

# PRE-SERVICE TEACHERS MAINTAINED THEIR OWN SELF-EFFICACY DURING THE COVID-19 PANDEMIC

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## Abstract

During the Covid-19 pandemic a higher education (HE) qualified teacher status (QTS) provider working in partnership with schools in the northwest of England monitored the impact of anti-Covid-19 measures on pre-service teachers' self-efficacy. Previous conference proceedings papers [1] [2] [3] [4] [5] report the findings from the quantitative and qualitative data collected from three anonymous online questionnaires using pre-validated self-efficacy items [6] [7] during 2020 and 2021.

Despite articulating the negative impacts of anti-Covid-19 [2], initial teacher education (ITE) programme respondents maintained high levels of confidence in their teaching expressed as self-efficacy scores for skill statements in the categories: pedagogy, behaviour management and engagement [1]. They also identified positive impacts [2] that helped explain differences between mean scores for skill categories, individual skill statements and the two cohorts of pre-service teachers surveyed.

Possible explanations for overall high self-efficacy scores that increased during the ITE programme for the second cohort [1] [2] [3] drew on Bandura's [8] framework of major influences on self-efficacy and Korthagen's [9] onion model for reflection. This suggested [4] that curtailment of school experience placements negatively affected respondents' self-efficacy in skills emphasised towards the end of their programme and those that were more associated with teacher subject knowledge [10] rather than teachers' personal attributes. Patterns in the data also suggested that curtailment also reduced the opportunities for the first cohort respondents to perceive the connections between individual teaching skills [5].

The support of mentors and tutors during school experience and ITE programmes delivered would normally contribute to the development of these [11] [12]. The current paper eliminates differing levels of school contact during lockdown for the first cohort, and the variety of disruptions experienced by the second cohort as possible factors in the respondents maintaining high self-efficacy scores. These differences in school placement experiences could not be linked with self-efficacy scores for teaching skills. This further supports the suggestion that personal teacher attributes such as strong teacher identity and resilience are possible explanations for the high self-efficacy skills demonstrated during the pandemic.

Keywords: Self-efficacy, qualified teacher status, initial teacher education, pre-service teachers, England, onion model for reflection, teacher identity, resilience, mixed methods, Covid-19.

## 1 INTRODUCTION

During the Covid-19 pandemic drastic anti-viral infection measures were necessary to protect the most vulnerable in society and ensure that health services could cope until vaccines could be developed and administered. In the United Kingdom (UK) this involved two periods of national lockdown that alternated with times when people were allowed to mix according to regulations specifying location and numbers, and the maintenance of social distancing and hygiene strategies intended to slow down infection rates. The full impact of implementing these anti-viral measures is still being assessed for all aspects of society.

Education was severely disrupted, which in turn affected initial teacher education (ITE) programmes leading to qualified teacher status (QTS) in the devolved countries of the UK. This directly impacted two cohorts of preservice teachers due to be recommended for QTS in the summers of 2020 and 2021. Temporary changes removed requirements for the numbers of days they needed to train in-person at schools and QTS providers to allow these preservice teachers to be recommended for QTS. This was needed to ameliorate the effect of the first national lockdown in England, which curtailed the 2019-20 cohort's school experience placements before final training and assessment in schools was complete. These remained as it became clear that the 2020-21 cohort's ITE programmes continued to be disrupted by a shorter national lockdown and unpredictable full or partial school closures, together with absences

from school due to Covid-19. The nature of face-to-face teaching was significantly altered by the need to comply with social distancing and hygiene measures even when schools were fully open.

Teacher education practitioners at a higher education (HE) QTS provider working in partnership with schools in the northwest of England tracked the impact of anti-Covid-19 measures on pre-service teachers' self-efficacy. Conference proceedings papers [1] [2] [3] [4] [5] reported the findings from the quantitative and qualitative data from three anonymous online questionnaires using pre-validated self-efficacy items [6] [7] during 2020 and 2021. The initial aim of the surveys was to support early career teachers as they took up their first teaching appointments by identifying the areas of teaching that they had felt less confident in due to the impact of anti-Covid-19 measures on their ITE programmes. However, it became clear that the respondents' experiences could also illuminate the functions of affected areas of their ITE programmes at the QTS provider. Although the findings have been discussed fully with reference to existing theoretical frameworks [1] [2] [3] [4] [5], a brief outline of the main findings will help explain the reason for the further analysis of the data reported in this proceedings paper.

