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## Teachers' perceptions about online teaching: Analysis of their experiences and opportunities for knowledge sharing

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### ABSTRACT

This study investigates teachers' experiences and perspectives on online education to enhance teachers' well-being across the globe. Through interviews and focus groups with university teachers, positive aspects such as increased efficiency and creative opportunities were found. Simultaneously, challenges of online teaching were identified, such as declining student engagement, shifts in teacher identity, and weakened informal connections with students. Job resources in online teaching include knowledge exchange, autonomy and support, whereas job demands encompass time constraints and students' dissatisfaction. Creating informal moments and establishing a knowledge-sharing infrastructure are conducive to teachers' well-being in online education.

### 1. Introduction

Education is increasingly offered online by universities worldwide to attract students for whom on-campus education is not feasible. Benefits of online education are that students can participate in educational activities from anywhere as long as they have a device that is connected to the internet (Means et al., 2013). The use of online and often asynchronous teaching activities can reduce access barriers by making education accessible for students from geographically diverse locations, for students for whom travel time or costs are a barrier, or for those who cannot commit to synchronous on-campus education due to their work schedules or personal circumstances such as illness and taking care of significant others (Paudel, 2021). Asynchronous learning involves learners independently interacting with course materials at their own pace, without the need for real-time engagement with a teacher or peers. Additionally, blended forms of education that combine online and on-campus education are increasingly embedded within academic curricula (Means et al., 2013).

However, online and blended education may entail challenges for teachers, such as technological barriers, insufficient online competencies of students and teachers, and academic dishonesty, such as unauthorized collaboration on take-home assessments (Paudel, 2021; Turnbull et al., 2021). Online teaching requires teachers to invest energy in the development of new skills and materials, in some cases without

receiving satisfying rewards in terms of student engagement, as teaching in an online context might weaken the connection teachers have with their students (Cutri & Mena, 2020; Klusmann et al., 2022).

Prior to the COVID-19 pandemic, online education was typically designed for smaller groups of students, such as part-time learners. Even then, educators faced challenges, particularly in adapting traditional teaching methods to the online format (Baran et al., 2011). This transition forced them to take on new roles and responsibilities (Adnan, 2018). Negative experiences, frequently derived from the time of the COVID-19 pandemic—during which teachers were forced to transition to online education without proper preparation (i.e., emergency remote teaching, Bond et al., 2021)—not only reflect the challenges that were present before COVID (Kebritchi et al., 2017), but also the exacerbated scale and urgency of those challenges during the pandemic. This rapid shift likely further reduced teachers' enthusiasm to teach online, as it amplified issues such as technological gaps, student engagement difficulties, and the need for quick adaptation (Klusmann et al., 2022). Additionally, the scale of online education expanded to reach a much larger and broader student population (Cutri & Mena, 2020).

In this large scale online educational setting, teachers' well-being may be challenged, particularly when the informal connection with students is weakened (Passey, 2021). Additionally, not feeling sufficiently competent to teach online may further reduce the motivation and well-being of teachers in the context of online education (Klusmann

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et al., 2022). Job resources, such as institutional and social support, might be able to buffer these effects (Karatuna et al., 2022; Kim et al., 2022). Furthermore, knowledge sharing might be strategy that can aid in fostering teachers' needs for competence, autonomy and relatedness in the context of online education (Hermansen, 2017; Ryminn et al., 2017).

Research on teachers' perspectives on online education is largely based on experiences before and during the COVID-19 pandemic (Sidi et al., 2023). While this provides valuable insights, there is a growing body of work examining teachers' experiences with online teaching in the post-pandemic context. These post-pandemic studies are important, as the motivations, preparation, and institutional support for online teaching in this period differ significantly from the emergency shift that occurred during COVID-19, or the smaller scale online teaching during the pre-COVID era. Before COVID-19, online education was primarily designed for smaller groups of students, such as part-time learners balancing work and study (Ortagus, 2017). During the pandemic, online education was an unexpected global transition without any preparation. Now, universities are thoughtfully designing courses for online or blended contexts, on an increasingly larger scale. Therefore, this study aims to develop an understanding of teachers' experiences and needs in the post-COVID era. This information is useful to adequately implement online and blended education while maintaining teachers' motivation and well-being. This includes identifying activities designed to foster connections between teachers and their students. In addition, we aim to explore skill development and knowledge sharing between teachers related to online teaching, as this might enhance both teachers' competence and their connection with peers (Ryminn et al., 2017).

## 2. Theoretical framework

Teacher well-being concerns the mental, social, and physical health of educators (Liang et al., 2022). It encompasses a healthy functioning at work as well as positive evaluations of the work environment. To investigate teachers' experiences in the online context, we draw on two theoretical frameworks: Job Demands-Resources model (JD-R; Bakker et al., 2014) model and Self-Determination Theory (SDT; Ryan & Deci, 2000). SDT is used as a valuable starting point that provides prerequisites for motivation and well-being. However, it does not fully encompass teachers' experiences in online education, as it does not sufficiently focus on contextual factors. The Job Demands-Resources model (JD-R) model is a valuable framework that does take these contextual factors into account (Granziera et al., 2021). By combining SDT and JD-R we use two theoretical lenses that complement each other, thereby providing a more complete picture of teacher well-being and motivation in online education. Furthermore, knowledge sharing might be a valuable solution for problems occurring in the realm of online education. Sharing knowledge can be viewed through the lenses of both SDT and the JD-R model. Here, knowledge sharing will be highlighted as a job resource (in JD-R) that can contribute to all three prerequisites of motivation and well-being according to SDT, namely competence, autonomy and relatedness (Ryan & Deci, 2000)

### 2.1. Self-determination theory

Self-determination theory (SDT) posits that motivation and subsequent well-being require three key prerequisites: (1) autonomy, (2) perceived competence, and (3) a sense of connectedness (Ryan & Deci, 2000; Passey, 2021; Fig. 1). All three of these prerequisites are challenged in the implementation of an online program as most teachers (1) did not autonomously choose to teach online, (2) do not feel sufficiently competent due to a lack of education in the use of effective pedagogy in the online setting, and (3) experience a loss of connection with both peers and students (Kim et al., 2022; Klusmann et al., 2022).

