Connectedness with students as a key factor in online teaching self-efficacy

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ABSTRACT

This paper investigates how lecturers' connectedness with students affected their experience of online teaching during the first COVID-19 lockdown in the UK and Switzerland. We examined how this connectedness predicted lecturers' self-efficacy in online teaching. This was in addition to other social context variables (connectedness with colleagues and perceived support from the university) and their previous experience with digital tools. The shift to online teaching in the lockdown period abruptly removed any in-person contact between lecturers and their students. Lecturers' self-efficacy in online teaching is crucial to student motivation, achievement, and the lecturer's own teaching experience. Likewise, lecturers' connectedness with students and colleagues has been identified as a key factor in learning. Consequently, this study explored how different forms of connectedness predicted lecturers' self-efficacy in the new teaching environment. A total of 252 lecturers from UK and Swiss universities completed an online survey about their teaching experiences before and during the COVID-19 lockdown. Multiple regressions were used to predict lecturers' online teaching self-efficacy. The results revealed that connectedness with students was a significant and positive predictor of online teaching self-efficacy. However, connectedness with colleagues and perceived support from the university did not. The perception that digital tools enhanced teaching prior to the lockdown was a significant predictor only for the UK lecturers, but not for the Swiss ones. These findings point towards lecturers' connectedness with their students being a pathway to success in online teaching.

1. Introduction & background

The emergence of the COVID-19 pandemic led to significant challenges and changes to teaching practices in educational institutions across the globe. During the first wave of the pandemic, universities across Europe transferred their teaching and learning activities online to comply with the adoption of lockdowns and social distancing measures. This shift to online teaching led to the exclusion of any in-person contact between lecturers and students as well as to lecturers having to abruptly adjust to these new teaching environments. Recognizing their critical role in delivering instruction during the pandemic, this study explicitly focuses on the lecturers' perspective.

Lecturers as well as students had to manage the new situation by using various digital tools, learning platforms and online video communications from home, with many finding it hard to create meaningful relationships with their peers and colleagues after the exclusion of in-person contact. This led to difficulties for teachers in communicating and engaging with students, as well as in transferring their teaching

knowledge and skills from the physical classroom to the online context [1].

Subsequently, students described feelings of psychological distance, loneliness, isolation, and disconnection from their peers and education institutions [2,3]. However, less research has explored how the disconnection and isolation from students, colleagues and the workplace influenced lecturers and their online-teaching abilities. This is especially important as lecturers will have had various levels of experience and knowledge of online platforms, tools and support offered by their institutions and thus experienced the shift to online teaching differently. It is expected that lecturers with previous experience and a more positive attitude towards digital tools would have found this easier than those who lacked confidence in their skills [4], with many lecturers finding this period stressful and anxiety-inducing [5,6].

As such, it is important to explore what factors influenced the confidence and preparedness of lecturers during the COVID-19 pandemic. Empirical evidence of teaching in an online setting suggests that teachers' self-efficacy is amongst the factors that are influential for

teaching effectiveness, student success, and motivation [7,8]. Teachers' self-efficacy, specifically classroom management self-efficacy, is also vital for their functioning and well-being [9]. Teachers' self-efficacy has also been linked with connectedness, with teachers who have higher self-efficacy also forming more meaningful relationships with their students [10,11] as well as feeling more connected with their colleagues and supported by their workplace [12,13].

To contribute to the understanding of how these unique circumstances affected lecturers, the present study aimed to examine predictors of online teaching self-efficacy during COVID-19 for lecturers at two universities in the UK and Switzerland. Through this comparative analysis, the study also aims to identify how contextual factors specific to each university contribute to lecturers' adaptation to online teaching. In the following sections, therefore, we aim to explore the role of lecturers' online teaching self-efficacy, along with its underlying drivers and associated factors, including connectedness with colleagues and students, and university support.

