

Teacher Educators' Self-Efficacy Beliefs During The COVID-19 Pandemic

Eva Naomi Beumer (6940943)

1st assessor: Dr. Despoina Georgiou

2nd assessor: Dr. Barbara Flunger

Utrecht University

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Abstract

Due to COVID-19 lockdowns, academic institutions had to shut down and offer alternatives to support students' learning adequately. The sudden change from face-to-face to online teaching, referred to as emergency remote teaching (ERT), caught most teachers unprepared. This study examines teacher educators' self-efficacy beliefs about the immediate switch to ERT. By investigating the self-efficacy of teacher educators using questionnaires and interviews, we adhere to the need for research within this target group. We deployed a mixed-methods design to shed light on teacher educators' self-efficacy beliefs towards ERT and online teaching through surveys and interviews. Results show that teacher educators experience online instructional strategies as effective. However, teacher educators believe they can less effectively engage students and manage their classrooms in an online environment. When teacher educators and universities are aware of this, support and guidelines can help in minimising this struggle. No significant differences were found between novice and expert teachers, implying that the two identified groups do not differ in their perceived self-efficacy during the COVID-19 lockdowns. This research suggests that novice teachers are ICT proficient and, therefore, can effortlessly teach online while expert teachers can easily switch to new circumstances. Directions for future research are given.

Keywords: teacher educators, COVID-19, emergency remote teaching, online teaching, self-efficacy

Teacher Educators' Self-Efficacy Beliefs During The COVID-19 Pandemic

In March 2020, schools and educational institutions closed worldwide due to the COVID-19 pandemic, impacting over 80% of the student population (UNESCO, 2020). Because of the lockdown, many institutions moved to online education almost overnight. Face-to-face education in lecture halls and classrooms turned into recorded lectures or video calls on various online platforms (e.g. Zoom, MS Teams, Google Meets) (Rapanta et al., 2020). The speed of these closures and the rapid move to online education allowed little time for developing, planning, or reflecting on the risks and benefits of online education (Winthrop, 2020). Flores and Swennen (2020) stated that an instant adaptation is needed to become part of this new reality. This sudden shift to online education, which was fostered due to the pandemic, is known as 'emergency remote teaching' (ERT) (Hodges et al., 2020).

Planning, preparing, and developing a course usually takes nine to six months (Hodges et al., 2020). The urgent move to online learning has "added to the stress and workload experiences by university faculty and staff (...), not to mention work-life balance" (Rapanta et al., 2020, p. 924). Teachers of all ages and backgrounds suddenly had to "prepare and deliver their classes from home, with all the practical and technical challenges this entails, and often without proper technical support" (Hodges et al. 2020). Online teaching differs from face-to-face education as it involves various tools, resources, pedagogical approaches, roles, forms of interaction, monitoring, and support (Rapanta et al., 2020). The role of teachers switched from knowledge transfer to facilitating students' learning environment instead (Chigeza & Halbert, 2014; Carrillo & Flores, 2020). Within all these different aspects, the capacity for shifting the time and place of interaction (Anderson, 2011, p. 344) requires teachers to be flexible. Teachers' lack of experience in online learning and the complex environment at home are difficulties associated with the COVID-19 lockdown. Furthermore, lack of support (Judd et

al., 2020) and issues regarding teachers' digital instructional competencies (Huber & Helm, 2020) have been identified (Carrillo & Flores, 2020). As a result of the rapid change, support focused on the technological tools available to make the switch quickly (Rapanta et al., 2020) rather than developing online education deliberately. Teachers' factors (such as beliefs and attitudes) towards this sudden change have not been investigated yet. Also, the literature lacks an exploration of teachers' self-efficacy beliefs towards successful adaptation to this new reality.

Self-efficacy beliefs develop in response to four sources of information: mastery experiences, vicarious experiences, verbal persuasion, and psychological and affective states (Bandura, 1977). Since the aforementioned components of self-efficacy are relatively broad in this study, we will focus on teacher educators' self-efficacy and their ICT efficacy. Teacher educators are underrepresented in the literature, but they play an essential role in the current society as they educate future teachers. Teacher educators "are responsible for the initial and ongoing education of pre-service teachers" (Georgiou et al., 2020, p.2). In other words, teacher educators have a direct influence on the quality of education. So, it is crucial to know how teacher educators experience self-efficacy in times of the pandemic to ultimately act on it and provide the support or help they need.

Since the literature on teacher educators lacks, the terms teacher self-efficacy and teacher ICT self-efficacy are used retrospectively to refer to teacher *educator* self-efficacy and teacher *educator* ICT efficacy. Thus, this study sheds light on teacher *educators'* self-efficacy beliefs to create a knowledge base for further supporting teacher educators' professional development training targeting online teaching and ERT. Online education is currently of lesser quality (Daumiller et al., 2021), and student motivation is low (Wang et al., 2020). Exploring teacher educators' self-efficacy beliefs may benefit pre-service teachers since better teaching quality leads to better students' performance (Darling-Hammond &

Hylar, 2000). Moreover, this leads to better quality teachers since these students ultimately become teachers themselves (Lunenberg et al., 2007; Snoek et al., 2011). Additionally, universities gain an understanding of current teacher educators' self-efficacy and can provide guidance and supervision to enhance self-efficacy when this is low.

Theoretical Framework

Ross (1994) states that teachers (and thus, teacher educators) develop an overall stable set of core beliefs about their abilities as their teaching experience grows. However, new challenges can re-evaluate their self-efficacy (Haverback, 2020). When the task is seen as routine, the efficacy is based on memories of that task and how well it was executed (Tschannen-Moran et al., 1998). When teachers do not have prior experience with the task, they cannot rely on their routines, and their self-efficacy might decrease as a result. Therefore, the COVID-19 pandemic created a "situation in which usually efficacious teacher educators may not feel efficacious now" (Haverback, 2020, p. 3). Thus, we hypothesise that teacher educators' self-efficacy decreased as a result of ERT.

Teacher Educators' Self-Efficacy

Teachers (and thus, teacher educators) are usually more comfortable teaching online by the second or third course repetition (Hodges et al., 2020). The first time teacher educators experience the challenges of online education, their feeling of competency might be unbalanced. Self-efficacy is "people's judgements of their capabilities to organise and execute courses of action required to attain designated types of performance" (Bandura, 1986, p. 391). Following Bandura's line on reasoning, teacher educators' self-efficacy can be translated as judgement one holds about their capability to bring about desired learning outcomes, even with unmotivated students (Pfitzner-Eden, 2016). Teacher educators' self-efficacy relates to

instructional behaviour (Alt, 2018) and student achievement because it affects teachers' behaviour and strategies to create learning environments (Galvez et al., 2018). The level of competency teacher educators perceive determines how they interact with colleagues and students, their level of creativity and their effort to achieve good results (Caprara et al., 2003; Caprara et al., 2006; Egido et al., 2018; Guskey & Passaro, 1994). Self-efficacy, therefore, influences teacher educators' belief about their capability of executing their work.