The first prerequisite is autonomy. While teachers often do not autonomously choose to teach online, they can be supported to make

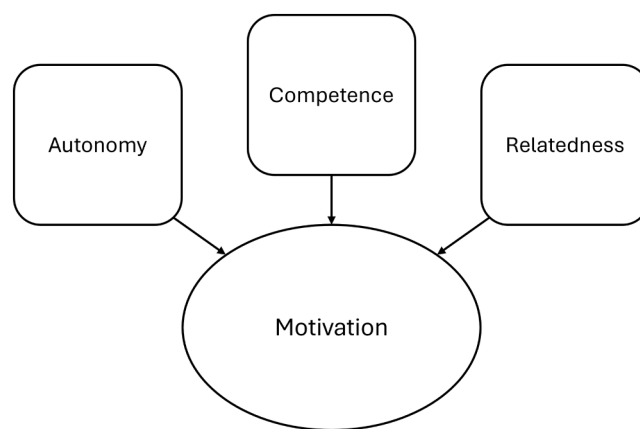


Fig. 1. Self-determination theory (SDT).

their own decisions about, for example, the instructional strategies and technologies that are used in their online curriculum (Kim et al., 2022). Competence is the second prerequisite for digital well-being, and is associated with self-efficacy, a personal job resource representing teachers' confidence in their own capabilities and expertise. (Corry & Stella, 2018). To enable teachers to increase their competence and their self-efficacy for online teaching, teachers need to have knowledge about technology, pedagogy, and the content they teach, and must be able to integrate their technological, content, and pedagogical knowledge to deliver the subject matter at hand effectively using the available technological tools (Niess, 2011).

The third prerequisite concerns relatedness. This encompasses feeling connected (to both students and colleagues), feeling cared for, and having a sense of belonging (Ryan & Deci, 2000). Online education may change or diminish the connection teachers have with their students for several reasons such as a decrease of informal moments in class and only seeing a small image of their students on the computer screen in an online lesson. Besides, online teaching has proven to be challenging in terms of monitoring student progress, student engagement, interaction with and between students, and creating a positive learning environment (Baroudi & Shaya, 2022; Ma et al., 2021). The three prerequisites derived from SDT aid in acquiring an understanding of teachers' experiences with and perspectives on online education. Moreover, exploring the online teaching activities that help online teachers connect to their students will provide insight into teachers' sense of relatedness.

### 2.2. JD-R model

The JD-R model posits that all jobs entail both job demands and job resources (Bakker et al., 2014; Fig. 2). Job demands are job aspects that require psychological, physical, or psychological energy or costs. In the context of online education, possible job demands entail workload, time pressure, a lack of (technological) knowledge, a distorted work-life balance, a lack of (informal) connections with students, the loss of an academic work environment and a change in teacher identity (Karatuna et al., 2022; Kim et al., 2022). In contrast, job resources are aspects of the job that allow employees to achieve goals, develop themselves professionally, and manage job demands. Job resources are further divided into work-related and personal resources. Work-related job resources in the context of online education include autonomy, coping strategies, technical support, institutional support, and knowledge sharing with colleagues (Granziera et al., 2021; Karatuna et al., 2022; Kim et al., 2022; Liang et al., 2022). A personal resource, also called psychological capital, is an individual characteristic that can increase well-being or alleviate job demands, such as self-efficacy (Bakker et al., 2014). The confidence teachers have in their own ability to complete

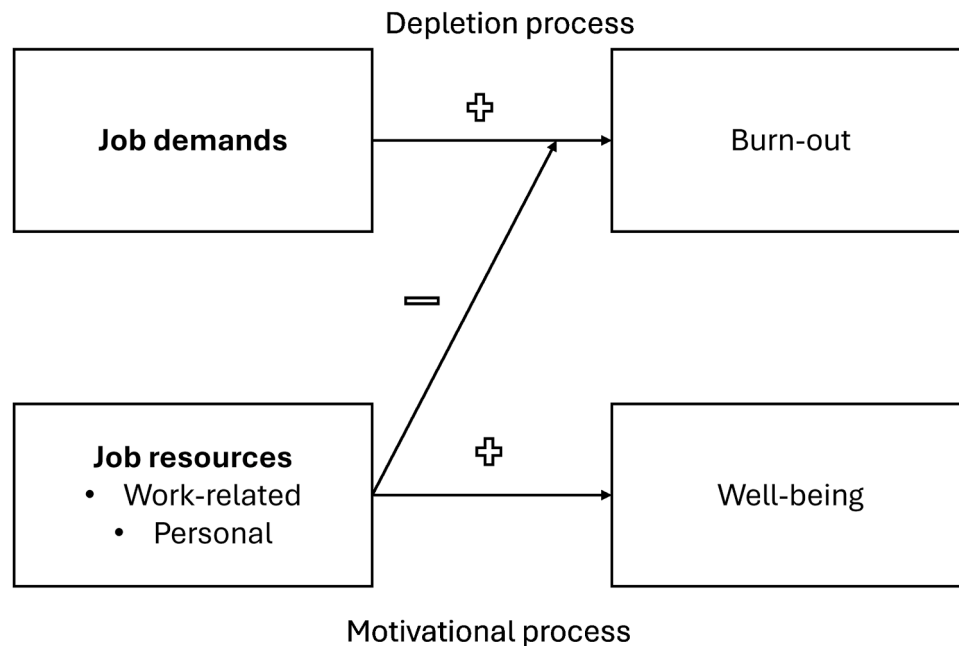


Fig. 2. Job demands-resources model (JD-R Model).

tasks or goals, in relation to their own job success and the academic success of their students, impacts how they experience online teaching (Corry & Stella, 2018; Liang et al., 2022).

Both job demands and job resources can influence well-being (Liang et al., 2022). Job demands can lead to decreased well-being through a depletion process. This suggests that these demands can precipitate burnout or exhaustion, subsequently resulting in a decline in overall well-being. Job resources can lead to increased well-being through a motivational process that fosters increased engagement, consequently elevating overall well-being (Bakker, 2015). Furthermore, job resources buffer against the negative impact of job demands (buffer-effect) and job demands can make the influence of job resources more important (salience-effect) (Bakker, 2015). When one possesses job resources, these can be strategically utilized to alleviate the pressure stemming from job demands. Hence, it is crucial to further identify the specific job demands and resources that emerge within the context of online education.