1.1. The role of self-efficacy in online teaching

Bandura [14] defined self-efficacy as an individual's belief in their ability to carry out and complete a task. More specifically, self-efficacy refers to a person's belief in their ability to succeed in a particular situation, such as teaching. Individuals with high self-efficacy are believed to be able to handle difficult situations more confidently, stay motivated, overcome obstacles, and persevere to achieve their goals. Bandura identified four main sources of self-efficacy beliefs [15]: (1) prior experiences of mastering tasks, (2) watching others mastering tasks, (3) messages or "persuasion" from others, and (4) emotional and physiological states that can either hinder or increase self-efficacy. These self-efficacy beliefs are self-constructed, and do not affect one's self-efficacy directly, instead their influence is moderated by an individuals' interpretation of their subjective experiences. Consequently, there can be gaps between a person's self-efficacy beliefs and their actual skill level, with self-efficacy beliefs more likely to be reinforced when attainment is attributed to one's own abilities rather than to external factors [16].

Teacher self-efficacy is a measure of a teacher's belief in their abilities to influence students' engagement and success in learning [17]. Teachers with high levels of self-efficacy are more open to new ideas and teaching methods, demonstrate higher levels of planning and organization, and perseverance in the face of difficulties [18]. Teachers' sense of self-efficacy is important for educational institutions as it has been associated with successful student outcomes, such as higher academic achievement [8] and increased student motivation [19,18], as well as positive outcomes for the teacher such as higher teacher performance [8], less burnout [20], more job satisfaction [21] and well-being [9]. Teaching self-efficacy is seen as both context- and subject-matter specific [18], meaning that a teacher's self-efficacy can vary as a function of contextual factors such as geographical setting, instructional practice, and teaching resources. Therefore, it is important to explore self-efficacy in the context of online teaching during the COVID-19 pandemic specifically.

Forms of online teaching were in use prior to the COVID-19 pandemic, with the last two decades seeing an increase in various forms of "flexible" education, ranging from solely remote online learning to blended-learning, which involves a combination of online and face-to-face instruction [22]. Research conducted in online teaching environments prior to the COVID-19 pandemic has identified several key factors that influence teachers' self-efficacy in online teaching. These factors include the teacher's experience with technology, the teacher's knowledge of the subject matter, and the teacher's ability to effectively communicate with students online (e.g., [7,23]). Previous research has also shown that students' satisfaction with online teaching and greater level of online teacher self-efficacy is correlated with greater teaching satisfaction, student engagement [24], and emotional intelligence [25].

The existing literature on the impact of COVID-19 on classroom teaching however, has focused on students' and teachers' experiences of online teaching and the challenges associated with it (e.g., [1,26–29]), with less research focusing on teacher's self-efficacy beliefs.

Some studies have attempted to fill this gap [6,30–33]. For example, Culp-Roche et al. [31] explored online self-efficacy of nursing teachers at ten universities in the United States during the COVID- 19 pandemic. Their findings indicated that the faculty had high overall self-efficacy, with prior online teaching being a predictor of self-efficacy, whereas instructional support and years spent teaching were not. The results indicate that self-efficacy for online teaching can be built up by increasing online opportunities for lecturers. Baroudi & Shaya [34] in turn conducted a mixed methods study of online teaching self-efficacy during COVID-19 with a sample of 150 K-12 teachers from six Arabic countries. The results indicated that perceived self-efficacy in online teaching was high, and that two main factors – receiving support in online instruction design and receiving professional development in online teaching – significantly predict self-efficacy in teaching. Furthermore, similarly to the findings of Culp-Roche et al. [35], teachers with previous experience of online teaching had higher self-efficacy scores than teachers with limited or no experience. Overall, these findings indicate that the examination of antecedents and predictors of teacher self-efficacy in online teaching during COVID-19 could be valuable and should be investigated further in conjunction with other factors that have been identified as facilitators of or barriers to online teaching.

1.2. The role of connectedness

Similarly, with the growth of online teaching there is also a corresponding need to better understand the importance of connectedness between lecturers, their colleagues, and students. Connectedness relates to the idea that teachers and students have a shared understanding and sense of engagement. This connection helps to foster a positive learning environment and facilitates effective learning. Connectedness is important in any teaching environment but especially in online teaching, where students and teachers are physically separate.

