch with students that usually are quiet in the classroom. They write to me much more now, and it's first, second and third-year students. Not just the students that had to do distance learning last Spring due to covid-19. (Teacher from school F, second interview in 2020)

The teacher groups grappled with getting to know participants' needs as distance students. The students represented a heterogeneous group. Some students had good study strategies and completed distance courses with little help from the teachers. Other students required more support from the teacher, but what kind of support was difficult to establish since these students often did not communicate with the teacher.

The spectrum of distance students is quite broad. Many are excellent distant learners, self-sufficient, and staying in touch with them through Skype⁵, writing or feedback works. However, we also have a group of students with whom it does not work and who do not want to apply for onsite courses. Moreover, I would like more tips on this. How can I improve my teaching practice to support these students? (Teacher from school C, first interview in 2019)

During the last interview in 2021, a teacher from School C said that she had changed her view of the students. Therefore, her teaching had changed. Before, she viewed students as self-sufficient persons who managed their studies independently, leading to many dropouts. Today she saw the students as persons with individual needs and therefore communicated differently and more frequently with these students. She, as a teacher, became more visible in distance courses. In turn, this has led to more students passing their courses.

In schools B and C, the covid-19 pandemic forced them to close onsite meeting opportunities for adult students. The teacher groups reflected on if onsite meetings were necessary. During the pandemic, they noticed a positive change in the distance students' digital competence due to prolonged emergency online courses. The teachers were inclined to adapt course introductions to student needs. They had started to use asynchronous assignments or synchronous online meetings depending on if the student started the course as planned or if the teachers had difficulties getting in touch with the student.

The sociocultural contexts of the schools

During all the group interviews, the teacher groups kept returning to questions relating to the sociocultural contexts of the schools. In school A, a school objective was to establish relationships with students and ensure students succeeded in finding their place in the world. The systematic work resulted in a change in the study culture among distance students. New students were introduced to student collaboration in different distance courses. Many students started showing up for synchronous lessons and actively participating in collaborative tasks when they realised it supported their studies. It was an important professional development for the teachers as they put a lot of time and effort into planning and supporting students during synchronous lessons.

Now that we have started a new school year, many students say, "no, I won't be able to attend lessons; I will do everything on my own". And then, when they have been in a few lessons, they say, "Can I change groups? I want to come to all of the lessons, but the lesson time does not work for me". And then we solve that. Perhaps they realised they had gained something from the lessons. I work a lot with group discussions and breakout rooms⁶. (Teacher from school A, third interview in 2021)

⁵ Skype is a video call and chat software that teachers from school C used for synchronous and individual supervision sessions with distance students.

⁶ Breakout rooms make it possible to invite participants during a video conference to separate synchronous sessions like small-group discussions.

Teachers from schools B, C and D explained that many students were unfamiliar with adult education and did not know what was expected of them. Many students had busy schedules that made them less interested in synchronous or onsite arrangements. The schools needed to support students individually for them to succeed and provide coherent digital course structures and flexible digital support. In a sense, the adult education providers were trying to develop individualistic school cultures in relation to adult students' expectations and the flexibility expected from them as digital adult education providers.

Perhaps we should invest in, from now on, to individualise distance education even more than we do today. Make a real effort to support each student so they can continue their studies. Moreover, we must share with all our colleagues how to structure courses clearly and remove excess content. Many students struggle with knowing what to do and what not to do. I see that in many of our courses. (Coordinator from school B, third interview in 2021)

Discussion

This study has investigated secondary and adult education teachers' perceptions of their digital teaching. Initially, the teachers struggled to establish themselves as distance teachers on digital platforms, which is not uncommon among distance teachers (cf., Baran et al., 2011). New communication strategies made them redefine their professional role as distance teachers. The teachers adapted their communication strategies to student needs and became more active with students. Most teachers developed diverse ways to communicate with distance students to establish social relationships and support students' studies. Most teachers also started using digital platforms and resources intentionally, realising that different platforms and resources could support different aims and intentions. They used faster asynchronous communication to answer questions from students (email, chat) and follow students' study processes (comments, video feedback). They included intentional synchronous communication (video calls, chat, interactive discussion boards) to support students' studies, address questions, and identify knowledge gaps among students.