Although, the respondents demonstrated full awareness of the potentially negative impacts of anti-Covid-19 measures [2], they maintained high levels of confidence in their teaching expressed as self-efficacy scores for skill statements in the categories: pedagogy, behaviour management and engagement [1]. There were differences between mean scores for skill categories, some individual skill statements and between the two cohorts of pre-service teachers surveyed, and the positive impacts identified by respondents [2] partly explained these. Bandura's [8] framework of major influences on self-efficacy and Korthagen's [9] onion model for reflection were utilised to seek plausible explanations consistent with respondents' high self-efficacy scores, which, contrary to pre-pandemic studies' findings, increased during the ITE programmes for the second cohort [1] [2] [3]. For the first cohort of respondents, premature curtailment of school placements negatively affected self-efficacy in skills practiced more independently towards the end of their programmes, and those linked to teacher subject knowledge [10] rather than personal attributes [4]. Patterns in the data also suggested that such curtailment also reduced the opportunities for the first cohort respondents to perceive the connections between individual teaching skills [5].

With reference to Bandura's framework [8], the pandemic reduced opportunities for respondents from both cohorts to practice teaching in the classroom and to receive feedback (mastery and persuasion experiences) and also to observe more expert colleagues (vicarious experiences). Respondents acknowledged other opportunities for vicarious experiences through mentor and tutor support and supplementary ITE materials provided online [2]. They reported [2] that these improved their teacher subject knowledge [10] and raised affective states, helping to maintain their confidence. However, most open responses expressed their awareness of the potential negative impacts of pandemic ITE programme experiences on the development of teacher subject knowledge and skills [2].

Korthagen's onion model [9] positions teaching skills or competencies between personal teacher attributes that motivate and shape teaching and the external context for teaching that facilitate or constrain it. The pandemic altered the context for teaching stimulating an immediate move to online teaching and learning and the development of media and technology-based pedagogies. This may have been stressful or exciting for respondents depending on their prior interest and expertise in this area. However, it is reasonable to assume that positive personal teacher attributes would also have compensated for negative impacts of anti-Covid19 measures and contributed to maintaining positive affective states and high levels of confidence to teach.

Applying Bandura's [8] and Korthagen's [9] models suggest that plausible explanations for differences between the mean efficacy scores ascribed by respondents can be found in their open responses describing the positive and negative impacts of anti-Covid-19 measures on their ITE programmes [1] [2] [3]. These models [8] [9] also help theorise observed patterns in the data in terms of the ITE programme structure that was disrupted during the pandemic [4] [5]. It is also plausible to suggest that the overall high levels of confidence to teach indicated by the self-efficacy scores could be linked to maintaining positive affective states [8] overriding the negative impacts of a disrupted context for teaching [9]. Both the online support of mentors and tutors and the preservice teachers' own positive personal attributes could have contributed to this. There is some indication in the open responses [2] [3] that some respondents developed effective professional working partnerships with tutors, mentors and other teachers more rapidly than would have been the case during normal times. Others mentioned the importance of specific personal characteristics that supported their self-efficacy during the pandemic [2] [3]. The pandemic may have been a catalyst for the preservice teachers that responded to the survey to develop new attributes linked to their teaching such as a strong teacher identity [11] or strong resilience [12].

This paper further analyses the self-efficacy scores ascribed by the respondents for all three surveys by giving a numerical score to their pandemic experiences responses and correlating these to their self-efficacy scores. For the first cohort, a significant positive association between respondents' self-efficacy scores and scores for continued involvement with their placement school during lockdown would suggest that mentors played a role in maintaining high self-efficacy. For the second cohort, significant negative associations between self-efficacy scores and the scores for reported disruption to school placements would suggest mentors contributed to self-efficacy scores. Such associations could indicate the individual teaching skills and categories that mentors and supervising teachers in school had a major influence on during the two phases of the pandemic.