Connectedness can be defined as the perception of belonging [36], and as such often also referred to as relatedness [37]. The need for connectedness or relatedness with others, has a long history in psychology and has been described within many theoretical perspectives. For example, Baumester and Leary [38] suggest that the need to form and maintain strong interpersonal relationships is central to human psychological functioning, and that this need is connected to our behaviours and emotions.

Likewise, within Self-Determination Theory relatedness is seen as one of the three basic psychological needs possessed by humans along with autonomy and competence. Relatedness refers to the desire to feel connected to and supported by others [39]. Self-Determination Theory suggests that students' intrinsic motivation and achievement is increased when teachers support these three basic psychological needs [39]. Many studies have shown support for this, with positive correlations found between teachers' perceived relatedness to their students and student motivation [40,41] as well as academic achievement [42–44]. Other researchers have found that students feeling connected with teachers is correlated with better health and wellbeing [45], more academic success [46] and higher graduate outcomes [47].

There is also empirical support for a link between teachers' self-efficacy and connectedness, with teachers who have higher self-efficacy forming more meaningful relationships with their students [11,48]. Teachers who are confident in their abilities to teach and have high expectations for student success tend to have better communication skills [49] and be more motivated [17] and engaged in their teaching [37]. On the other hand, teachers with lower self-efficacy beliefs may have a more insecure communication style, thus hampering student engagement and successful learning [17]. Therefore, higher self-efficacy

beliefs are also likely to strengthen the quality of relationships between students and teacher.

Furthermore, according to Self-Determination Theory, teachers might be more likely to establish stronger relationships and more supportive learning environments with their students if their own needs for relatedness are being met in the work environment [50]. More specifically, teachers who feel supported and valued at work tend to be more motivated to teach [51]. In support of this notion, research indicates that the relationships teachers form within their institutional environments may impact teachers' self-efficacy, with stronger relationships with colleagues being correlated with higher self-efficacy beliefs [13]. Furthermore, research has also shown that teachers' perceptions of support at work predict their motivation, teaching effectiveness, and beliefs about their teaching abilities ([37,51,52]), and that a lack of support from their institutions is linked with difficulties in the shift to online teaching [53].

With the rapid and widespread change to online teaching during the COVID-19 pandemic, the exploration of connectedness in online teaching environments is especially crucial, as the pandemic led to reduced social interactions and increased feelings of social isolation [54]. Therefore, the opportunity to make meaningful connections was diminished for teachers. Research conducted prior to the pandemic indicates that students' feeling of relatedness was significantly lower during online lectures than during in person lectures [55]. Recent research has attempted to explore the role of connectedness in online classes at university during the pandemic, with the results showing that relatedness is positively associated with students' motivation [56] and students' perceived learning [57].

These studies have specifically focused on the role of connectedness from a student perspective, while less frequently investigating the perspective of university lecturers. Therefore, as the COVID-19 pandemic not only isolated students but also lecturers, it seems worthwhile to explore the effects of online teaching from the perspective of lecturers.

1.3. The current study

Although the number of studies exploring the challenges associated with the transition to online teaching during the pandemic is increasing, few studies has explored the predictors of online teaching self-efficacy specifically. As disclosed in the available literature, the COVID-19 pandemic created various challenges for lecturers around the globe, such as having to rapidly adjust to a new online teaching environment and the removal of any in-person contact, making it harder to form meaningful connections and leading to feelings of isolation and loneliness. Furthermore, many lecturers also found this period stressful and anxiety inducing, and lacked confidence in their ability to teach online [5,6].

The current study, therefore, aims to explore lecturers' experience of online teaching during the first COVID-19 lockdown in the UK and Switzerland. More specifically, the study had two main aims. First, we investigated how lecturers' connectedness with their students predicted lecturers' self-efficacy along with other variables of the social context (connectedness with colleagues and perceived support from the university) and previous experience with digital tools. Second, we explored how these differed between the two universities. It is anticipated that the findings of this study can be leveraged to identify the key barriers to online teaching self-efficacy and may provide insight into what could be done to facilitate the design of productive online teaching environments.

The following research questions were of interest:

Q1. Did connectedness with students and colleagues, perceived university support, and previous experience with digital tools predict lecturers' online teaching self-efficacy during the COVID-19 lockdown?