Results of High Teacher Educators' Self-Efficacy

Teacher educators with high self-efficacy invest in teaching, are more positive and responsive to students, enhance positive classroom environments, and set high goals for themselves (Alt, 2018; Miller et al., 2017; Tschannen-Moran & Hoy, 2001). Additionally, studies show that teachers' self-efficacy is associated with persistence in performing teaching activities, supporting their students and improving student learning, the degree of involvement with others (Egido Galvez et al., 2018; Ross, 1994), the openness to new ideas, and willingness to experiment with new methods to better meet the needs of students (Alt, 2018; Tschannen-Moran & Hoy, 2001). Tschannen-Moran et al. (1998) make a clear distinction between self-perception of competence and the actual level of competence. This relates to Bandura, who states that "self-doubts can easily overrule the best of skills" (1977, p. 35). Professional self-efficacy beliefs reflect a long-life process that is not static but rather a continuous development (Klassen & Chiu, 2010).

Aspects of Teacher Educators' Self-Efficacy

Tschannen-Moran and Hoy (2001) identified three concepts that determine teacher (and thus teacher educators) self-efficacy: instructional strategies, classroom management, and student engagement. Instructional strategies compose of beliefs about different strategies to enhance learning. For example, using various assessments, asking good questions,

responding to difficult questions, gauging student comprehension, adjusting the curriculum to students' abilities and providing examples (Tschannen-Moran & Hoy, 2001). Beliefs about classroom management determine how a teacher can control disruptive behaviour, get students to follow class rules, can establish routines to keep activities running smoothly, and calm students when necessary (Tschannen-Moran & Hoy, 2001). Student engagement consists of beliefs about motivating students. For example, letting students believe they can do well, helping students value learning, and helping students think critically and creatively.

Teacher Educators' ICT Efficacy

Yesilyurt et al. (2016) showed a positive impact of teacher self-efficacy and ICT self-efficacy on their attitude towards applying computer-supported education. They state that developing positive attitudes towards online education is vital to make its use relevant for professional practice. Concerning its practical application, teacher educators need high levels of ICT self-efficacy. Teacher educators with high ICT self-efficacy perceive themselves as able to access and use ICT systems and have greater confidence about their abilities to use these to strengthen their teaching activities (Compeau & Higgins, 1995). Compeau and Higgins (1995) evolved Bandura's self-efficacy theory in the computer context (Mtebe, 2020). They defined *ICT self-efficacy* as the belief to use a computer in the accomplishment of the task. This perception of belief develops in response to three sources of information: encouragement by others, computer support, and encouragement for usage.

Present Study

Understanding teacher educators' self-efficacy and ICT efficacy towards emergency remote teaching are imperative for practice and research. University structures and policymakers can adjust curricula and offer professional training to support teachers' skills

and competencies. By measuring teacher educators' self-efficacy quantitatively (research questions 1a and 2a) and exploring it qualitatively (research questions 1 and 2), we gain an in-depth understanding of the concept. Thus, we propose the following research questions:

1. To what extent teacher educators feel able to apply instructional strategies, manage their classrooms effectively, and foster student engagement in online environments?
 - a. Is there a significant difference in self-efficacy beliefs of novice and experienced teacher educators about instructional strategies, classroom management, and student engagement in online environments?
2. To what extent teacher educators feel able to incorporate ICT tools to foster student learning in online environments?
 - a. Is there a significant difference between novices and expert teacher educators to ICT implementation in online environments?

Method

This study used a mixed-method approach to give an in-depth insight into how the COVID-19 situation impacts self-efficacy. Teacher educators' self-efficacy and teacher educators' ICT efficacy were measured using several research instruments and additional interviews. Research questions 1 and 2 were answered qualitatively by conducting and analysing interviews. Moreover, research questions 1a and 2a were answered quantitatively by analysing questionnaire data. A combination of interview and questionnaires enrich understanding the development and maintenance of teacher educators' sense of efficacy (Hipp & Bredesqn, 1995; Rosenholtz, 1987; Webb, 1987; Tschannen-Moran & Hoy, 1998).

Participants

Beforehand, this study intended to have at least 132 respondents determined by the G*Power Analysis (Faul et al., 2007; 2009). A total sample of $N = 44$ participants completed

the questionnaire (12 male, 32 female). The sample included teacher educators from the Netherlands ($n=42$), Germany ($n=1$), and Switzerland ($n=1$). The majority of respondents had a Dutch nationality, so only Dutch participants were included in the final sample. Additionally, two participants did not meet the sample criteria; these cases were deleted, remaining 40 participants (see Table 1). A total of 75 respondents entered the survey, and 44 completed it (59% response rate). We use the following levels of expertise: ten years or less experience as a teacher educator (24 participants) and ten years or more (16 participants). This study intended to conduct up to 10 additional interviews (Hennink et al., 2016) to better understand teacher educators' self-perceived abilities to their teaching practices during the pandemic. However, four interviews were held due to a lower response rate.

Table 1*Demographic Data*

Characteristics	Total (N=40)	%
Gender		
Male	12	30
Female	28	70
Other	0	0
Age		
20-30 years old	3	8
31-40 years old	13	33
41-50 years old	14	35
51-60 years old	8	20
61+	2	5
Years of experience		
Ten years or less	24	60
Ten years or more	16	40
Current student population		
First year students (higher education)	31	78

Characteristics	Total (N=40)	%
Second year students (higher education)	28	70
Third year students (higher education)	27	68
Fourth year students (higher education)	30	75
First year master students	7	18
Second year master students	5	13
Post graduate degree students	7	18
Other	1	2
Working hours		
1 day a week	1	3
2 days a week	1	3
3 days a week	6	15
4 days a week	19	48
5 days a week	9	23
Other/prefer not to say	4	10

Procedure

This study followed a mixed-method approach with a quantitative and a qualitative part. In the quantitative study, we conducted an online survey to collect data. In the follow-up interview study, we held online interviews to gain an in-depth understanding of teacher educators' self-efficacy. Two instruments were used to measure teacher educators' self-efficacy beliefs quantitatively, the Teacher Self-Efficacy Scale (TSES) (Tscannen-Moran & Hoy, 2001) and the Teachers' ICT Efficacy scale (Vanderlinde & van Braak, 2010). Data were collected in March 2020 using the online platform Qualtrics. Participants were randomly recruited via social media platforms, university newsletters, and e-mails to Dutch and German universities. A reminder was sent after two weeks. On the first page of the survey, participants' informed consent (Appendix B) was provided.

Responses regarding teacher educators' self-efficacy and ICT tools were assessed using a five-point Likert scale ranging from 1: *not at all* to 5: *very much*. At the end of the

questionnaire, respondents were asked whether they would be willing to participate in an additional interview. Eight participants indicated their willingness. Four participants replied when they were invited for the interview. Additional interviews were held online using Microsoft Teams. Information letters and informed consent forms (appendix C and D) were sent beforehand and sent back signed. The interviews lasted approximately 30 minutes. Participants were asked about their experiences with teaching online during the COVID-19 pandemic and the effects on teacher educators' self-efficacy and ICT efficacy. The interviews were audio-recorded and transcribed for further analysis.