### 2.3. Knowledge sharing

Sharing knowledge can play a role in solving the problems that arise in the context of online education. This statement can be substantiated by the SDT and the JD-R model. Knowledge sharing may be part of social support from colleagues, and can therefore be seen as a job resource (Granziera et al., 2021). Furthermore, knowledge sharing may strengthen the personal job resource self-efficacy through four mechanisms. First, teachers gain more knowledge based on the successful experiences of peers with tools or activities. Second, teachers observe their peers effectively adapting to the online environment, which boosts their own confidence. Third, social support and positive feedback from colleagues, ensures that teachers believe in their own capacity to teach online. Fourth, knowledge sharing by itself leads to positive feelings in teachers, which in turn increases self-efficacy for online teaching (Liang et al., 2022).

Additionally, research suggests that - in addition to the above-mentioned improvements in perceived competence - knowledge sharing between teachers stimulates both relatedness and autonomy, the essential prerequisites of motivation according to the self-determination theory (Ryan & Deci, 2000; Ryminn et al., 2017). When teachers share knowledge with colleagues, this mitigates the sense of professional

isolation teachers might feel, especially in new endeavours such as online education. In addition, a positive environment in which knowledge can be shared and everyone is respected might further contribute to a sense of relatedness. However, it should be noted that cases of 'knowledge sabotage,' in which a teacher provides incorrect information or withholds critical knowledge, can hinder colleagues' performances (Perotti et al., 2022). In contrast, effective knowledge sharing can enhance the collective knowledge base among teachers, fostering a greater sense of shared competence and well-being (Ryminn et al., 2017). Additionally, knowledge sharing might foster autonomy. It enables teachers to choose between tools to utilize, thereby empowering them to make their own decisions (Hermansen, 2017). Thus, knowledge sharing is likely to increase teacher well-being by increasing their competency, their sense of relatedness and their perceived level of autonomy.

### 3. Research questions

In this study, we aim to understand how we can improve teachers' experiences with online education. Drawing from self-determination theory and the JD-R model, we posit that fostering relatedness and facilitating knowledge sharing are crucial elements in improving the well-being and motivation of teachers in an online environment. To explore this, the paper will address the subsequent questions:

1. What are teachers' experiences with and perspectives on online education?
2. Which online teaching activities help teachers connect with their students?
3. How do teachers currently share knowledge about online teaching with their peers?

### 4. Methods

To answer these research questions, we employed a qualitative approach in which we performed interviews and focus groups with university teachers. To explore teachers' experiences with online education (Research question 1) and knowledge sharing (Research question 3), we conducted four focus groups, each with five teachers. In total, 20 participants from seven departments, varying in gender and role, were

included. One focus group was online, and the others were in-person based on participant preferences (see 4.2 Focus groups). For Research question 2, interviews were conducted with 11 teachers: 7 from the faculty's online pre-master program and 4 from online programs in other faculties. Additionally, a secondary analysis of three interviews with teachers in a fully online program was performed (see 4.3 Interviews).

#### 4.1. Context

The university where this study has taken place has been developing a handful of fully online programs within several of its faculties. Within the faculty of the current study, a pre-master program developed an online variant that went partially live in the 2022–2023 academic year, with four online courses that were taught by instructors who were generally positive about online education. In the 2023–2024 academic year, the remaining eight courses were transitioned online. This study took place during the second half of the 2022–2023 academic year.

In preparation for the transition towards online education, workshops were conducted with the course directors in the spring of 2022. In these sessions, many of the course coordinators expressed concerns about their work enjoyment; they commonly described that they receive great satisfaction from physical education, which is diminished or eliminated in the online setting. They further described the loss of connection with their students and reduced educational efficacy because of their inability to observe classroom dynamics in the online setting.

For the online redesign of their courses, course directors were supported by a group of educational consultants who guided them through the process of instructional alignment in the context of online education. Online course materials that were developed primarily included video clips and self-study modules. Synchronous online teaching activities included tutor groups and online lectures. Online lectures were usually conducted fully online. Occasionally, hybrid lectures were used in which online students joined an on-campus lecture through a remote connection. Zoom licenses were provided by the university for synchronous teaching activities. Otherwise, teachers were free to use the tools they preferred; no guidance was provided herein by the university. Students could choose to complete their exams either on campus or online with proctoring. In both situations exams were done on a computer with digital exam software.

Within the school, all PhD students have teaching responsibilities for approximately 15 % of their time, usually in tutor groups (small-group sessions for students to digest the material). Dedicated tutors within the school have similar teaching responsibility as the PhD students, but on a full-time basis. Assistant, associate, and full professors are usually responsible for the coordination of one or more courses in one of the five programs the school offers. Usually, they also serve as lecturers and/or supervise tutor groups.

#### 4.2. Focus groups

To get insight into teachers' experiences with online education (Research question 1) and the way in which they share knowledge (Research question 3), we performed four focus groups of approximately 90 mins each with a diverse group of five teachers per focus group. Two focus groups consisted of only junior teachers (tutors and PhD students) and two focus groups consisted of only senior teachers (assistant, associate, and full professors), to ensure all teachers felt comfortable speaking freely. In each focus group, we ensured that participants varied in terms of department (seven in total), gender, and role. We aimed to recruit this purposeful sample using a combination of random selection of teachers from the faculty, after which snowball sampling was used to purposefully identify additional participants (i.e., participants have been asked to recommend other participants). Before the focus group sessions, participants were requested to express their viewpoints on online education. Consequently, this information was used to establish

groups with diverse perspectives, stimulating the conversation during the focus group.

One focus group was conducted online and three focus groups were conducted live on campus based on participants' preferences. An interview guide was used, which included questions about knowledge and skills as well as the hopes and fears teachers have regarding online education (Appendix A). To ensure participants could speak freely, the scheduling and communication regarding the focus groups have been conducted by a student assistant not affiliated with the faculty (JV). The focus groups were conducted by two educational psychologists (BBdK, MLN) who were also unaffiliated with the faculty and who had no relationship to the participants. Focus groups were recorded and transcribed (verbatim).

#### 4.3. Interviews

To obtain insight into activities and tools teachers use to foster a connection with their students (Research question 2), interviews were conducted with tutors and PhD students who had taught in purposefully designed online courses. Seven participants were teachers of the four courses of the faculty's pre-master program that went online in 2022–2023 (tutors and coordinators; one coordinator taught two courses). Additionally, four participants were teachers from two other faculties within the same university who taught in other online programs. Expert sampling was used, where the researchers contacted participants with specific expertise directly. Questions were mainly about online teaching activities that helped foster connection with students (Appendix B). Additionally, experiences with online education were discussed. The interviews were conducted online by a student assistant (JV) who had no relation to the participants, avoiding any hierarchical relationship between interviewer and interviewees. Interviews were recorded and transcribed (verbatim).