Q2. Were there differences in the impact of these factors on lecturers, depending on which of the two universities they were teaching at?

2. Materials and method

This research employed an online survey design with the survey comprising questions related to the teaching experiences of lecturers both before and during the COVID-19-related teaching situation (CRTS). A link to the online survey set up on the survey platform Qualtrics was sent out to all lecturers at the participating universities via email, with the survey kept open from mid-May to mid-June 2021. A reminder to participate was sent out after two weeks. Participation in the study was voluntary with informed consent sought.

To assess self-efficacy in online teaching, we modified items from two existing scales: the online Teaching Self-Efficacy Inventory [58] and the College Teaching Self-Efficacy Scale [59]. The scale questions focused specifically on online teaching self-efficacy during emergency remote teaching (e.g., *I feel confident that I am able to meet my students' expectations despite the current crisis.*). The scale consisted of eight-items ($\alpha=0.85$) measured on a 4-point Likert scale ranging from (1) "Not at all" to (4) "Completely Agree". Connectedness was measured with scales developed by Klassen et al. [37]; $\alpha=0.75$, resp. 0.85], with both connectedness to students (e.g., *I feel connected to my students)* and colleagues (e.g., *The relationships I build with my colleagues are important to me*) consisting of 4 items rated on a 7-point Likert with responses ranging from (1) "Never" to (7) "Always". We further assessed connectedness by asking lecturers to what extent they felt that their university was backing them up with a single item on a 4-point Likert scale (1 = not at all, 4 = to a large extent).

Previous experience with using digital tools in teaching was captured with three single items. We asked (1) to what extent participants had used digital tools in teaching before the lockdown (1=Not at all, 4= to a large extent) and (2) to what extent digital tools had enriched participants' conventional teaching (1 = not at all, 4 = to a large extent). The third question assessed whether participants considered themselves a 'digital native' (familiar with the digital world) or 'digital immigrant' (needing adjustment to the digital world).[1] This question had a choice of "other" and an open answer box where lecturers could indicate if neither digital immigrant nor digital native were suitable. Those lecturers who indicated that they were "*in between*" the two were also included in the analysis.

2.1. Sample

The study employed a convenience sampling method, with participation in the survey being voluntary. The survey was emailed out to all lecturers in the participating universities, with lecturers who actively taught during the first COVID-19 lockdown in 2020, asked to participate. The privately funded university from the UK was originally a polytechnic institution that was granted university status in 1992 and has nearly 20,000 students. The government-funded university from Switzerland is a traditional, century-old institution that conducts intensive basic research and research-based teaching and has over 10,000 students.

A total of 252 lecturers participated in the study, with 90 lecturers from the UK university and 162 from the Swiss university. Participants

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[1] In this survey, the terms "digital native" and "digital immigrant" have been used in the questionnaire to operationalize an additional construct to capture lecturers' self-perceived confidence. It is important to note that the terms are not understood in a dichotomous and discriminatory sense as originally proposed by Prensky [62]. Rather, they are employed to explore the subjective experience and self-evaluation of lecturers who have been faced with the abrupt transition to online teaching due to the COVID-19 pandemic. The findings are intended to contribute to ongoing discussions (e.g., [63]) by exploring how these perceived identities concerning the use of digital technologies may influence individuals' confidence in and adaptation to online teaching. For a critical review of the terms see Bayne and Ross [60] and Eynon [61].

were from a variety of age groups with the majority (95 %) being 25–65 years old. Gender was evenly distributed across the two universities with 52 % of the overall sample identifying as female, 44 % as male, 2.4 % as other, and 1.2 % who did not report their gender. The lecturers taught a wide range of subjects (e.g., Business, Social Sciences, Humanities, STEM, Medicine, Arts, Computer Science) with the majority coming from Humanities (29 %), STEM (24 %), Business and Economics (13 %), Social Sciences disciplines (10 %) and Medicine (10 %). Some lecturers also taught across several disciplines. See Table 1 for full sample details.