Instruments

Teacher Educators' Self-Efficacy

The Teacher Self-Efficacy Scale (TSES) (Tschannen-Moran & Hoy, 2001) consists of 24 statements in which respondents need to answer the most suitable option. To our knowledge, there is no scale available specified at teacher educators. This is why the current study used the TSES. Minor modifications were made to specify the statements to emergency remote teaching by adding the words 'during online education...' and changing the word 'pupil' to 'student'. The TSES is often used when examining teacher self-efficacy and is "superior to previous measures of teacher efficacy" (Hoy & Spero, 2005, p. 354) because it closely aligns with self-efficacy theory in general. For example, Klassen et al. (2009) found reliabilities from .71 to .94 in five countries and significant relationships between the subscales. Wolters and Daugherty (2007) reported Cronbach's alpha coefficients above .80 and an adequate fit, $\chi^2(13, N = 512) = 35.12$, CFI = .98, NFI = .96, TLI = .96, RMSEA = .06. The TSES measured three factors: student engagement (i.e. To what extent can you use a variety of assessment strategies?), instructional practices (i.e. How much can you do to control disruptive behaviour in the classroom?), and classroom management (i.e. How much

can you do to get students to believe they can do well in schoolwork?). Participants answered how much this statement applied to them with a 5-point Likert scale ranging from 1: *not at all* to 5: *very much*.

Teacher Educators' ICT Efficacy

Vanderlinde and van Braak (2010) designed this five-item scale to measure teachers' competency and ability beliefs towards using ICT in their classrooms. Teachers reported their level of agreement to the following five statements: 1) I have sufficient technical knowledge and skills to use ICT in the classroom; 2) I can easily fix technical problems when being confronted with them; 3) I have sufficient organizational skills to integrate ICT in my classroom; 4) I have sufficient background to use ICT in my classroom for instructional purposes; and 5) I have shortcomings to use ICT in a pedagogical and didactical way. The scale ranged from 1 (*completely disagree*) to 5 (*completely agree*).

Interviews

In the semi-structured interviews, participants were asked questions to gain in-depth knowledge of the concept of self-efficacy to answer research questions 1 and 2. The original interview guide included five main questions developed by Rapanta et al. (2020): 1) In what aspects do you think online learning design and delivery is different from face-to-face teaching and learning? 2) What do you think makes online teaching and learning successful? 3) What would you say to non-expert colleagues who follow a materials-based approach to online teaching, e.g. sharing materials with students or asking them to produce materials? 4) What would you say to colleagues who follow an ICT tools-based approach to online teaching, i.e. the idea that tools such as videoconferencing or text-based discussion boards are the key features of online learning? 5) What are some effective ways of monitoring students'

engagement and learning during online courses? How can they inform assessment? The interview guide is first pilot tested with three people to ensure its validity and reliability. After which a few questions were added to enhance grasping teacher educators' self-efficacy as a whole. During the pilot study, questions 3 and 4 by Rapanta et al. (2020) were deemed too complex and were replaced by the open question: 'what do you think is the best way to shape online education?' Questions about instructional strategies, classroom management and student engagement were added to ensure we gained an in-depth understanding of the self-efficacy concept (e.g. how do instructional strategies differ in online education compared to face-to-face education? How does classroom management differ in online education in comparison to face-to-face education? How does student engagement differ in online education in comparison to face-to-face education?). We included the final interview guide (Appendix A) to maximize dependability. An additional master student recoded 30% of the data to ensure inter-rater reliability and credibility; no notable differences were found.

Data Analysis

Descriptive statistics were calculated using SPSS to answer research questions 1 and 2. Means and standard deviations were calculated to summarize the sample. The interviews further supplemented the findings and were analysed using Applied Thematic Analysis (Guest et al., 2012). Applied Thematic Analysis identifies key themes in transcripts, which are transformed into codes and a codebook. Identifying key themes enhances the opportunity to capture the complexity of different meanings (Guest et al., 2012). Initial codes were based on participants' actual words. We paid attention to feelings participants have about their abilities, teaching, transitioning to online education, and using ICT resources. Similar phrases were assigned to the same categories. When initial categories were too general or broad, these were

split between two smaller categories (Guberman & McDossi, 2019). After final codes were determined, key themes were identified.

We returned to the dataset to compare initial themes against the data. After reviewing all codes and themes, a few adaptations were made. The initial theme 'assessment' was deemed a better fit for 'best practices', instead of having its own theme. This, because all interviewees talked about how to best conduct assessments during the pandemic. The student experiences mentioned in the interviews are all positive ones. So, these are filed under 'positive experiences'. One participant mentioned adaptation of the lecture duration. The participant cut lectures short due to student concentration. This originally had its own theme but was filed under 'differences' because the different length was chosen in response to the new situation. 'Differences' and 'difficulties' were taken apart because not all mentioned differences were difficulties. In some interviewees' answers, participants stated that the current situation is different from face-to-face education, but not that they experienced difficulties with these differences. While in other statements, it became clear they were facing difficulties because they explicitly mentioned this with the words 'difficult', 'problem', or 'hard'. 'Limit live information provision' was initially coded as 'lessons learned', but is also mentioned as a 'best practice'. This is solved by coding all fragments where participants state they want to limit live information provision in the future as 'blended/hybrid'.

For sub-questions 1a and 2a, a one-way ANOVA was performed using SPSS (Version 26) to determine if novice and expert teacher educators significantly differ on the aspects of teacher educator self-efficacy as dependent variables (e.g. instructional strategies, classroom management, and student engagement). After checking the assumptions for normality, the variable levels, the sphericity assumption, and dependability, the F-value was computed. When assumptions for normality were not met, the non-parametric Kruskal-Wallis test was conducted.

Results

Even though the used instruments were validated and reliable, we administered a reliability analysis. Internal consistency was conducted using Cronbach's alpha. The total questionnaire has an excellent internal consistency (for 29 items; $\alpha = .93$). The constructs showed good internal consistency for instructional strategies (8 items; $\alpha = .84$), classroom management (8 items; $\alpha = .88$), student engagement (8 items; $\alpha = .86$), and ICT tools (5 items; $\alpha = .88$).

Research Question 1 and 2

After cleaning the data (e.g. removing missing data, deleting participants outside the sample), and computing mean and sum variables, descriptives (see Table 2) were computed to answer research questions 1 and 2. The qualitative interview data were used to supplement the quantitative data. The total amount of teacher educators averaged a mean of 27 ($SD=4.50$) on self-efficacy. After analysing the interviews using thematic analysis, eight themes were identified: differences, lessons learned, best practises, difficulties, positive aspects, feeling confident, organisational, and teacher educators' knowledge and skills (see Appendix E for the themes and their descriptions).