Before the covid-19 pandemic, teachers often included onsite meetings to support distance students' study strategies and digital competence. During covid-19, onsite meetings were impossible, which prompted the teacher groups to question other ways to support students. In many cases, synchronous online meetings or introductory asynchronous assignments worked well. This study confirms that relevant and flexible use of synchronous and asynchronous communication can support teachers and students in distance courses (cf. Hrastinski, 2008; Watts, 2016).

Many teachers started creating digital content to structure courses better and establish social relationships with students. However, it required time and energy throughout the course, adding to the already heavy workload of most teachers. The workload associated with digital content production would be essential to address in distance organisations and future research. Digital content that can be re-used or updated automatically may reduce the distance teacher's workload by better using the digital learning environments (cf., Miyazoe & Anderson, 2010). However, more standardised content may conflict with the creativity and autonomy of teachers from a Didaktik perspective that requires them to reflect on the content, aims, methods, digital media, and participants (cf., Jank & Meyer, 2006; Keiding, 2013).

The digital teaching platforms (itslearning, Microsoft 365 and Teams, Google Classroom) were identified as organisational and professional factors; how the platforms were implemented within the faculty affected teachers' professional development and competence to teach online. This study suggests distance teachers require professional competence development that allows them to test different online teaching strategies and reflect didactically on possibilities and challenges with the digital platform, which is in line with previous research (cf. Baran et al., 2011; Bradshaw, 2002; Hicks, 2014). In this study, faculty discussions were fruitful ways to learn more about recent updates or new features of the digital platforms while effective instructional strategies and course structures could be discussed (cf., Anderson & Garrison, 1998; Miyazoe & Anderson, 2010). The curriculum was identified as a normative factor through the nationally stipulated assessment criteria. The teachers deemed these criteria challenging to assess online. The analysis suggests that distance teachers need a curriculum that acknowledges onsite and online knowledge assessments.

The R&D program supported a dynamic and non-linear process in line with Didaktik traditions that emphasise autonomous teachers considering different teaching factors in relation to the students (Hopmann, 2007; Jank & Meyer, 2006). Relevant research (cf. Salmon, 2013) confirmed aspects the teachers had previously felt were essential and challenged them to consider new teaching methods on digital platforms. The sociocultural contexts,

changes in the instructional practices and organisational visions of the schools had implications for some development work. One of the upper secondary online schools transformed an individualistic school culture into a more collaborative one by including more student collaboration in many courses. Two adult education providers identified sociocultural factors specific to them and worked towards individualistic school cultures to provide students with coherent course structures, individual support, and flexible studies.

The R&D program offered the teacher groups time to reflect on and develop distance teaching practises relevant to their contexts for three years, something previous research confirms is important (cf. Baran et al., 2011; Bradshaw, 2002; Hicks, 2014). The teachers were more inclined to address critical issues with school leaders, and they could also identify future issues. Flexible communication strategies were necessary for student retention and course completion rates during the program. However, asynchronous communication with students was time-consuming as it was hard to plan for and could take place after school hours. In most organisations, asynchronous communication was not perceived as important as synchronous communication in the classroom. An organisational factor that the teacher groups underlined was important to address. Previous research confirms that digital educational processes on the classroom level often become administrative processes that must be handled on organisation levels to address issues with, for example, teachers' workload (cf. Pettersson, 2021).

Limitations and future research

The Didaktik theory used in this study was developed for classroom teaching and during a period before digital media (Keiding, 2013). Digital media, communication and platforms would need to be added as conditional and structural factors to make the theory relevant in digitally networked distance education (cf. Miyazoe & Anderson, 2010; Watts, 2016). Digital platforms affected how the teachers structured content, designed assignments, and communicated with students. The theory (see figure 1) links many important factors when teaching. It helped identify normative, organisational, sociocultural, and subjective factors for teaching without creating rigid linearity or hierarchies. It proved crucial when analysing the data covering many aspects of distance teaching. As far as we know, research in distance education lacks Didaktik theories to analyse empirical material and professional development among teachers. Future research could evaluate the theory in different cultural and contextual (for example, primary school) settings. Teacher autonomy and conditions for teaching might be similar or different in other contexts.

Didaktik principles for distance education

This study suggests didactical principles to improve distance education quality based on the Didaktik-model (see figure 1), findings from this study and previous research.