3. Results

SPSS 26 and R version 4.2.1 were used for the statistical analysis of the data. Independent *t*-tests and chi square tests were run to compare differences in online teaching self-efficacy, connectedness and technology use between the UK and Swiss sample. Multiple linear regression analyses were used to predict lecturers' self-efficacy for online teaching from the three connectedness variables (connectedness with students, connectedness with colleagues, and perceived support from the university), and (2) from lecturers' previous experience with online teaching. All assumptions for multiple regression were evaluated. Initial inspection of scatterplots indicated a linear relationship between the independent variables and the dependant variable. Multivariate normality was assessed using a P-P plot of standardized residuals, revealing no significant deviations from normality. Homoscedasticity was examined via a scatterplot, which showed no apparent signs of funnelling, indicating that the assumption was met. The data satisfied the assumption of independent errors, as evidenced by a Durbin-Watson value of 1.87. Multicollinearity was assessed, and all variance inflation factor (VIF) values were below 2, with tolerance values exceeding 0.7, suggesting that multicollinearity was not a concern. Furthermore, no influential cases were identified, as indicated by Cook's Distance values, all of which were below 1.

Descriptive statistics including means and standard deviations were summarized for each university and the measures used (see Table 2).

Table 1
Sample description.

	UK	Switzerland
Gender		
Female	46	86
Male	41	70
Other	2	4
Missing	1	2
Age range		
<26	–	2
26–35	5	46
36–45	26	38
46–55	30	39
58–65	19	35
> 65	10	1
Missing	–	1
Disciplines		
Humanities	18	55
STEM	7	54
Business & Economics	28	5
Social Science disciplines	10	15
Law	–	7
Medicine	1	24
Educational sciences	1	3
Psychology	4	9
Theology	–	1
Languages	3	10
Other	26	7
Teaching Experience in Years		
<6	12	54
6–11	22	32
12–17	23	33
>17	33	41
Missing	–	2

Table 2
Descriptive statistics for each university and measure.

	UK			Switzerland		
	N	Mean	SD	N	Mean	SD
Online teaching Self-Efficacy	87	2.99	0.54	155	3.12	0.47
Connectedness students	87	5.77	0.96	152	5.55	0.94
Connectedness Colleagues	86	5.39	1.02	149	5.11	1.15
University Support	84	2.75	0.82	156	2.74	0.88
Digital usage before COVID	90	2.52	0.85	161	2.17	0.88
Digital Tools Enrichment	90	2.80	.83	151	2.66	0.91

The average online teaching self-efficacy score for the whole sample was 3.08 (SD = 0.50). The UK university lecturers had slightly lower means than their Swiss counterparts, however no statistically significant difference between groups was found (t(240) 1.902, $p = 0.058$, $d = 0.27$). The average score for connectedness with students was 5.6 ($SD=0.95$), and with colleagues 5.21 ($SD=1.1$) for the whole sample. There were no significant differences between connectedness to students (t(237) = 1.831, $p = .068$, $d = 0.25$) or colleagues (t(233) = 1.886, $p = 0.061$, $d = 0.26$) between the universities. Furthermore, no significant differences between the two universities could be found when it came to lecturers feeling that their institutions were backing them up (t(238) = 0.110, $p = 0.912$, $d = 0.01$).

In terms of technology used, the UK university lecturers had used educational technology more extensively before the pandemic than lecturers in Switzerland t(249) = 3.049, $p = 0.003$, $d = 0.40$. No significant differences between universities could be found when it came to the lecturers' views of digital tools enriching conventional teaching (t(239) = 1.227, $p = 0.212$, $d = 0.15$). However, more Swiss lecturers considered themselves to be "digital natives" compared to the UK lecturers. ($\chi2$ (2, 248) =7.820, $p = 0.020$). See Fig. 1.

To examine the relationships between educational technology use, connectedness, and online teaching self-efficacy, multiple linear regression analyses were computed separately for the two universities. In the multiple linear regressions, we predicted lecturers' online teaching self-efficacy from the three connectedness variables (connectedness with students, connectedness with colleagues, and perceived support from the university), from lecturers' previous experience with using digital tools in teaching and whether participants considered themselves a 'digital native' (coded as 1) or 'digital immigrant' (coded as 3) or in-between the two (coded as 2).