Table 2

Descriptives of the Different Aspects of Teacher Educators' Self-Efficacy

Different aspects	<i>N</i>	Min	Max	Mean	<i>SD</i>
Teacher Self-Efficacy					
Instructional strategies	40	16	36	26.63	4.83
Classroom management	40	17	40	27.53	5.4
Student engagement	40	15	25	23.80	5.12
ICT self-efficacy	40	5	38	18.40	3.91

Instructional Strategies

For instructional strategies, 39% of the participants chose 'a lot' as the answer representing their feeling most (Table 3). Just 2% answered 'none at all'. During the interviews, participants mention that instructional strategies online are not significantly different than during face-to-face education. They all feel that they can effectively teach their students the content. One participant mentions:

Uh, well, I do believe I can apply that [instructional strategies] effectively. Still, I think I can improve there. Uh, because well.. no one is perfect and online I really haven't done everything possible yet. But I do feel like what I am doing online is effective. I am lucky to be quite ICT proficient so that removes a lot of limitations: in the freedom of choice you have and the application of various didactic skills, models and so on. Uh, so no. Actually, I do not experience any difficulties.

Another participant mentioned something similar:

Uh, yes. Well, I do believe I can. That based on my story and instructions I give... if the preparation is thorough enough, I can connect with my students. Well, then it will be possible to apply those instruction strategies well and make sure that it comes across. If I check for understanding.. that'll work. (...) I have that much confidence in that now, so can say that I do that well.

Another participant also felt quite confident about their instructional strategies:

I find that my students really acquired their skills after a day of training them.. and we do that in a certain way and they are very active and they practice and do well. And they manage to do that at the end of the day, so I do believe that they've learned something during that that day.

Table 3*Frequencies and Percentages for Instructional Strategies*

Single items	(1) None at all (%)	(2) A little (%)	(3) A moderate amount (%)	(4) a lot (%)	(5) a great deal (%)	<i>M</i>	<i>SD</i>
To what extent can you use a variety of assessment strategies?	0 (0%)	7 (18%)	18 (45%)	13 (33%)	2 (5%)	3.25	.81
To what extent can you provide an alternative explanation for example when students are confused?	0 (0%)	2 (5%)	13 (33%)	18 (45%)	7 (18%)	3.75	.81
To what extent can you craft good questions for your students?	0 (0%)	3 (8%)	9 (23%)	21 (53%)	7 (18%)	3.8	.82
How well can you implement alternative strategies in your classroom?	1 (3%)	10 (25%)	15 (38%)	13 (33%)	1 (3%)	3.08	.89
How well can you respond to difficult questions from your students?	0 (0%)	4 (10%)	6 (15%)	23 (58%)	7 (18%)	3.83	.84
How much can you do to adjust your lessons to the proper level for individual students?	2 (5%)	8 (20%)	15 (38%)	12 (30%)	3 (8%)	3.15	1.0
To what extent can you gauge student comprehension of what you have taught?	1 (3%)	18 (45%)	7 (18%)	14 (35%)	0 (0%)	2.85	.95
How well can you provide appropriate challenges for very capable students?	1 (3%)	14 (35%)	13 (33%)	11 (28%)	1 (3%)	2.93	.92
Total	7 (2%)	67 (24%)	74 (26%)	108 (39%)	24 (9%)		

Classroom Management

For classroom management (Table 4), 42 % of the participants indicated 'a lot' as their answer. Only 1% of the participants indicated 'none at all'. In the interviews, participants indicated some troubles with classroom management as they feel less able to manage their classroom online. One participant stated:

Uh, it's very tricky. It helps if you set rules in advance. And at the same time be understanding. That story from those cameras, that keeps coming back. That's the biggest thing. Turn on the camera and your microphone and say something when you're being spoken to. And well... I notice that.. that works. But at the same time, it is also very important to be understanding if it does not happen.

Another participant says something similar when asked about their beliefs about classroom management:

Online? Well, bad. I don't see anything. The group... is way too big. I don't see them all. If I also want to share a PowerPoint, I certainly don't see the group. So in that sense... I find that a really difficult aspect of it. A small group is fine. But once I get more than.... 4 people [laughs]... It'll get complicated. (...) It's a very different kind of interaction. Let's say you have a face-to-face group of 40 or so. Then you can go and walk around. And very quickly, you'll pick things up. Well, you can't do that now. (...) And, uh.. for example, if I have divided them into breakout rooms and someone has a question, then I can only explain that to them and then no one else hears that. Whereas, that's what happens when you're in class. Then you can say, "Hey guys, pay attention. This may be unclear, but it's this and that." And you can't do that now.

Table 4*Frequencies and Percentages for Classroom Management*

Single items	(1) None at all	(2) A little	(3) A moderate amount	(4) a lot	(5) a great deal	M	SD
How much can you do to control disruptive behaviour in the classroom?	2 (5%)	10 (25%)	9 (23%)	14 (35%)	5 (13%)	3.25	1.13
How much can you do to get children to follow classroom rules?	1 (3%)	8 (20%)	9 (23%)	19 (48%)	3 (8%)	3.38	.98
How much can you do to calm a student who is disruptive or noisy?	0 (0%)	5 (13%)	12 (30%)	19 (48%)	4 (10%)	3.55	.85
How well can you establish a classroom management system with each group of students?	0 (0%)	7 (18%)	17 (43%)	13 (33%)	3 (8%)	3.30	.85
How well can you keep a few problem students from ruining an entire lesson?	0 (0%)	6 (15%)	11 (38%)	17 (43%)	6 (15%)	3.58	.93
How well can you respond to defiant students?	0 (0%)	9 (23%)	17 (43%)	12 (30%)	2 (5%)	3.18	.84
To what extent can you make your expectation clear about student behaviour?	0 (0%)	2 (5%)	9 (23%)	24 (60%)	5 (13%)	3.80	.72
How well can you establish routines to keep activities running smoothly?	1 (0%)	5 (13%)	12 (30%)	17 (43%)	5 (13%)	3.50	.96
Total (%)	2 (1%)	47 (15%)	103 (32%)	135 (42%)	33 (10%)		

Student Engagement

For student engagement (Table 5), 42% indicated 'a moderate amount' as their answer. Here, 'none at all' is 12%, by far the highest number across the different constructs.

During an interview, a participant indicated (s)he can easily engage students:

I think that's very easily manageable. A) by providing relevant content, also what I just mentioned: if you come in as a student and you get an hour just sending, transmitting, that's.. well.. That doesn't motivate, I've noticed. (...) But also make it clear in advance: what are we going to do? So that you tell your class "okay guys, here's what we're going to do, this is how we're going to do it" so as a student, you can come and get through our lecture with that information. You also increase the involvement in my opinion because the people who are attending (...), the people who attend, they attend and they know what they are going to do and I try to make it so that it is also relevant. And sometimes I pose the question: "what do you want to do?"

Another participant is less confident about student engagement. When asking to what extent the participant believes they can effectively promote student engagement, (s)he answered as follows:

Not [laughs]. That involvement, yes that's really hard. I think it's a really difficult thing. Yes.... I don't think there's an egg of Columbus to fix this. So well, I just have to accept that that involvement is lower this year. And well, it's impossible for me to do door-to-door visits and say "why weren't you in class?". I can't, they live way too scattered for that.