Additionally, a secondary analysis on three interviews conducted by educational advisors affiliated with the university was performed. The respondents of these interviews were four teachers from a fully online program within another faculty. Questions addressed their experiences with online education, required skills, social aspects of teaching online (based on social belonging), received and perceived support, and workload. Relevant sections were extracted from notes and recordings and shared for further analysis. The results from both sets of interviews, ours and those conducted independently, underwent analysis and coding.

#### 4.4. Analysis

Initially, transcripts and notes were coded deductively, using concepts from the literature, such as self-determination theory (autonomy, relatedness, competence), job demands and job resources, Technological Pedagogical Content Knowledge (TPACK), self-efficacy, institutional support and the (loss of) connection with students (engagement, interaction, classroom management, monitoring progress). After an initial round of coding, the codes were sorted into themes. Subthemes were merged and separated, in iterative cycles of coding and analysis. Results were summarized in figures, which were discussed and reflected on in weekly team meetings with the researchers (JV and WvD). Coding was conducted in Atlas.ti, without any automatization.

#### 4.5. Ethics

All participants provided informed consent for their participation in the study and the subsequent publication of their quotations. Before the research paper was submitted, participants were given the opportunity to review and validate the interpretation of their quotes.



## 5. Results

### 5.1. Demographics

We conducted 4 focus groups with an average duration of 86 mins ( $SD = 4.2$ ). Of the participants, 9 (53 %) were PhD students/tutors (53 %), 6 (35 %) assistant professors, and 2 (12 %) associate professors. Between 1 and 3 teachers from each of the 7 departments within the faculty participated. Of the participants, 6 (40 %) had a positive outlook on online education, 4 (27 %) were cautiously optimistic, and 5 (33 %) had a negative outlook (data on 2 participants missing).

We conducted 11 interviews with an average duration of 36 mins ( $SD = 8.7$ ) and analysed secondary data of 4 previously conducted interviews. Of the participants, 3 (21 %) were PhD students/tutors, 7 (50 %) assistant professors, and 4 (29 %) associate or full professors. The average age was 36 years (range 27–48) and 8 (57 %) were female. The median teaching experience was 12 years (range 1–22), while the median online teaching experience was 3 years (range 1–13).

### 5.2. General overview

In our focus groups and interviews, we identified positive and negative aspects of online education, specific skills needed to teach online, and job demands and job resources in effective online teaching (Research question 1, Fig. 3). The interviews also gave further insight into the tools and activities teachers use to transfer knowledge and to create or sustain an informal bond with students (Research question 2, Fig. 4). In the focus groups, we delved deeper into the knowledge sharing strategies, and the preconditions for these strategies to be employed (Research question 3, Fig. 5). Throughout the text, findings are illustrated by quotes.

### 5.3. What are teachers' experiences with and perspectives on online education? (Research question 1)

Five themes were identified for this research question: negative aspects, positive aspects, required skills and knowledge for online teaching, job demands, and job resources for teachers to teach online (Fig. 3).

#### 5.3.1. Negative aspects of online education

Online education has an impact on both teachers and students, both negatively and positively. Respondents in both the interviews and focus groups indicate that they experience, or fear, less energy and satisfaction, less informal connection with students and colleagues, less insight into student progress, and less engaged students. Teachers experience less engaged students, which makes forming an informal bond harder.

Furthermore, both less engagement and a weaker informal bond contribute to less energy and satisfaction. This is because teachers perceive a diminished responsiveness from students in response to their endeavours to cultivate stimulating lectures or tutorial groups. This is related to the depletion process, where job demands result in reduced well-being, as outlined in the JD-R model (Bakker et al., 2014), and to a decrease in feelings of relatedness, as explained by SDT theory (Ryan & Deci, 2000). The following citation illustrates the negative aspects of online education.

*"But you can't do it. They're all on mute. It's just not there. And when you do try to make it happen, it feels very forced, in my opinion. [...] Then I'm there with less energy and less motivation than I would like. So, I'm not the type of teacher I would like to be or the type I used to be enthusiastic about a few years ago as a teacher."* (Junior teacher, focus group 3)

In addition, teachers' responsibilities change in online education, as materials that were traditionally offered through (large-scale) lectures are now offered in short video clips and other online materials. This changes teachers' identities, both for lecturers and tutors, albeit in different ways. For tutors, they feel as if they are expected to answer questions students have based on the recorded lectures, in addition to the content of the tutor groups. This requires tutors to become more familiar with the content. When tutors are unfamiliar with this, it may reduce their sense of competence, which is a key aspect of motivation according to SDT theory (Ryan & Deci, 2000).

For lecturers, recording video clips changes the way in which they transfer their knowledge and enthusiasm. Because of this, the workload in preparing courses is also experienced as quite high (e.g., recording video clips), although this workload reduces during the course. The subsequent quote illustrates the workload teachers experience in preparing courses.

*"I think the workload is mainly in the preparation of the lessons [...] recording knowledge clips and all related matters, setting up, reorganizing your course, yes, that is always a significant workload. [...] It is a less pleasant workload because when you know you are going to see a group of students, you are automatically motivated to prepare. Whereas, yes, if you are recording videos, then you are a bit less... or at least I am a bit less motivated to do that."* (Respondent 4, Interviews)

Finally, negative aspects for students might become negative aspects for teachers. When students express their dissatisfaction with online education, this might diminish teachers' fulfilment. Students express their dissatisfaction concerning the inconsistency in the structure of online courses, strict rules and regulations for the exams, and a feeling of being treated unequally compared to students who receive their education on campus. For example, students indicate that they experience less support in online education as opposed to on-campus education. This disparity may lead teachers to feel that their ability to contribute to