Separate regressions were run for the Swiss and the UK sample. The results showed that the multiple linear regression model was significant for both the UK (F (6,71) = 4.75, $p < .001$) and Swiss (F (6114) = 6.55 p < 0.001) sample. The predictors in the model explained 23 % (UK) and 22 % (Swiss) of the variability in online teaching self-efficacy scores. Connectedness with students emerged as a significant positive predictor, while connectedness with colleagues and perceived support from the university were not significant for either the UK or Swiss sample. The perception that digital tools had enriched lecturers' teaching pre-lockdown was also a significant predictor (positive) but only for the UK sample. The relaimpo package and lmg metric on the software R version 4.2.1 were used to calculate decomposed R^2 values for each predictor. Connectedness with students was the strongest predictor for the Swiss sample explaining 15 % of the variance. For the UK sample, connectedness with students explained 8 % of the variance, with the perception that digital tools had enriched teaching pre-lockdown being the strongest predictor and explaining 11 % of the variance in lecturer's self-efficacy for online teaching. (See table 3 for coefficients and R^2 values.

4. Discussion

Our goal in this study was two-fold. First, we aimed to add to the literature base regarding online teaching self-efficacy and its
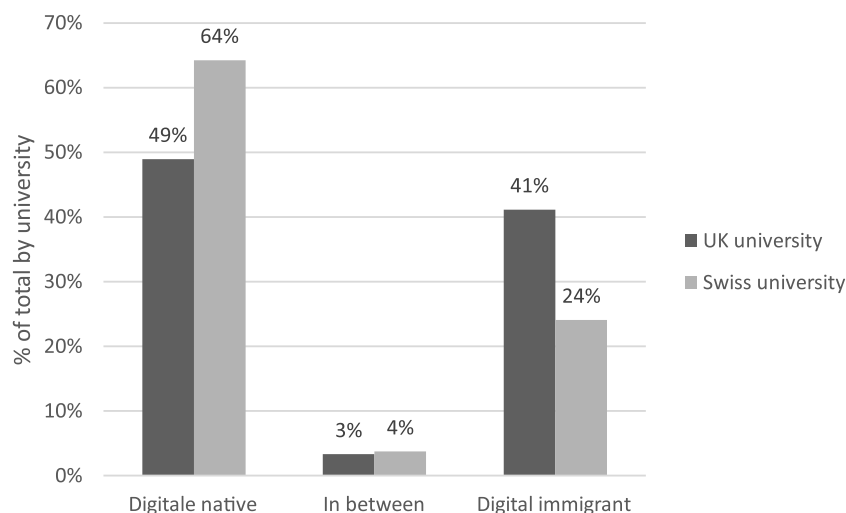
Fig. 1. Bar chart showing percentage of total by university lecturers that identified as digital natives, digital immigrants or in between the two for the UK ($N = 90$) and Swiss ($N = 162$) universities.

Table 3

Summary of multiple regression analyses for measures predicting online teaching self-efficacy for UK lecturers and Swiss lecturers ($N = 120$).

Variables	UK						Switzerland					
	B	*SE B*	*β*	*t*	*R²*	*p*	*B*	*SE B*	*β*	*t*	*R²*	*p*
Connectedness Student	*.142*	*.065*	*.259*	*2.185*	***.078***	***.032***	*.188*	*.046*	*.379*	*4.121*	***.152***	***<0.001***
Connectedness Colleagues	−0.032	.060	.060	−0.532	.006	.596	.011	.036	.025	.291	.013	.772
University Support	.080	.071	.123	1.129	.028	.263	.063	.047	.119	1.345	.042	.181
Digital Tool Usage Before COVID	0.42	.076	.068	.558	.033	578	.052	.052	.091	.996	.027	.322
Digital Tool Enrichment of Teaching	.183	.082	.275	2.222	**.106**	**.029**	.055	.048	.104	1.146	.020	.254
Digital Native/Digital Immigrant	−0.057	.060	−0.104	−0.948	.034	.346	−0.020	.045	−0.037	−0.441	<0.001	.660

antecedents. More specifically, we investigated how lecturers' connectedness with their students predicted their online teaching self-efficacy along with variables of the social context (connectedness with colleagues and perceived support from the university) and previous experience with digital tools. Secondly, we examined whether and how these differed between UK and Swiss university lecturers.