Table 5*Frequencies and Percentages for Student Engagement*

Single items	(1) None at all	(2) A little	(3) A moderate amount	(4) a lot	(5) a great deal	<i>M</i>	<i>SD</i>
How much can you do to get students to believe they can do well in schoolwork?	0 (0%)	5 (13%)	16 (40%)	14 (35%)	5 (13%)	3.48	.88
How much can you do to help your students value learning?	1 (0%)	5 (13%)	19 (48%)	11 (28%)	4 (10%)	3.30	.91
How much can you do to motivate students who show low interest in schoolwork?	2 (5%)	14 (35%)	18 (45%)	6 (15%)	0 (0%)	2.70	.79
How much can you assist families in helping their children do well in school?	26 (65%)	3 (8%)	8 (20%)	2 (5%)	1 (3%)	1.73	1.11
How much can you do to improve the understanding of a student who is failing?	0 (0%)	7 (18%)	17 (43%)	13 (33%)	3 (8%)	3.30	.85
How much can you do to help your students think critically?	1 (3%)	2 (5%)	19 (48%)	14 (35%)	4 (10%)	3.45	.85
How much can you do to foster student creativity?	2 (5%)	7 (18%)	19 (48%)	9 (23%)	3 (8%)	3.10	.96
How much can you do to get through to the most difficult students?	1 (3%)	15 (38%)	18 (45%)	5 (13%)	1 (3%)	2.75	.81
Total	33 (12%)	53 (19%)	118 (42%)	60 (21%)	16 (6%)		

Another participant mentions struggles with student engagement because most students turn off their cameras and do not respond during online sessions:

I notice that communication is sometimes a bit more difficult than in online variants. It's harder to interact, especially when the cameras are all off. In a large class that is really difficult, then you ask a question and then it just depends on: well, is there someone who wants to say something for that large group? In a classroom I can scan the room: make contact, eye contact, small non-verbal communication that.. well.. that falls away when you are looking at a black screen.

In conclusion, student engagement is perceived as challenging, but providing the lesson's rationale helps to engage students.

ICT tools

For ICT tools (Table 6), 54% of the participants indicated 'somewhat agree' as the most suitable answer. Participants indicated that they had learned a lot during emergency remote teaching. They switched from giving knowledge during live sessions to recording lectures for knowledge transfer and knowledge application during a live tutorial session. One participant mentioned a difference between online and face-to-face education:

As a teacher, you need to realize that online education is really different from physical. So you're not just going to preach. And besides, I don't think you should do that in physical education, but you often see that, that's the tendency, to give a lot of information. I notice that online education offers many opportunities to do -that information provision- at a different time so that you can really focus on interaction in such a live moment.

One participant stated that (s)he is ICT proficient and that influences the tools (s)he uses:

I am lucky to be quite ICT proficient. So that removes a lot of limitations, so to speak, in the freedom of choice you have and the application of various didactic skills, models and so on. (...) Look, what online education at least needs is working equipment, which I think is a precondition. Uh, it's got to be in order. The teacher in general must also be able to operate that equipment. That is also what you hear from students, when there are lectures of lesser quality, then nine times out of ten times, it is due to teachers having problems with hosting a presentation or showing a video. Those issues are also very annoying in the classroom, but you can pick up a little more effectively in a classroom. So it's also about making the teacher proficient in that regard.

Another participant mentions an improved infrastructure due to the necessity to move online:

What is also nice is, because we switched to online education, the infrastructure has improved a lot at of a sudden. So, where you experienced some problems first, like: 'how are we going to develop this? How are we going to do this now? How do you record things? How do you share things?'. It's much easier now, it's much better now.

One participant says teacher educators should follow all innovations closely and experiment with them:

Uh.. variety.. Yes definitely the variety. I would certainly follow all the current innovations. So really follow them closely. And also try not to be too uptight and think 'I always work with Teams so I won't use anything else'.

Table 6*Frequencies and Percentages for ICT Tools*

Single items	(1) comple tely disagre e	(2) somewh at disagree	(3) disagree nor agree	(4) somewhat agree	(5) comple tely agree	<i>M</i>	<i>SD</i>
I have sufficient technical knowledge and skills to use ICT in classroom	1 (3%)	4 (10%)	6 (15%)	21 (53%)	8 (20%)	3.78	.97
I can easily fix technical problems when being confronted with it	3 (8%)	5 (13%)	5 (13%)	22 (55%)	5 (13%)	3.53	1.11
I have sufficient organizational skills to integrate ICT in my classroom	1 (3%)	0 (0%)	8 (20%)	23 (58%)	8 (20%)	3.93	.8
I have sufficient background to use ICT in my classroom for instructional purposes	1 (3%)	1 (3%)	8 (20%)	24 (60%)	6 (15%)	3.83	.81
I do not have shortcomings to use ICT in a pedagogical and didactical way*	2 (5%)	7 (18%)	10 (25%)	17 (43%)	4 (10%)	3.35	1.05
Total (%)	8 (4%)	17 (8%)	37 (18%)	107 (54%)	31 (16%)		

Note. * Inverted item value

Research Question 1a and 2a

For research question 1a and 2a, we first checked the assumption of normality. The Shapiro-Wilk test was significant ($p < .001$) indicating the data are not normally distributed. We then conducted a Levene's test ($p > .05$) showing the two groups were equal. ANOVA tests indicated no significant differences between the two groups (novice and experts) for instructional strategies ($F(1,38) = 2.68; p = .11$), classroom management ($F(1,38) = 0.47; p = .50$), student engagement ($F(1,38) = 2.42; p = .13$), and ICT tools ($F(1,38) = 2.12; p = .15$). The non-parametric Kruskal-Wallis test was not significant either for instructional strategies ($H(1) = 2.29; p = .13$), classroom management ($H(1) = 0.25; p = .62$), student engagement ($H(1) = 1.88; p = .17$), and ICT tools ($H(1) = 0.95; p = .33$).

Discussion

This study aimed to explore teacher educators' self-efficacy beliefs during the COVID-19 pandemic. Specifically, we aimed to understand how teacher educators' general self-efficacy beliefs (research question 1) and beliefs about using ICT tools (research question 2). Furthermore, we aimed to understand if there is a difference between novice and expert teacher educators' self-efficacy beliefs (research questions 1a and 2a).

Considering research question 1, we identified to what extent teacher educators' self-efficacy beliefs are experiences using three aspects: instructional strategies, classroom management, and student engagement. The first aspect, instructional strategies, were perceived by participants as doable or even effective. Participants and respondents using instructional strategies during emergency remote teaching (ERT) did not experience increased problems compared to face-to-face education. Teacher educators believe they can use different assessment strategies, answer complex questions from students, and gauge student

understanding. This finding is beneficial considering self-efficacy beliefs are related to teachers' behaviour (Tschannen-Moran & Woolfolk Hoy, 2001). Our finding is inconsistent with the results of Ching et al. (2018), who reported the complexity of instructional strategies as the main difficulty of teaching online. A possible explanation for this inconsistent finding is that respondents and participants gained a year of experience in online teaching since the outbreak of COVID-19. Because when teacher educators gain successful experience with teaching online, their self-efficacy increases (Igbaria & Iivari, 1995). Bandura (1977) argues that self-efficacy influences behaviour and behaviour influences self-efficacy likewise. It, therefore, seems plausible that teacher educators got accustomed to emergency remote teaching. As a result, they acquired new knowledge and skills to cope with online education. Additionally, as the lockdown continued, experts and companies gave much advice about tools and materials aimed at teachers for replacing their face-to-face classes (Bates, 2020). This advice through practical tips and tricks might contribute to feeling competent and why teacher educators now believe they can effectively use instructional strategies online. Future research needs to explore whether experience in online teaching and practical advice aimed at teachers explains teacher educators' relatively high self-efficacy beliefs.