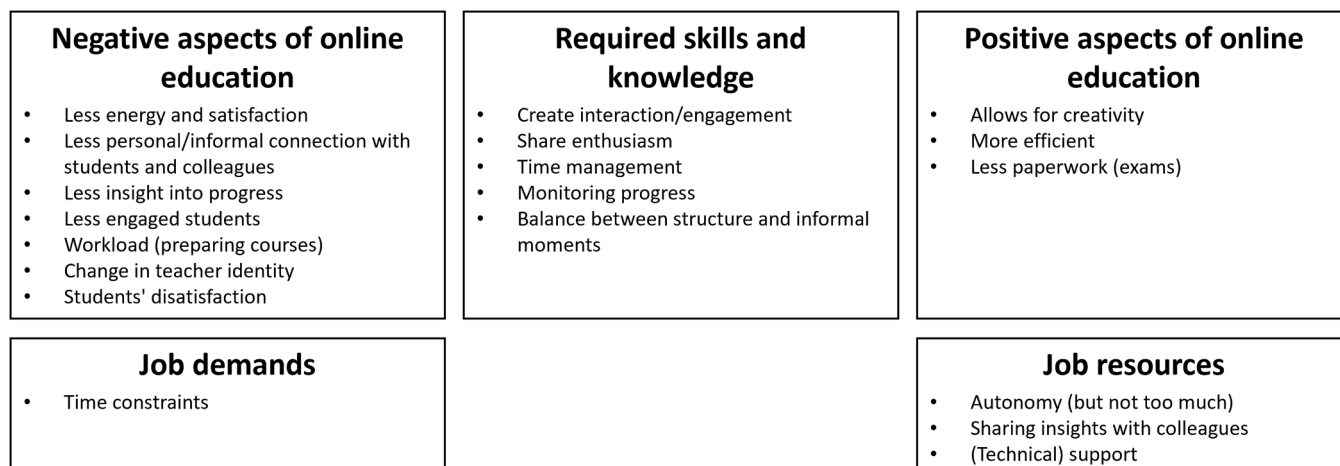


Fig. 3. Negative and positive aspects, required skills and knowledge, job demands and job resources.

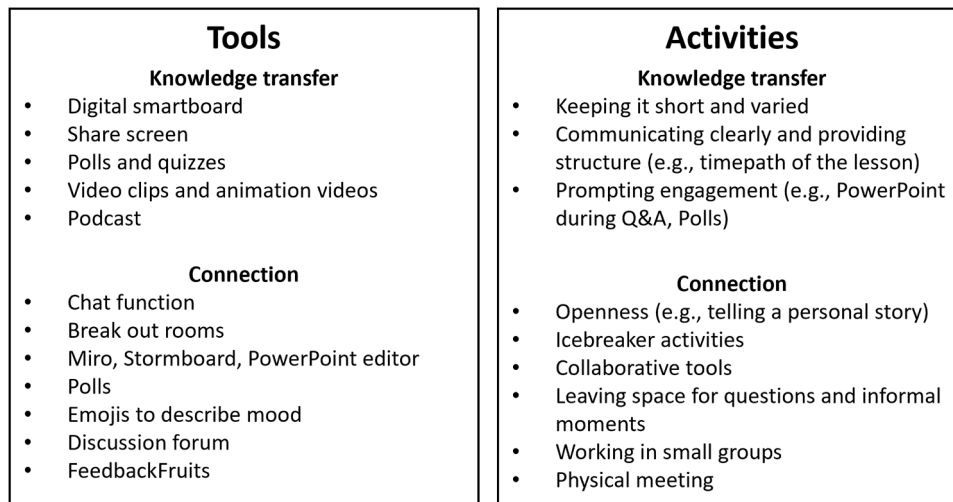


Fig. 4. Tools and activities.

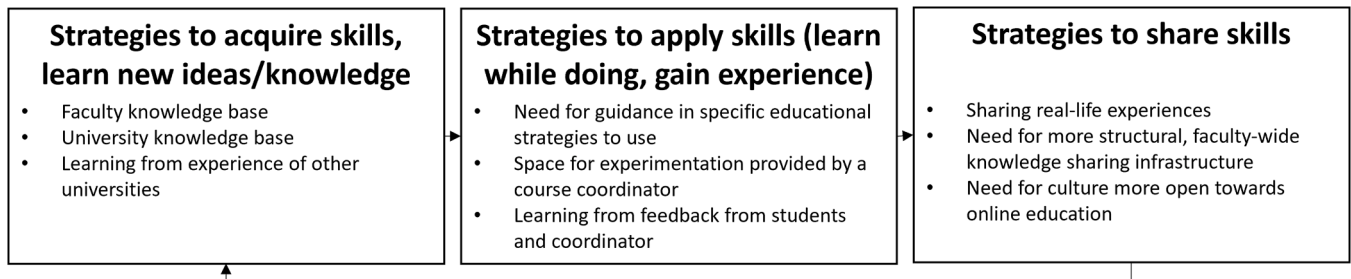


Fig. 5. Knowledge sharing.

their students’ knowledge is reduced in the online setting, challenging their self-efficacy and teacher identity. Another possible negative aspect for students is the loss of strong connections with peers and an academic community. Teachers are concerned about the potential decrease in students’ acquisition of soft skills in the context of online education. This is viewed unfavourably by teachers, as exemplified in instances of students adopting a more blunt communication style in their communication towards teachers. The subsequent citation illustrates the fear teachers have of losing an academic community.

“What I find even more challenging is conveying the tacit aspects, ways of doing things, and just being at a university in general. How do you do that? Can you do that online? A lot is lost in that sense online. [...] it’s different in interaction, but also in the whole atmosphere surrounding it.” (Senior teachers, focus group 2)

5.3.2. Positive aspects of online education

Teachers also reported positive aspects of online teaching. Teachers indicated that online education allows for creative thinking about alternative learning activities. Besides, online education was perceived to be more efficient compared to on-campus education, as less time is spent on informal interactions. Efficiency here refers to the smoother transmission of content with fewer informal disruptions, rather than a reduction in the time it takes to cover material or an increase in students’ learning speed. However, it should be noted that there is a trade-off between efficiency and creating informal connections with students during class as this lack of informal connections also has a negative impact on both students and teachers (see 4.3.1). This could potentially diminish motivation, as relatedness is a basic need for this according to SDT-theory (Ryan & Deci, 2000). A final positive aspect concerns less paperwork because of digital exams. The subsequent quote illustrates the trade-off between efficient knowledge transfer and the connection

with students in online education.

“[...] you can convey quite a lot of knowledge because there are fewer opportunities to go off on tangents [online]. When I teach in person, for example, I might spend the first 10 mins discussing the occupation of the university building by a protest movement. [...] So, that’s the positive side; you can indeed do a lot in terms of content, especially. [...] still paying attention to the well-being of students is important. I found that quite challenging as well. [...] we should have some awareness of the ambience, and in a digital environment, that’s just really difficult, you can’t really gauge it.” (Junior teachers, focus group 4)

Positive experiences of students (as perceived by teachers) also affect the well-being of teachers positively. These benefits concern the flexibility that online education offers, for example, by eliminating the time that is lost traveling to campus. Besides, the recording of lectures allows students to rewatch a lecture when something is not clear yet. It is emphasized that online education is especially efficient for small groups of students (e.g., thesis supervision), international students (as it allows them to participate remotely) and pre-master students as they are highly motivated to succeed.