The structural factors include student's digital competence and needs, course content, intentions, methods, digital media, interactions, and communication:

- Consider supporting distance students' digital competence and online study strategies
- Consider designing synchronous/asynchronous introductions for students to a) the digital platform(s), b) the course structure, c) the teacher(s)
- Consider relevant digital content and assessment methods (length of texts, audio files, video clips)
- Consider teacher visibility and activity (timely feedback, comments, responses) during courses
- Consider and plan for what, when and how communication between teacher and student occurs (frequency, form, media, mode)
- Consider using both synchronous and asynchronous interactions during courses
- Design for recurring student-content interactions
- Design for recurring student-student interactions if student collaboration is possible

The conditional factors include teachers' professional development, faculty support and organisational structure for distance education:

- Support teachers' didactical knowledge to structure distance courses
- Include recurring faculty discussions about distance teaching on the school's digital platform(s)
- Consider the workload of the teacher (communication strategies, administration)
- Provide coherent course outlines that support students' studies and reduce teachers' workload
- Consider the sociocultural context of the school (curriculum, policy documents, legal restrictions, visions and resources for distance education)
- Establish an online learning climate in the school that is open and responsive to participants' backgrounds, needs and expectations

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References:

- Anderson, T. (2003). Modes of interaction in distance education: Recent developments and research questions. In M. G. Moore, & W. G. Anderson (Eds.), *Handbook of distance education* (pp. 129-144). Lawrence Erlbaum Associates, Inc.
- Anderson, T. D., & Garrison, R. D. (1998). Learning in a networked world: New roles and responsibilities. In C. Gibson (Ed.), *Distance Learners in Higher Education* (pp. 97-112). Atwood Publishing.
- Anderson, T., & Shattuck, J. (2012). Design-based research: A decade of progress in education research? *Educational Researcher*, 41 (1), (pp. 16–25), <https://doi.org/10.3102/0013189X11428813>
- Arnold, K.-H., & Koch-Priewe, B. (2011). The Merging and the Future of Classical German Traditions in General Didactics. In B. Hudson & M. Meyer (Eds.), *Beyond Fragmentation: Didactics, Learning and Teaching in Europe* (pp. 252–264). Barbara Budrich Publishers.
- Barab, S., & Squire, K. (2004). Design-Based Research: Putting a Stake in the Ground, *Journal of the Learning Sciences*, 13:1, 1-14, https://doi.org/10.1207/s15327809jls1301_1
- Baran, E., Correia, A-P., & Thompson, A. (2011). Transforming online teaching practice: critical analysis of the literature on the roles and competencies of online teachers. *Distance Education*, 32 (3), 421–439, <https://doi.org/10.1080/01587919.2011.610293>
- Barbour, M. K., & Reeves, T. C. (2009). The reality of virtual schools: A review of the literature. *Computers & Education*, 52, 402–416. doi:10.1016/j.compedu.2008.09.009
- Bradshaw, L.K. (2002). Technology for Teaching and Learning: Strategies for Staff Development and Follow-Up Support. *Journal of Technology and Teacher Education*, 10 (1), 131-150. Retrieved June 24, 2022, from <https://www.learntechlib.org/primary/p/9307/>.
- Corry, M., Dardick, W., & Stella, J. An examination of dropout rates for Hispanic or Latino students enrolled in online K-12 schools. *Education and Information Technologies*, 22, 2001–2012 (2017). <https://doi.org/10.1007/s10639-016-9530-9>
- de la Varre, Irvin, M. J., Jordan, A. W., Hannum, W. H., & Farmer, T. W. (2014). Reasons for student dropout in an online course in a rural K–12 setting. *Distance Education*, 2014 Vol. 35, No. 3, 324–344, <http://dx.doi.org/10.1080/01587919.2015.955259>
- Guri-Rosenblit, S., & Gros, B. (2011). E-Learning: Confusing Terminology, Research Gaps and Inherent Challenges. *International Journal of E-Learning & Distance Education / Revue Internationale Du E-Learning Et La Formation à Distance*, 25(1). Retrieved from <https://www.ijede.ca/index.php/jde/article/view/729>
- Gündüz, B. (2011). *Das Hamburger Model* [The Hamburger Model]. Grin Verlag.
- Hopmann, S. (2007). Restrained teaching: The common core of Didaktik. *European Educational Research Journal*, 6(2),109–124. <https://doi.org/10.2304/eerj.2007.6.2.109>
- Hicks, M. (2014). Professional Development and Faculty Support. In O. Zawacki–Richter & T. Anderson (Eds.), *Online Distance Education. Towards a Research Agenda* (pp. 267–286). AU Press, Athabasca University.
- Hilli, C., & Åkerfeldt, A. (2020). Redesigning distance courses to support social and teaching presence in adult and upper secondary education. *Education in the North*, 27 (2), 38–55.
- Hrastinski, S. (2008). Asynchronous and synchronous e-learning: A Study of asynchronous and synchronous e-learning methods discovered that each supports different purposes. *EDUCAUSE Quarterly*, 31 (4), 51–55.
- Ifous (2022). *Digitala lärmiljöer. Likvärdig utbildning med fjärr- och distansundervisning. 2022:2 – Slutrapport från FoU-programmet DigiLi* [Digital learning environments. Equivalent education with remote and distance learning. 2022:2 - Final report from the R&D program DigiLi]. Åkerfeldt, (ed.). Ifous rapportserie 2022:2.
- Jank, W., & Meyer, H. (2006). *Didaktiske modeller. Grundbog i didaktik* [Didactic models. Handbook of Didaktik]. Hans Reitzels Forlag.
- Keiding, T. B. (2013). Læreteoretisk didaktik [Learning-theoretical Didaktik]. In A. Qvortrup & M. Wiberg (Eds.), *Læringsteori og didaktik* [Learning theory and Didaktik] (pp. 358–378). Hans Reitzels Forlag.
- Keiding, T. B., & Wiberg, M. (2013). Handlingsorienteret didaktik. In A. Qvortrup & M. Wiberg (Eds.), *Læringsteori og didaktik* [Learning theory and Didaktik] (pp. 337–357). Hans Reitzels Forlag.
- Klafki, W. (2010). Didaktik Analysis as the Core of Preparation of Instruction. In I. Westbury, S. Hopmann & K. Riquarts (Eds.) *Teaching as a Reflective Practice. The German Didaktik Tradition* (pp. 139–159). Routledge.
- Lindfors, M., & Pettersson, F. (2021). K–12 Students’ Experiences of the Synchronous Remote Teaching and Learning Environment. *Journal of Online Learning Research*, 7(3), 249-268.