For the second aspect of teacher educators' self-efficacy beliefs: (i.e. classroom management), 42% of the respondents indicated they feel they can manage their classroom 'a lot of the time'. The interviews represent this variation between participants. Classroom management in larger classes was already challenging pre-pandemic, and remote teaching made it even more challenging (Lungu & Lungu, 2021). An essential aspect of designing effective online learning "involves providing ample opportunities for collaboration and communication between students" (Loose & Ryan, 2020; Kim et al., 2019). During the interviews, it became clear that teacher educators wanted to provide these opportunities but experienced problems while teaching online. For example, camera policy, working in

breakout rooms, and using discussion boards have their limits (e.g. internet connection and lack of interaction) and did not always work effectively, according to the teacher educators. While they agreed with the importance of students collaborating, the tools or organisational aspect seemed to be lacking. When the conditions for online education are not met, teachers cannot conduct their job effectively (Hodges et al., 2020), which results in lower self-efficacy (Bandura, 1977).

For the third aspect, student engagement, the current study found that participants experienced this as the most challenging part of teaching remotely online. This finding is problematic for students since student engagement is an essential aspect of education (Finn & Zimmer, 2012). Wang et al. (2020) refer to student engagement as how students feel able to maintain a high level of interest in coursework and make meaningful connections between learning activities. Our result adds to both research and literature. Because when teacher educators lack skills to keep students engaged throughout an online course, the danger of students dropping out is high since disengagement seems to be a strong predictor of student dropout rates (Sinclair et al., 2003). Similarly, Wang et al. (2020) identified the same challenge based on students' reports which show a decline in their interest in general during online education during the pandemic. Additionally, Sinclair et al. (2003) mention contextual factors: home, school, and peers highly influence engagement. Undeniably, the home factor plays a major role during the pandemic, where we are obliged to stay indoors. When connection and interaction with school and peers disappear, the danger of student disengagement is problematic. Students disengage more easily from courses and content because of the lack of physical interaction (Trinidad, 2020; Van der Spoel et al., 2020). The current study identified engaging students as a challenging aspect. Of course, further research needs to determine to what extent teacher educator beliefs influence the quality of their

lessons to the extent that students drop out or drop out because they feel unmotivated because of mental stress during the pandemic.

For research question 2, results showed that teacher educators felt ICT proficient. Participants indicated they use ICT tools and have learned to incorporate these tools within their lessons. Our findings align with those of a previous study by Turvey (2010), who states that teachers' attitudes towards tools can influence their perceived value within the teaching and learning context. In contrast to a recent study by Huber and Helm (2020), who identified challenges with teacher educators' ICT competency, our results show that teacher educators currently feel competent about using ICT tools in their online classes. The year of experience teachers gained using these tools might explain this contrasting finding. The question remains whether teacher educators *feel* competent and whether they *are* competent in using ICT tools. Carrillo and Flores (2020) mention the need to master technological tools effectively *and* understand their pedagogical possibilities. Similarly, Bates (2019) argues that to engage students, teachers need to learn the strengths and weaknesses of various technological tools.

Whether we will return to traditional ways of teaching or whether we will adapt to new teaching methods, such as blended or hybrid learning (Allen et al., 2020), remains to be seen. Chigeza and Halbert (2014) mention the role of teachers in effective online environments is about facilitation rather than knowledge transfer. If it is up to the participants, knowledge *transfer* is unnecessary to conduct during live sessions and will be outsourced to digital tools such as knowledge clips. Instead, they will focus on knowledge *application* during live sessions. It seems plausible that this 'lesson learned' is implemented even when things go back to normal (Van der Spoel et al., 2020). This implies that universities should facilitate teachers to learn the pedagogical possibilities of the applied tools (Peters et al., 2020; Swan et al., 2007). When adopting new teaching methods (e.g. blended or hybrid

learning), teachers need knowledge about effective online teaching strategies and need to apply these effectively. For this reason, it is vital to explore teacher self-efficacy further.

Regarding research questions 1a and 2a, no significant results were found between the two identified groups outlining no significant differences between self-efficacy beliefs of novice and expert teachers educators. A possible explanation is that novice teacher educators are proficient in dealing with ICT tools, as this generation grew up with technology (research question 2a). Research by So et al. (2012) shows that Digital Natives (i.e. people born before 1980) have better proficiency in teaching with technology than earlier generations of teacher educators because this generation grew up surrounded by digital technologies. Expert teachers may be less ICT proficient but are more experienced in teaching in general as they possess over ten years of experience (research question 1a). Ericsson (2008) states that experts in a specific area, teaching in this case, can respond rapidly and intuitively to changes. The expert theory (Ericsson, 2008) seems fitting in the context of this research, as a year has passed since all education moved online because of the pandemic. Since then, all teacher educators gained experience in this mode of delivery and might feel competent due to this experience (Van der Spoel et al., 2020). Concluding, novice teacher educators might be proficient in using ICT, while expert teachers adapt quickly because of their experience. However, this finding should be taken with caution as we have no evidence for this claim. Future research might explore this proclamation.

Limitations

This study was not conducted without limitations. Firstly, despite various attempts to collect as many participants as possible, we are aware that this study did not receive as many as intended. Our relatively small sample size ($N= 40$) did not allow for a significant result or power. A larger sample size is needed to test whether there is a difference between novice and

expert teacher educators. However, since this study does not adhere to risk factors, the small sample size is not a concern (Hackshaw, 2008). Nevertheless, this research has an exploratory value since we explored and generated themes applicable to the COVID-19 situation using questionnaires and expert interviews. Through insider knowledge, experts provide valuable insights on new topics (Bogner et al., 2009). The forced, rapid move online certainly is one of those new emerging topics (Jandrić, 2020).

Unfortunately, we could not compare the situation at the start of the pandemic with the current state of teacher self-efficacy beliefs, as this research began half a year after the start of the Dutch lockdown. When this study began at the start of the pandemic, our results might have differed. For example, Van der Spoel et al. (2020) conducted research just after a month of schools closing and found increased workloads and experienced high pressure. When teacher educators rapidly moved online, they did something for the first time, affecting their self-efficacy (Haverback, 2020). Nowadays, teachers have a year of experience in teaching online and have adapted to the situation, which may result in higher self-efficacy.