## 2 METHODOLOGY

This paper provides further quantitative analysis of practitioner research, survey data and is part of a mixed methods investigation of preservice teacher self-efficacy during the Covid-19 pandemic [1] [2] [3] [4] [5].

On three occasions participants were invited from all final year preservice teachers on ITE programmes at a HE QTS provider in partnership with schools in the northwest of England. The study followed British Education Research Association (BERA) ethical research guidelines [13] and was categorised as posing minimum ethical risks (20/EDC/006). Participants were invited by email and provided with a link to the survey. The participant information page explained the aims of the research and that participation was voluntary. It explained that completing or partially completing the questionnaire implied informed consent for responses to be analysed and reported anonymously. Participants were traceable and could withdraw their responses from the study at any time for any reason. The page also gave researchers' contact details for further information, complaints or to request data to be withdrawn.

The research question for the new analysis was: During the Covid-19 pandemic, what was the effect of variations in the levels of school contact or school disruption on preservice teachers' confidence to teach expressed as self-efficacy scores for teaching skills?

### 2.1 Data gathering

Pre-service teachers at a HE QTS provider working in partnership with schools in in the northwest of England were invited on three occasions to respond to an anonymous online survey. The timing of the surveys is shown in Fig. 1, which also indicates the phases in the respondents' ITE programme and the anti-Covid-19 measures in place at the time. The maximum response possible was 500 for each survey. The 2019-20 cohort was surveyed at the end of their ITE programmes and the 2020-21 cohort at the start and end. This is a self-selecting, non-random, convenience sample [14] with n1=166, n2=78, and n3=110. This was sufficient sample size for statistical analysis but not statistical inference [15], and no attempt has been made to extrapolate findings to larger populations of preservice teachers.

Year	2019					2020					2021									
Month	September	December	January	April	July	September	December	January	April	July	September	December	January	April	July					
ITE Programme	Start					End					Start									
School Placements	4 days a week		5 days a week								4 days a week		5 days a week							
Phase of Training	Induction		Practice			Demonstrating competence					Induction		Practice			Demonstrating competence				
Covid-19 Measures						All schools closed, placements terminated					Social distancing, hygiene and other measures		All schools closed, placements interrupted			Social distancing, hygiene and other measures, absences, and localised closures				
Questionnaires distributed online						2019-20 Cohort End of Programme Survey					2020-21 Cohort Start of Programme Survey					2020-21 Cohort End of Programme Survey				

Figure 1 The data gathering timeline

Each survey had a common core structure and organisation with twenty-four pre-validated teacher self-efficacy items [6][7], in three sets of eight skills, categorised as Pedagogy, Behaviour Management and Engagement. Participants were asked to rate their confidence to demonstrate each skill as a self-efficacy score: 1-5 for lower confidence, and 6-10 for higher confidence levels. Participants were able to expand or explain their scores using open response items which were unrestricted and voluntary. Respondents were also asked to share anonymous demographic information and details regarding the respondent's ITE programme pandemic experiences.

Survey items asked the 2019-20 respondents to indicate if they had experienced up to seven levels of post lockdown contact with their placement school, ranging from no contact with school to frequent contact and acting in support as a volunteer. For each respondent, a score of 1 was added for each type of contact above none, giving a range of scores between 0 and 6. In both 2020-21 cohort surveys, respondents were asked to indicate their experience of up to seven types of school disruption ranging from nothing more than social distancing and hygiene measures to temporary full school closures. A score of 1 was added for each different disruption reported by a respondent, giving a range of scores between 1 and 7.

## 2.2 Data analysis

Using spread sheet formulae, Pearson's ( $r$ ) correlation coefficient [16] was calculated for each of the twenty-four self-efficacy items and numerical scores for the level of school contact during lockdown reported by the 2019-21 respondents, or the level of school disruption that 2020-21 participants reported. An effect size metric, the proportion of variance expressed as a percentage (POV%), was also calculated using each correlation coefficient:  $POV\% = r^2 \times 100$  [15].