5.3.3. Required skills and knowledge

Teachers are mostly in agreement that online teaching requires different skills and knowledge compared to physical teaching. In an online environment, teachers commonly mention the need to develop strategies for effectively creating interaction and engagement. Besides, teachers indicate that sharing enthusiasm is difficult in an online setting, but a crucial skill to facilitate the interaction and engagement. Being able to find a balance between structure and informal moments is a delicate but crucial skill in this matter. Teachers express a desire to attain educational objectives in an online environment while simultaneously ensuring the incorporation of adequate informal moments to

foster a meaningful connection with students. This informal connection with students is relevant to motivation, as it can be viewed both as a job resource that fosters motivation through a motivational process (JD-R model), and as a prerequisite for motivation (SDT theory).

Other skills needed include time management and progress monitoring. For example, deciding how much time is spent on working in groups in break-out rooms and a plenary discussion, while also ensuring enough time for informal moments. Monitoring progress is perceived to be harder in an online environment, because of the inability to visit every group in person. However, visiting break-out rooms seems to be a relatively decent solution to this problem. The following quote illustrates the difficulty teachers experience in facilitating interaction with students in an online environment.

*"[...] I usually rely so much on the interaction and how I let the group lead [...]. whether I go along with it [the group taking the lead] or lead the group. This can't be done easily online, I wouldn't know what to do if things don't go as planned. Whereas normally, I can adapt quite easily. And I don't feel like I have the skills to do that online."* (Junior teachers, focus group 4)

#### 5.3.4. Job demands

The main job demand teachers experience when teaching online is time constraints. There is limited time to think about the design of online lessons, to develop skills necessary for online teaching, and to share knowledge concerning online teaching. This job demand may thereby hinder relevant job resources (e.g., knowledge sharing) to promote motivation for online teaching.

#### 5.3.5. Job resources

Job resources that can enhance the experience of teachers who teach online, are autonomy, sharing insights with colleagues and (technical) support (e.g., by student assistants or educational consultants). Autonomy to adjust lessons is appreciated. However, too much autonomy is not appreciated, for example when lots of tips are given, without additional information on which tips to implement, how, and when. The following quote illustrates this.

*"Ironically, this [support] often results in more work for you, rather than them telling you exactly what to do; they usually say, "Here are the options, take a look." [...] it's almost never the case that someone genuinely takes work off your hands. Ideally, you'd like someone to take your script and say, "Can you look at this?" and actually edit it, but that doesn't happen."* (Respondent 10, Interviews).

Teachers experienced the current support they receive as mixed. They indicated they appreciate the support of student-assistants, for example in monitoring the chat during lectures, as long as they prove to be knowledgeable and helpful. Besides, student representatives can give a good insight into what is going on among students. Altogether, technical support and support from education consultants affiliated with the university is appreciated. However, additional support in the implementation of tips is desired, as is more professional help, for example in recording video clips. This would reduce the workload at the start of the course and enable teachers to think about other aspects of transferring their course to an online context.

### 5.4. Which online teaching activities help online teachers connect with their students? (Research question 2)

In addressing this research question, a distinction is made between tools and activities to connect with students (Fig. 4). Both were used for two distinct purposes: fostering a connection with students and transferring knowledge.

#### 5.4.1. Tools

Teachers mention tools and activities that either help to transfer knowledge, create a connection with students, or both. Tools that are primarily used to transfer knowledge in synchronous education, are a digital smart board, the 'share screen' function, polls, and quizzes. The

digital smartboard is used to display content that is normally displayed in the physical classroom, for example writing formulas. Polls and quizzes are used to test students' knowledge. Quizzes can both be used in synchronous and asynchronous activities.

Tools that primarily facilitate building a connection are the chat function, break-out rooms, collaborative platforms (Miro, Stormboard, PowerPoint Editor), polls and picking emojis to describe a mood. These tools concern synchronous education. The chat function and polls are often used to prime engagement, by asking students to leave an answer to a question in the chat or to vote on a poll. However, they can also be used to check whether students have understood the material. Break-out rooms are mainly used to facilitate discussions in smaller groups. The following quote portrays a positive experience with break-out rooms, in which students seem to be engaged in a group discussion.

*"I often have the situation where I come in, and it seems like they don't even realize I'm there. They just keep talking. [...] So, it flows very naturally."* (Respondent 7, Interviews)

Collaborative platforms such as Miro and Stormboard are primarily used to be able to track students' progress, and to create a feeling of connection by seeing everyone's cursor on the screen. Letting students pick an emoji to describe their mood is used to stimulate a feeling of connectedness with the teacher and other students.

Video clips, animation videos, and podcasts are tools used in asynchronous education. Video clips are the tool that is mentioned most often in asynchronous education. Experiences with video clips are overall positive. However, it is mentioned that the workload can be quite high when it comes to recording the clips. Besides, scripting the clips in a predetermined format (as suggested by the faculty management) is disliked by many teachers, because of the artificial nature of the clip when it is scripted. Animation videos and podcasts are not named as often as video clips. However, the experiences with those tools are also positive. The subsequent citation illustrates a positive experience with video clips.

*"[video clips] That's the only thing I think is really appreciated. So, short videos that contain the essence to explain things. It takes some time to film and write everything. But then you have something for the coming years."* (Respondent 9, Interviews)

Other tools that are used for asynchronous purposes are the learning management system Canvas and FeedbackFruits. Canvas is the learning management system that provides students access to course materials. FeedbackFruits is a tool to stimulate interaction with students and to provide feedback within articles. Experiences with FeedbackFruits are positive. On the other hand, experiences with the discussion board within the learning management system are mainly negative, due to a lack of student responses.

#### 5.4.2. Activities

Online activities that are short and varied to keep students engaged with the material are perceived as working best to transfer knowledge. Besides, communicating clearly and providing structure are essential, for example by providing a time path at the start of a lesson. Engagement can be prompted by using interactive elements, such as polls and showing a PowerPoint during synchronous online meetings where question can be asked to the teacher. This encourages students to ask questions about topics they might not feel knowledgeable about yet. The following quote clarifies the importance of providing structure for students.