The results of this study showed that connectedness with students was a significant and positive predictor of online teaching self-efficacy for both UK and Swiss lecturers, explaining between 8 % and 15 % of the variability in online teaching self-efficacy. These results support previous research in this area, which showed that connectedness between teachers and students is important for both teachers' self-efficacy [10,48] and students' outcomes [8,11]. Our findings are in line with the results of Hajovsky et al. [10], in which teachers' self-efficacy was found to be a predictor for teacher-student relationship quality. The findings also corroborate the ideas of self-determination theory, where relatedness is seen as one of the three basic needs underlying motivation, with teachers whose need has been met providing more supportive learning environments [39].

Our research extends these previous findings by exploring the relationship between lecturer-student connectedness and lecturers' self-efficacy specifically within an online environment.

This is especially important as teaching self-efficacy is context-specific, with previous research indicating that students' feelings of relatedness with teachers is lower during online lecturers than during in-person teaching [55]. Furthermore, our findings are also particularly important due to the sudden and unexpected nature of the shift to online teaching during the COVID-19 pandemic, which meant that many lecturers had little or no experience of teaching in this format [5]. The fact that connectedness with students remained an important predictor of lecturers' self-efficacy even in these challenging circumstances, where interactions with students were hindered, highlights the central role that

it plays in creating a positive teaching and learning environment. These results are in line with the recent findings of Capon-Sieber et al. [56] who indicated that students' perceived relatedness support from lecturers during the pandemic was positively correlated with their motivation and vitality, but with our research highlighting the importance of connectedness from the perspective of lecturers.

The finding that connectedness with colleagues and perceived support from the university did not predict self-efficacy for online teaching is also noteworthy, as it is contrary to previous research [12,13]. These rather surprising results could be explained by the context of the study exploring online teaching during the specific situation of the COVID-19 pandemic. It suggests that, while support from colleagues and institutions may be important, it may not be sufficient on its own during highly stressful and anxious times in enabling lecturers to feel confident and effective in their online teaching. Instead, the current study highlights the need for lecturers to build strong relationships with their students, even in the absence of face-to-face contact, in order to create a sense of connection and engagement, which can support effective teaching and learning.

A further unexpected finding was that in contrast to previous research indicating that lecturers' online self-efficacy is influenced by prior use of digital tools and online teaching [34,31], the current study found no evidence of this. The results of the multiple regression showed that prior use of digital tools was not a significant predictor for either of the two universities. There are several potential explanations for these findings. One possibility is that due to the sudden and unexpected shift to online teaching during the lockdown, lecturers were not able to draw on their previous experience in a meaningful way. Another potential explanation is that the use of digital tools prior to the pandemic was not necessarily equivalent to teaching in a fully online environment. Lecturers may have used online tools to supplement their in-person teaching, rather than relying solely on online tools for the delivery of course

content. Therefore, previous experience with online tools may not have prepared them adequately for the challenges of teaching in a fully online environment. Conversely, our study also found that although previous use of digital tools was not a significant predictor of self-efficacy, the perception of digital tools enriching conventional teaching pre-lockdown was, but only for the UK university lecturers. Thus, an alternative explanation for the lack of significance of previous use of digital technology could be that the effect was obscured by the perception that digital tools enrich the classroom.

Interestingly, the results of the current study also revealed further differences between the two universities, with the UK lecturers reporting using educational technology more extensively than the Swiss, whereas more of the Swiss lecturers identified as "digital natives." These seemingly contradictory findings may be due to several factors. Firstly, it is possible that Swiss lecturers were more used to using digital tools outside of academia, in their personal lives and not necessarily for teaching purposes. Therefore, their comfort with digital tools may not have translated into a perception of the value of technology in teaching. It is also possible that the UK and Swiss lecturers differed in the way they utilised digital tools during online teaching; previous research [64] within this context has identified different types of lecturers in regard to educational technology use, with some being more prepared for emergency remote online teaching than others.