- Miyazoe, T., & Anderson, T. (2010). The Interaction Equivalency Theorem. *Journal of Interactive Online Learning*, 9 (2), 94–104.
- Moore, M. (1989). Editorial: Three types of interaction. *The American Journal of Distance Education*, 3 (2), 1-7.
- Mor, Y., & Winters, N. (2007) Design approaches in technology-enhanced learning, *Interactive Learning Environments*, 15:1, 61-75, 10.1080/10494820601044236
- Pettersson, F. (2021). Understanding digitalization and educational change in school by means of activity theory and the levels of learning concept. *Education and Information Technologies* 26, 187–204. <https://doi.org/10.1007/s10639-020-10239-8>
- Salmon, G. (2013). E-tivities. *The key to active online learning. Second Edition*. Routledge.
- Tahirsylaj, S. (2019). Teacher autonomy and responsibility variation and association with student performance in Didaktik and curriculum traditions. *Journal of Curriculum Studies*, 50 (2), 162–184. <https://doi.org/10.1080/00220272.2018.1535667>
- The education act (2010). Skollag (2010:800). SFS 2021:452. Retrieved from: https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skollag-2010800_sfs-2010-800
- Uljens, M., & Ylimaki, R. (2017). *Bridging Educational Leadership, Curriculum Theory and Didaktik - Non-Affirmative Theory of Education*. Springer.
- Watts, L. (2016). Synchronous and Asynchronous Communication in Distance Learning. A Review of the Literature. *The Quarterly Review of Distance Education*, Volume 17 (1), 2016, 23–32.
- Åkerfeldt, A., & Hilli, C. (2021). Kollegialt lärande på distans – att dela erfarenheter och lära av varandra [Collegial learning at a distance – to share experiences and learn from each other]. In N. Rönström & O. Johansson (Eds.), *Att förbättra skolor med stöd i forskning. Exempel, analyser och utmaningar* [To improve schools with research. Examples, analyses and challenges], pp. 325–350. Natur & Kultur.