*"For example, I indicated that we would spend 10 mins together online. [...] After that, you would go into a break-out room, and we would come back in so many minutes. [...] you can easily send a message to everyone via Zoom using such an option, saying you have 5 more minutes before the break-out room closes. I think this kind of communication is very helpful. It's also a part of managing expectations, of course."* (Respondent 8, Interviews)

Activities to create an informal connection with students include icebreaker activities, incidental in-person meetings, openness, collaborative tools, leaving space for questions and informal moments, and



working in small groups. It is often mentioned that an in-person meeting at the start of a program or course can help students to get to know each other, thereby already forming a bond, that can be strengthened more easily throughout the rest of the curriculum. Besides, icebreaker activities in the online tutor groups can help students get to know each other. Working in small groups seems to contribute to the connection between students as well.

Openness concerns teachers being open to forming an informal bond with their students, for example by telling a personal story. This is tightly connected to leaving the space for questions and informal moments. This implies not only being task-focused, but deliberately scheduling time to talk about informal matters. The collaborative tools that were mentioned earlier can also be perceived as an activity to create connection. This connection with students plays a key role in motivation, acting as both a supportive job resource that drives motivation (according to the JD-R model) and a foundational element of relatedness that fosters motivation (as outlined in SDT theory). The following quote underscores the recommendations for creating a bond with students in an online context.

*"I really just tried to make it super clear that I am happy to be contacted, I want to be contacted, like that is what I am here for. [...] And I also respond to them super quickly. Be really flexible about my schedule. [...] Then I also think just being open to the fact that sometimes you're also going to be talking to the void. Just sharing your experiences, and how you're feeling today, what you've been up to. [...] I think it's quite necessary in an online environment to open the floor and have students feel like they can do that."* (Respondent 6, Interviews)

#### 5.5. How do teachers currently share knowledge about online teaching with their peers? (Research question 3)

Four themes have been discerned in answering this research question: preconditions for knowledge sharing, strategies to acquire skills, strategies to apply skills, and strategies to share skills (Fig. 5).

Three steps were identified in the process of knowledge sharing: (1) learning, (2) applying, and (3) sharing knowledge. Strategies to acquire skills are not sufficient; there is also a need for space and time to apply and practice the skills, before they can be shared. In other words, teachers need to gain experience in applying learned skills to learn by doing – see one, do one, teach one. Teachers mention two preconditions to be able to learn, apply, and share skills. The first one is at the individual level, the second one is at the faculty level. The first precondition concerns the individual's willingness to learn, apply, and share skills. This can be intrinsic (e.g., an interest in online education), but it can also be influenced by the precondition at the faculty level, namely a positive climate that promotes online education and stimulates knowledge sharing in this area.

Currently, there is no elaborate formal knowledge sharing infrastructure, according to respondents of both the focus groups and the interviews. Teachers did not mention the increase in well-being from knowledge sharing through enhanced competence, relatedness, or autonomy, as suggested by SDT literature (Hermansen, 2017; Ryminn et al., 2017). However, teachers do share knowledge with direct colleagues in an informal way. Nevertheless, (desired) strategies to acquire, apply and share skills are mentioned. When it comes to acquiring knowledge and skills, the broad knowledge base within the university (e.g., through educational consultants) is appreciated. However, this knowledge base is not sufficiently tailored to the specific content. Teachers express that information at the faculty-level would alleviate this concern. Another suggested form of acquiring knowledge and skills concerning online teaching, is being more open to learning from other universities and borrowing online materials (e.g., video clips) from them.

Applying the acquired skills requires guidance in the specific educational strategies to use in online learning situations, instead of only providing information about the educational strategies, without support

in the implementation of the strategies. For example, many tips that are given do not explicitly mention how it can be implemented within a specific content area. Additionally, tutors mentioned that it's important for course coordinators to provide time and space for experimentation. The coordinators themselves felt like they did receive this room for experimentation in the design of their courses. Finally, it is mentioned that teachers learn by receiving feedback from students and the coordinator. They can then implement the feedback they receive in future lectures or tutorials.

A culture that is open towards knowledge sharing (e.g., being open to observe each other's lessons) was perceived to be particularly important to effectively share knowledge and skills. An effective strategy that is mentioned is sharing real-life experiences with one another. This is often done in an informal way, since there is no structural, formal faculty-wide knowledge sharing infrastructure. Examples include discussing how an online activity went during lunch break, working on a document with tips for online teaching together or sending each other an occasional e-mail. The subsequent quote illustrates this process of informal knowledge sharing, mainly when teachers encounter difficulties.

*"So it does happen indeed in a course, when you're teaching a course with multiple people. Then there is some exchange. But even then, people don't really attend each other's lectures... you might ask for advice on an exam question, or about a tutorial that isn't working well. But more when you encounter something that isn't working, rather than when everything went really well."* (Senior teachers, focus group 1)

The following quote illustrates the discomfort that might arise from the lack of a more structural knowledge sharing infrastructure.

*"[...] I sometimes hear someone from one section complaining, and someone from another section has the solution, but they don't know about each other. So, they are working on a solution to the same problem at the same time."* (Junior teachers, focus group 3)

## 6. Discussion

This study aimed to gain insight into teachers' experiences with, and perspectives on, online education. Furthermore, the study aimed to explore the methods utilized for sharing knowledge and the activities undertaken to establish connections with students. The findings reveal that teaching in an online environment requires different skills than teaching in a physical environment. Furthermore, positive experiences involve enhanced creativity and efficiency, whereas negative experiences encompass less engaged students, fewer informal connections with students and a change in teacher identity. It is likely that a change in teacher identity poses a central aspect, as it is linked to several other aspects, such as less engaged students. This requires teachers to dedicate energy to inspire students. Job resources include knowledge sharing with colleagues and perceived autonomy with adequate support. Job demands involve time constraints and students' dissatisfaction. Finally, tools and activities to promote a connection with students are identified.

The results of this study are in accordance with previous literature that shows that online teaching entails specific job demands (e.g., workload, lack of student engagement) and job resources (e.g., needed institutional support and sharing knowledge with colleagues) (Karatuna et al., 2022; Kim et al., 2022; Klusmann et al., 2022). It also corresponds with self-determination theory, which posits autonomy, relatedness, and competence as prerequisites for well-being (Ryan & Deci, 2000). Teachers indicate their need for space to experiment in an online setting (autonomy), for creating an informal bond with students (relatedness), and needing different skills in teaching online (competence). As expected, the main challenge is the development of skills at the intersection between content, technology, and pedagogy (Niess, 2011).