Correlation coefficients have values ranging from 1 through 0 to -1, where 1 indicates a perfect positive correlation, 0 indicates both variables changing randomly, and -1 a perfect negative correlation [16]. The further away from 0 the correlation coefficient, the smaller the probability that the correlation is due to random variation. The probability of obtaining a particular correlation coefficient at random for a given number of pairs of variables can be obtained from Pearson distribution probability tables [16]. If that probability is 5% or less, the null hypothesis ( $H^0$ ) is rejected and the conclusion reached that there is a correlation with a non-random cause with a 5% or less chance that the conclusion is in error [16]. A significant correlation is not enough to establish a causal relationship between two sets of paired variables. However, this is one possible conclusion, which can be confirmed or rejected by further investigation [15] [16].

The statistical  $H^0$  for the 2019-20 survey was there was no correlation between respondents' self-efficacy scores and their scores for post lockdown contact with their schools. For the 2020-21 surveys the  $H^0$  was there was no correlation between respondents' self-efficacy scores and scores for the level of school disruption due to anti-Covid-19 measures.

Effect size metrics describe the overlap or separation between distributions of variables without any reference to the probability that the distributions are random [15]. The POV% metric describes the percentage of variance common to two sets of data. It is possible for non-significant correlations to demonstrate small to medium effect sizes using Cohen's categories applied to POV%, small 1-8%, medium 9-24%, large 25% and above.

## 3 RESULTS

Table 1 reports the correlation coefficients ( $r$ ) and effect sizes (POV%) derived from three anonymous online surveys, comparing scores for each self-efficacy item with scores for post lockdown involvement with placement schools for the 2019-2020 cohort respondents, and levels of school disruption due to anti-Covid-19 measures experienced by the 2020-21 respondents.

For the 20219-20 end of ITE programme survey, Table 1 indicates two pedagogy skill items with significant positive correlations to the level of school contact and involvement during lockdown. Although, there were no other significant correlations, thirteen of the twenty-four self-efficacy items demonstrated small or medium effect sizes. Overall, this is not consistent with more contact and involvement with placement schools contributing much to the 2019-20 respondents' confidence to teach.

At the beginning of their ITE programmes, Table 1 suggests that 2020-21 respondents' confidence to teach was negatively influenced by higher levels of disruption in placement schools due to anti-Covid-19 measures, particularly with regard to Behaviour Management and Engagement skills. Six behaviour management and three engagement skill items demonstrated significant negative correlations between self-efficacy scores and those for placement school disruption. Nineteen of the twenty-four self-efficacy items demonstrated small or medium effect sizes. However, there were no significant correlations indicated by the 2020-21 end of ITE programme survey and only nine out of twenty-four self-efficacy items demonstrated small effect sizes. Disruption to placements schools affected the confidence to teach of the 2020-21 respondents at the beginning of their ITE programmes but was not demonstrated again by the end of programme survey.

*Table 1 Pearson's correlation coefficient (r) and proportion of variance expressed as a percentage (POV%) for preservice teachers' scores for self-efficacy and 2019-20 respondents' post lockdown contact with school, and 2020-21 respondents' level of school disruption due to anti-Covid-measures.*