Practical Implications

Increased content knowledge and skills boost teachers' overall confidence (Åkerlind, 2003). Additionally, teachers with high self-efficacy are more willing to learn and acquire new knowledge (Scribner, 1999). This implies that teacher educators who believe they can execute their work successfully experiment while operating their work (Selkring & Keamy, 2014). For universities, it is worthwhile to increase teacher educators' self-efficacy because the willingness to learn results in new educational possibilities and educational innovations (Brownell et al., 2006). Our results suggest that teacher educators are more likely to innovate in instructional strategies and ICT tools since they feel confident applying these. Since our respondents and participants feel less confident about student engagement and classroom

management, it is unlikely they provide innovations in this regard. Therefore, high self-efficacy is essential for both teachers and their universities. Self-efficacy can, for example, be increased by facilitating teacher peer support to share feelings and support each other (Postareff & Lindblom-Ylänne, 2011).

A second implication lies in enhancing student engagement. More than 50 per cent of teachers prioritise fostering student engagement while simultaneously having a major need for tools, strategies, and resources to facilitate that student engagement (Trinidad, 2020). Deci et al. (1994) mention the need to provide meaningful rationale to identify the value of doing activities when people are not intrinsically motivated. In other words, student engagement can be enriched by presenting the relevance of the lessons and learning goals and by creating an online community (Van der Spoel et al., 2020). Additionally, providing teacher support and training to accommodate students' needs should be considered. This study shows that student engagement is an essential yet challenging aspect of education. So, it is relevant to determine how student engagement can be improved online. This practical advice might help practitioners in the future.

Conclusion

In summary, this study explored the self-efficacy beliefs of teacher educators using the constructs: instructional strategies, classroom management, student engagement, and using ICT tools. We identified specific themes with our complementary interview study, showing that teacher educators have grown accustomed to teaching online and even believe they can teach effectively. Student engagement and classroom management are challenging aspects of teaching online. When teacher educators and universities are aware of this, support and guidelines can help in minimising this struggle. Swennen et al. (2010, p. 132) stated that teacher educators are a “specialized professional group within education with their own

specific identity and professional development". We add to the scarce literature about teacher educators in general (Swennen et al., 2010). The results of this study can be used to design more extensive confirmatory studies (Hackshaw, 2008) with a broader range of participants to enhance teacher education development regarding online learning.

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Appendix A Interview Guide

Prior to interview

- Send outline information letter of this project
- Send informed consent and have it returned, signed
- Schedule an appointment, explain online interview, mention duration of the interview

Introduction

- Welcome
- Introducing myself (name, study, why this research)
 - “Welcome (name)..., thank you for participating in this study, my name is Eva Beumer and I am a master student Educational Sciences of Utrecht University. I am interested in the consequence of moving education online due to the pandemic.
- Let the participant introduce themselves.
- Check if participant is ready: “Are you in a comfortable and quiet place where you can speak freely?”
- Mention that the interview will be in English, unless the participant prefers to do it in Dutch. Emphasise that if the participant does not understand something or does not know how to say something in English it is okay to say it in Dutch.
 - “There are no right or wrong answers, you can say anything you think or feel.”
 - “If you do not understand a question, or if you have a question of your own, feel free to ask this, so I can clarify it for you.”
- Repeating that the interview is recorded, and information is used confidentially. Check if they still want to participate. If yes, start recording.
- I will ask you a few questions about teaching online as a result of the covid19 pandemic.

Questions to break the ice

First of all, how do you experience online education?

- a. Why?
- b. Difficulties?
- c. Benefits?

Predetermined questions by Rapanta et al. (2020)

- 1) In what aspects do you think online learning design and delivery is different from face-to-face teaching and learning?
- 2) What do you think makes online teaching and learning successful?
- 3) What are some effective ways of monitoring students' engagement and learning during online courses?
How can they inform assessment?

Questions specifically about teacher self-efficacy:Instructional strategies

- Do you believe you can apply instructional strategies effectively online?
- How do instructional strategies differ in online education in comparison to face-to-face education? Why/How?

Classroom management

- Do you believe you can manage the virtual classroom effectively online?
- How does classroom management differ in online education in comparison to face-to-face education? Why/How?

Student engagement:

- Do you believe you can foster student engagement effectively online?
- How does student engagement differ in online education in comparison to face-to-face education? Why/How?

Other questions

- What do you think is the best way to shape online education?
- What have you learned from moving online? (i.e. Learning to work with MSTeams, being more flexible?)
- What do you take with you if everything goes back to normal?
- Is there anything you like to add?
- Do you have (remaining) questions?

Closing

“Thank you for your time and your answers. I will use your answers to write my thesis. Your name will not be mentioned. If after this interview, you have questions remaining, you can always email me. Thanks again, and have a nice day.”

Appendix B Information Letter Questionnaire

Welcome to the study: Teacher Educators' Self-Efficacy Beliefs During The Covid-19 Pandemic

Due to the COVID-19 pandemic most of teachers were forced to change from face to face to online teaching without appropriate preparation. The purpose of this study is to investigate teachers beliefs about their teaching practices during the COVID-19 pandemic.

The result of this study will be published and the data may be used for publication. Personal data such as age, gender and academic year will be used, but will not be traceable back to the participant. Data will remain confidential and will be anonymised before the data will be stored. Only the researchers involved in this project can access the data. The personal data collected will be stored separately from the raw research data. The storage period for the data is at least 10 years for raw data, the personal data will be stored for as long as necessary for this research and then will be deleted. Participation in this research is voluntary and can be terminated at any time without giving reasons and without consequences. If you withdraw your consent, the data that has been collected up to that point will not be used in this research.

Contact details researcher

Name: Eva Beumer

Email addresses: e.n.beumer@students.uu.nl

Telephone number: +31655971942

Contact details of the supervisor (for questions and remarks about the study)

Name: Despoina Georgiou

Email addresses: d.georgiou@uu.nl

Contact for formal complaints

Email addresses: klachtenfunctionaris-fetcsocwet@uu.nl

If you agree to participate in this study, please first provide your inform consent by clicking on the box stating “I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study”

When answering the following questions, think of how you reacted due to the sudden change from face to face to online teaching during the outbreak of the pandemic.

During online education due to COVID19...

1. ... to what extent can you use a variety of assessment strategies?
2. ... to what extent can you provide an alternative explanation for example when students are confused?
3. ... to what extent can you craft good questions for your students?
4. ... how well can you implement alternative strategies in your classroom ?
5. ... how well can you respond to difficult questions from your students?
6. ... how much can you do to adjust your lessons to the proper level for individual students?
7. ... to what extent can you gauge student comprehension of what you have taught?
8. ... how well can you provide appropriate challenges for very capable students?

During online education due to COVID19...

9. ... how much can you do to control disruptive behavior in the classroom?
10. ... how much can you do to get children to follow classroom rules?
11. ... how much can you do to calm a student who is disruptive or noisy?
12. ... how well can you establish a classroom management system with each group of students?
13. ... how well can you keep a few problem students from ruining an entire lesson?
14. ... how well can you respond to defiant students?
15. ... to what extent can you make your expectation clear about student behavior?
16. ... how well can you establish routines to keep activities running smoothly?

During online education due to COVID19...