Secondly, the difference in the perception of the value of technology in teaching may be related to the different pedagogical approaches in the two countries, as well as to the quality and availability of digital tools and support. The UK university may have had more comprehensive and well-established online resources and support systems prior to the pandemic, which could have made it easier for lecturers to integrate technology into their teaching and perceive it as a valuable tool. The Swiss university, on the other hand, may have had fewer online resources and support systems, which could have made it more difficult for lecturers to feel confident in using digital tools for teaching. These differences could be explained with a stronger market-driven approach of the privately funded UK university, which can be characterized by "short-term responsiveness to market trends" while public universities "are likely to be rooted in public service, academic diversity, and knowledge generation" ([65], p. 6). This distinction between market logic, leading to quicker adoption of innovations, and science logic, representing a conservative stance towards consistency, could therefore have implications for institutions' digital transformation. Regardless of the reasons behind these findings, they suggest that simply providing opportunities and training in the use of digital tools may not be sufficient to support effective online teaching and learning. However, the application of these findings to the context of online teaching during COVID-19 is exploratory and future research should specifically examine the impact of institutional types on online teaching.

4.1. Limitations, future research and conclusions

Although the findings of the present study contribute unique information to the literature regarding the importance of connectedness with students for lecturers' online teaching self-efficacy, some limitations must be noted. Firstly, our study used a voluntary convenience sample, and thus the sample of lecturers is not necessarily representative of all the lecturers at the two universities. However, although a convenience sampling method was employed, the lecturers that participated in the survey were varied in age, gender, and the disciplines they taught. The cross-cultural nature of the study further strengthened our conclusions, making it possible to identify and establish connectedness with students as an importance factor across two countries. Another limitation is that the results are limited to lecturers' perceptions. Therefore, to get a more holistic picture of the importance of teacher-student connectedness, it would be important to analyse data from both teachers and students to explore a relationship to student academic achievement and well-being. For this reason, it is particularly important to recognize that students'

need for relatedness in an online environment vary depending on their life situation and psychological disposition [66].

Moreover, our study was cross-sectional and correlational in nature, with the survey taking place after lockdowns and emergency remote teaching had already been implemented. As such, no causal relationship can be drawn. Future research should investigate the theorised relationships between connectedness with students and online teaching self-efficacy longitudinally. Ideally, these future studies would also be conducted with interventions to establish how best to facilitate connectedness between students and lecturers in online environments. As a result, with further research, more refined conclusions could be drawn as to how instructors can create a social atmosphere in both online and conventional teaching environments that is responsive to the needs of the students [67]. Furthermore, these questions and issues need to be examined in a new light with the advent of generative artificial intelligence, as human-computer interaction is undergoing rapid change with unprecedented implications for teaching and learning in higher education [68].

In conclusion, this research suggests that lecturers' connectedness with their students is a pathway to success in emergency online teaching. The results provide valuable insights for institutions and lecturers seeking to improve their online teaching practices. The findings suggest that building strong relationships with students should be a central focus to support effective online teaching and learning. This insight can guide the development of best practices that prioritize interpersonal connections in instructional design and delivery, potentially improving student engagement and academic outcomes. Furthermore, knowing that connectedness with students is a strong predictor of lecturers' online teaching self-efficacy, universities can set a strategic focus for professional development programs. Training would equip lecturers with skills to build and maintain student relationships in online settings. This could include encouraging interaction and engagement through discussion forums, group projects, and other collaborative activities. In addition, institutions should consider the unique challenges and opportunities presented by online teaching and develop effective strategies to support the integration of technology into teaching and learning.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used ChatGPT and DeepL in order to improve language and readability. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

CRediT authorship contribution statement

Rosa K. Leino: Writing – review & editing, Writing – original draft, Validation, Methodology. **Tomas Kaqinari:** Writing – review & editing, Writing – original draft, Project administration, Investigation, Data curation, Conceptualization. **Elena Makarova:** Writing – review & editing, Project administration, Investigation, Conceptualization. **Anna K. Döring:** Writing – review & editing, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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