Teaching skill category	Item	Correlation coefficient, Pearson's r (POV%) <sup>a</sup>			
		Survey	2019-20 end n=166	2020-21 start n=78	2020-21 end n=110
Pedagogy	1		0.17* (2.9)	-0.12 (1.5)	0.08 (0.7)
	2		0.15 (2.4)	-0.10 (1.0)	0.11 (1.2)
	3		0.15 (2.3)	-0.03 (0.1)	0.12 (1.4)
	4		0.00 (0.0)	-0.08 (0.6)	0.03 (0.1)
	5		0.22* (4.7)	-0.06 (0.4)	0.09 (0.8)
	6		0.12 (1.4)	-0.16 (2.7)	-0.05 (0.3)
	7		0.14 (2.0)	-0.17 (2.8)	0.13 (1.7)
	8		0.13 (1.7)	-0.12 (1.5)	0.06 (0.4)
Behaviour management	1		0.08 (0.6)	-0.28* (7.6)	0.06 (0.4)
	2		0.06 (0.3)	-0.23* (5.1)	0.08 (0.6)
	3		0.08 (0.7)	-0.27* (7.0)	0.07 (0.5)
	4		0.10 (1.1)	-0.20 (4.1)	0.11 (1.2)
	5		0.03 (0.1)	-0.27* (7.2)	0.02 (0.1)
	6		0.02 (0.0)	-0.25* (6.4)	0.07 (0.5)
	7		0.07 (0.5)	-0.18 (3.3)	0.11 (1.3)
	8		-0.03 (0.1)	-0.31* (9.4)	0.12 (1.4)
Student engagement	1		0.11 (1.1)	-0.20 (3.8)	0.06 (0.4)
	2		0.10 (1.1)	-0.27* (7.0)	0.09 (0.7)
	3		0.03 (0.1)	-0.30* (9.0)	0.02 (0.1)
	4		0.14 (1.9)	-0.03 (0.1)	0.06 (0.3)
	5		0.08 (0.7)	-0.06 (0.4)	0.12 (1.4)
	6		0.12 (1.4)	-0.20 (3.9)	0.16 (2.6)
	7		0.14 (1.9)	-0.17 (2.9)	0.12 (1.4)
	8		0.10 (0.9)	-0.24* (5.8)	0.08 (0.7)

<sup>a</sup> Effect size categories: 1 - 8 small, 9 - 24 medium, 25 and above large

\* P = 0.05 or less

The 2019-20 respondents' school experience placements were terminated before final training and assessment were completed. In their end of ITE programme survey, the pedagogical skill self-efficacy scores significantly positive correlated to higher levels of contact and involvement with placement schools during lockdown were for items 1 and 5 with small effect sizes (Table 1). These referred to being able to use a variety of assessment techniques and answering challenging questions raised by pupils.

For the 2020-21 start of programme survey there were significant negative correlations between higher levels of placement school disruption due to the pandemic and behaviour management skills self-efficacy scores for items 1, 2, 3, 5, 6 and 8, and for engagement skills items 2, 3 and 5 (Table 1). The significant behaviour management items referred to respondents' ability to control disruptive behaviour, apply rules and establish routines, calm individual disruptive learners, manage a few problem pupils to keep a lesson on track, and respond to defiant pupils. These all demonstrated small effect sizes apart from establishing routines, which was medium (Table 1). The significant engagement skill items referred to respondents' ability to foster a love of learning, motivate disaffected learners and help learners who

were falling behind the class. The items demonstrated small effect sizes apart from motivating disaffected learners, which was medium (Table 1).

## 4 DISCUSSION

The 2019-20 cohort of respondents started their ITE programmes in September 2019 spending the majority of their time in partnership schools on school experience placement until March 2020 when the introduction of national lockdown closed schools apart for the children of key workers [17]. In July 2020, to be recommended for QTS in England there were two main criteria. At the point that their school placements were terminated due to anti-Covid-19 measures, mentor and tutor assessments needed to indicate that a preservice teacher was on track to meet the Teachers' Standards [18] assuming expected progress for the remainder of the ITE programme. Preservice teachers were also required to maintain engagement with the alternative ITE programme offered online by their QTS provider. They were encouraged but not required to keep in contact with their mentors and placement schools and to volunteer their help online and in the production online materials. For the purposes of this discussion, this meant that the preservice teachers were in regular contact with tutors from their QTS provider but that their contact and involvement with placements schools was much more variable [1] [2] [3].

It is plausible to suggest that 2019-20 respondents' self-efficacy scores could be affected by the differing levels of involvement with their placement schools, which could have resulted in more mastery, persuasion and vicarious experiences [8], albeit of a different kind to face-to-face full class teaching. Also, the differing levels of opportunity for online support from school mentors and other teachers could have influenced affective states and self-efficacy teaching skills [8]. However, the analysis in Table 1 suggests that for the skills surveyed these were a small influence. There were small effect sizes for all but one pedagogy skills items, two of which demonstrated significant correlations. There were no significant correlations for the other skills categories but some small effect sizes, one in behaviour management and five in the engagement category). By process of elimination, this suggests that the high self-efficacy scores ascribed by the 2019-20 respondents were affected more by individual personal teacher attributes [9].