17. ... how much can you do to get students to believe they can do well in schoolwork?
18. ... how much can you do to help your students value learning?
19. ... how much can you do to motivate students who show low interest in schoolwork?
20. ... how much can you assist families in helping their children do well in school?
21. ... how much can you do to improve the understanding of a student who is failing?
22. ... how much can you do to help your students think critically?
23. ... how much can you do to foster student creativity?
24. ... how much can you do to get through to the most difficult students?

Please indicate the level of agreement to the following statements:

During online education due to COVID19...

- 1) ... I have sufficient technical knowledge and skills to use ICT in classroom;
- 2) ... I can easily fix technical problems when being confronted with it;
- 3) ... I have sufficient organizational skills to integrate ICT in my classroom;
- 4) ... I have sufficient background to use ICT in my classroom for instructional purposes; and
- 5) ... I have shortcomings to use ICT in a pedagogical and didactical way.

The scale ranges from (0) completely disagree, (1) disagree, (2) disagree/agree, (3) agree, to (4) completely agree.

Appendix C Information Letter Interview

Title of the study: Teacher Educators' Self-Efficacy Beliefs During The Covid-19 Pandemic

Dear participant, the purpose of this study is to investigate the due to COVID-19. Therefore, it is aimed to answer the following questions:

1. To what extent teacher educators feel able to apply instructional strategies, manage their classrooms effectively and foster student engagement in online environments?
 - a. Is there a significant difference in self-efficacy beliefs of novice and experienced teacher educators about instructional strategies, classroom management and student engagement in online environments?
2. To what extent teacher educators feel able to incorporate ICT tools to foster student learning in online environments?
 - a. Is there a significant difference between novices and expert teacher educators to ICT implementation in online environments?

The result of this study will be published and the data may be used for follow-up or future research that might have another purpose. Personal data such as age, gender and academic year will be used, but will not be traceable back to the participant. This data will be used to investigate if those factors influence the experience with online education. Data will remain confidential and will be anonymised as much as possible before the data will be stored. Only the researchers involved can access the data. The personal data collected will be stored separately from the raw research data. The storage period for the data is at least 10 years for raw data, the personal data will be stored for as long as necessary for this research.

The data will be collected using Microsoft Teams. Preferably with a video call, but audio only is also sufficient. The research is an interview, which will take up to 30 minutes, and will be about your experiences with online education due to COVID-19. Participation in this research is voluntary and can be terminated at any time without giving reasons and without consequences. If you withdraw your consent, the data that has been collected up to that point will not be used in the research.

Contact details researcher

Name: Eva Beumer

Email addresses: e.n.beumer@students.uu.nl

Telephone numbers: +31655971942

Contact details of the supervisor (for questions and remarks about the study)

Name: Despoina Georgiou

Email addresses: d.georgiou@uu.nl

Contact for formal complaints

Email addresses: klachtenfunctionaris-fetcsocwet@uu.nl

Appendix D Informed Consent Form Interview

Title of the study: Teacher Educators' Self-Efficacy Beliefs During The Covid-19 Pandemic

I volunteer to participate in a research project conducted by Eva Beumer from Utrecht University. I understand that the project is designed to gather information about academic work of faculty online. I will be one of approximately 10 people being interviewed for this research.

1. My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty. If I decline to participate or withdraw from the study, no one on my campus will be told.

2. I understand that most interviewees in will find the discussion interesting and thought-provoking. If, however, I feel uncomfortable in any way during the interview session, I have the right to decline to answer any question or to end the interview.

3. Participation involves being interviewed by researchers from Utrecht University. The interview will last approximately 30 minutes. Notes will be written during the interview. An audio tape of the interview and subsequent dialogue will be made. If I do not want to be taped, I will not be able to participate in the study.

4. I understand that the researcher will not identify me by name in any reports using information obtained from this interview, and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions.

5. Faculty and administrators from my campus will neither be present at the interview nor have access to raw notes or transcripts. This precaution will prevent my individual comments from having any negative repercussions.

6. I understand that this research study has been reviewed and approved by the Faculty Ethics Review Board (FERB) at the Utrecht University. For research problems or questions regarding subjects, the Institutional Review Board may be contacted through klachtenfunctionaris-fetcsocwet@uu.nl

7. I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.

8. I have been given a copy of this consent form.

_____ My Signature

_____ My Name

For further information, please contact Eva Beumer

_____ Date

_____ Signature of the Investigator

Appendix E Themes

Initial coding (# of references)	Themes	Definition of theme
clarification of the interview question (2) introduction (5) target group (1)	Other	Where participants introduce themselves, ask clarifications and mention their target group of students
coping with classroom management (8) classroom management face-to-face education (1) different student-teacher communication (5) different student-student communication (4) adaption duration of lectures (2) new ways of working (5)	Differences	Participants (teacher educators) mention differences in online education compared to face-to face education. They mention that they found ways to cope with the technical aspects of moving online, how communication between teachers and students and students among each other differs, how they made adaptations in their lectures
having understanding of the situation students are in (3) lessons learned (12) blended or hybrid learning (7) Assessment (4)	Lessons learned	These are the things participants mention about what they have learned, what they take with them when the pandemic is over. They mention blended learning as a nice way to have students prepare for tutorials or lectures to ensure that they can focus on interaction during the lessons.
create engagement from the start (1) exchanging experiences (1) focus on interaction (8) guiding students (2) make relevance clear (4) pose questions to students (2) provide relevant content (3) variety (10) limit information provision (11)	Best practices (tips)	Participants mention different things they think work well when they are teaching online. They mention that variety is key and that they limit live information provision and expand live interaction. Making the relevance of their lecture or tutorial to students is also mentioned. Two participants often ask feedback on how to improve their teaching.
cognitive load higher (1) camera policy (3) difficulties (12) distracted (2) insecurities (4) limitation (1) online takes more time (3)	Difficulties	Quite a few difficulties are mentioned by the participants. They all experienced insecurities and difficulties. Mentioned is that online education enhances a higher cognitive load, people are distracted more easily and the camera policy is experienced as a difficulty. Student engagement is mentioned most as a difficulty.
effective (3) experimenting (3) focus as a transmitter (3) broadens your world (3) more structured (1) serving students better (2)	Positive aspect	These are mentioned as positive aspects of the emergency remote teaching situation. Less travel time is mentioned the most, student responsibility is deemed higher, students are better served at a distance and as a knowledge

travel time (5) student responsibility (2) student experiences (4)		transmitter you can focus better than in a lecture hall.
feeling confident (19) gotten used to it (3) gradual transition (2) not really different (3) positive (1)	Feeling confident	All participants are somewhat confident about their instructional strategies and classroom management. This differs across participants. All have gotten more used to it compared to the start of the pandemic.
ICT proficiency (1) professional behaviour (7) technological knowledge of teachers (7) tools for engagement (9)	Teacher educators' knowledge and skills	Participants mentioned skills, tools and attitudes needed for teacher educators during the pandemic.
organisational (5) important aspect (2)	Organisational	Things mentioned about the important aspects of education and also online education. Organisational aspects of online education and conditions needed.