In line with prior research, teachers find it challenging to establish informal bonds with less engaged students, and they perceive a lack of responsiveness to their efforts in creating engaging lectures or tutorial groups (Klusmann et al., 2022). By sharing personal experiences and allocating sufficient time for informal interactions, teachers can create a

sense of community and stimulate student engagement. Additionally, our study identified that the skills and knowledge required for online teaching differ from those necessary for physical teaching. In an online environment, teachers face challenges related to creating interaction and engagement, time management, monitoring progress, and conveying their enthusiasm (Ma et al., 2021). Teachers encounter barriers in the form of time constraints and student dissatisfaction, which can impact their well-being and job satisfaction. However, autonomy, knowledge sharing with colleagues, and technical support serve as job resources for teaching in an online context (Karatuna et al., 2022; Kim et al., 2022).

This study also identified positive elements of online education, such as enhanced creativity and efficiency. This aligns with pre-COVID studies, which show possible positive elements such as an increase in student engagement in online settings (Dumford & Miller, 2018), better performing students in fully online settings (Means et al., 2013), and increased efficiency in delivering education and optimizing the use of space (Bakia et al., 2012). However, the positive elements contrast with mid- and post-COVID studies, which have mostly identified negative experiences, such as uncertainty about the future and worries of students' and colleagues' health as burdens on teachers online teaching experiences (Kim et al., 2022). One plausible explanation for this disparity is that the courses examined in this study are intentionally designed for online delivery, in contrast to the emergency, pandemic-driven transition to online teaching during COVID. Interestingly, previous research highlights other stressors than those mentioned in the current study, such as an imbalanced work-life equilibrium (Karatuna et al., 2022; Kim et al., 2022). A possible rationale for no mention of this factor might be the fact that this was not explicitly asked, or that there are sufficient support mechanisms to ensure a healthy work-life balance. This matter may have become more prominent amid the pandemic, as school closures led to children staying at home.

Additionally, autonomy is considered a job resource in previous research (Liang et al., 2022). However, in the current study we show that autonomy might become a job demand when educators feel that they do not have the competency (yet) to autonomously apply strategies to improve their online teaching. In such cases, autonomy requires additional psychological, emotional, or physical effort to independently figure out how, and in which context, to apply certain teaching strategies. This suggests that teachers require substantial institutional support to feel assured in their ability to exercise autonomy and utilize it freely.

This study also investigated how knowledge regarding online teaching can be disseminated. First, there is a need for a positive climate and the willingness to share knowledge within the faculty. Furthermore, acquiring and sharing knowledge on three levels is discernable: among universities, within the university, and within the faculty. Strategies to apply knowledge encompass tailoring the knowledge from the two higher levels to faculty-level to ensure the applicability of the knowledge. Sharing knowledge can be achieved through the exchange of real-life experiences with colleagues. Facilitating a knowledge sharing structure will require work (e.g., creating a positive climate, willingness), but is expected to contribute to well-being (Klusmann et al., 2022).

This study is subject to limitations related to its external validity and the potential for response bias. First, the focus groups were exclusively conducted within a single faculty, potentially constraining the generalizability of the findings. Furthermore, the data was collected exclusively from teachers' perspectives, meaning the perspective of students is not represented. As a result, student achievements and experiences were not addressed, and terms like "increased efficiency" can only be interpreted from the teachers' point of view. Nonetheless, it is noteworthy that the respondents exhibited diversity in terms of gender, roles, and department. Additionally, the interviews encompassed a heterogeneous group of teachers, representing various faculties.

Second, there exists a potential for response bias because the principal investigator (WKvD) is affiliated with the faculty this study focused

on (and participants were aware of this researcher's involvement), which may have influenced respondents' answers. However, it is important to highlight that interviews and focus groups were conducted by researchers and a student-assistant who have no affiliation with the faculty, thereby mitigating the potential for response bias. Furthermore, teachers were critical of online education, indicating their willingness to share their honest opinions.

A final limitation is that solely qualitative data were collected. Nevertheless, the qualitative methodologies employed proved effective in obtaining a thorough understanding of experiences with online education in a non-COVID setting. This study is an important foundation for future research and can serve as a reference for teachers worldwide involved in developing online courses.

The integration of two theories, SDT and the JD-R model, allowed us to yield a more profound understanding of teachers' experiences and provided a more comprehensive overview of the potential challenges associated with online education. The incorporation of SDT, the JD-R model, and findings from the interviews and focus groups have provided themes that can be expanded upon in further research. Additionally, practitioners can utilize these models as reference points to inform their strategies in the realm of online education. Specifically, these models can assist in identifying the challenges teachers encounter, facilitating the implementation of targeted interventions to address these challenges. Practical recommendations to enhancing the overall experience for teachers working in an online environment include purposefully allocating time for informal moments, and the establishment of a knowledge-sharing infrastructure is essential. While recognizing the inevitability of certain job demands, it is feasible to supply ample job resources to buffer the impact of these demands on well-being (Bakker, 2015).

In conclusion, this study sheds light on several aspects related to teachers' motivation and well-being in online education: their hopes and fears, knowledge dissemination and fostering a connection with students in an online environment. This study provides novel insights by examining these aspects during a time of large-scale, intentionally designed courses, in contrast to pre-COVID teaching, when online teaching was primarily aimed at very specific and small-scale student groups, and mid-COVID teaching, when online activities were primarily driven by emergency measures. This study highlights the importance of informal connections with students, developing skills necessary for online teaching, sharing educational knowledge, and receiving sufficient autonomy and support. Furthermore, the study underscores the significance of providing teachers with the space and incentives to experiment, even within the constraints of time pressure. A formal infrastructure for effectively acquiring, applying, and sharing knowledge will likely support teachers' readiness to teach online and foster a culture with a positive perspective on online education.

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#### CRedit authorship contribution statement

**Jamie Verstraeten:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Annemieke van Dongen-Leunis:** Writing – review & editing, Methodology, Conceptualization. **Renee Scheepers:** Writing – review & editing, Methodology, Conceptualization. **Marloes L. Nederhand:** Writing – review & editing, Methodology, Investigation. **Bjorn B. de Koning:** Writing – review & editing, Methodology, Investigation. **Welmoed K. van Deen:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization.

## Declaration of competing interest

AvDL and WvD served as the program coordinator and the online coordinator, respectively, of the pre-master program described in the current study. JV, RS, MLN and BBdK have no conflicts of interest to declare. None of the authors have financial or non-financial relationships with the companies providing online learning tools described in the current study.

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## Supplementary materials

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