The 2020-21 cohort began their ITE programmes in September 2020 able to attend school and the QTS provider in person but with social distancing and hygiene protocols in place and facing unpredictable disruptions due to local partial and full school closures, absences, and changes in school routines and organisation to reduce Covid-19 infections. The start of ITE programme survey covered the period before the second shorter national lockdown with school closures in January 2021. The preservice teachers were able to attend in person once more when this finished. Their end of ITE programme survey covered the period of the full programme. Both surveys asked respondents to report the level of disruption to their school experience placements that they had experienced. There were respondents who could report experiencing nothing more than social distancing and hygiene protocols, but these were relatively few by the end of the programme [1] [2] [3].

Again, it is plausible to suggest that differing levels of school disruption due to anti-Covid-19 measures could affect self-efficacy scores for teaching skills by reducing opportunities for mastery, persuasion and vicarious experiences [8] and that positive affective states [8] could also be affected by disruptions that reduced 2020-21 respondents' access to mentors and supporting teachers. Table 1 suggests that disruption influenced the self-efficacy scores ascribed for teaching skills at the start of 2020-21 ITE programmes. The majority of items demonstrated small or medium effect sizes. Six behaviour management and three engagement skill items demonstrated significant negative correlations between self-efficacy scores and those for placement school disruption. However, by the end of the 2020-21 respondents' ITE programmes this effect has disappeared. There are no significant negative correlations, and the majority of items demonstrate negligible effects. This could be related to the development of individual personal teacher attributes [9] such as agency, teacher identity and resilience. According to Korthagen's model [9] personal teacher attributes underpin teaching skills and their practical implementation in context. Positive teacher attributes will also contribute to positive physiological and affective states, one of Bandura's major influences on self-efficacy [8].

Agency is a personal attribute [9] that has been has different facets: inquisitive, deliberative, recognitive, responsive and moral [19]. Agency enables teachers to act independently and correctly in novel situations. It is clearly also a part of teacher identity. Preservice teachers with strong personal identities are more likely to develop strong teacher identities but sometimes these become more refined through teaching practice [12]. However, it is plausible to suggest a strong teacher identity would help maintain a positive affective state and self-efficacy [8] during the challenges posed by qualifying to teach during

a pandemic, even if it is developed in abnormal circumstances. Resilience has been studied with regard to teacher attrition and retention. Drew and Sosnowski [11] identified that resilience is maintained when teachers are committed to their organisation's community and share its aims, learn from both negative and positive experiences, and maintain positive working relationships with learners, colleagues and mentors. This seems to describe the necessary personal attributes [9] to maintain positive affective states [8] and self-efficacy to teach in a pandemic.

## 5 CONCLUSIONS

These conclusions refer only to the preservice teachers on ITE programmes at a HE QTS provider working in partnership with schools in the northwest of England, who responded to three anonymous online surveys during the Covid-19 pandemic in 2020 and 2021.

During lockdown, contact and involvement with mentors and teachers at placement schools played a small part in maintaining 2019-20 respondents' confidence to teach indicated by high self-efficacy scores for teaching skills.

At the start of their ITE programmes, disruption in schools affected normal mentoring processes to negatively impact the 2020-21 respondents' self-efficacy scores, particularly for behaviour management and engagement skills.

At the end of their ITE programmes, disruption in schools was not associated with 2020-21 respondents' self-efficacy scores for teaching skills.

Previous analysis has rejected the idea that compensating positive aspects of respondents' pandemic ITE programmes could explain the generally high self-efficacy scores for teaching skills in all three surveys [1] [2] [3]. Also, the current analysis is not consistent with the argument that major factors influencing high self-efficacy scores were maintaining contact and involvement with placement schools during lockdown or experiencing less disruption in placement schools later in the pandemic.

Already possessing or rapidly developing positive teacher attributes whilst qualifying to teach during the Covid-19 pandemic remains the probable key factor in maintaining respondents' confidence to teach.

Further practitioner research is now in progress to investigate the development of teacher autonomy and resilience during ITE programmes in cohorts of preservice teachers whose prior education was disrupted by the Covid-19 pandemic.

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