



Did the Emergency Transition to Online Instruction Due to COVID-19 Impact Faculty Self-Efficacy for Online Teaching?

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Abstract

The purpose of this study was to examine the effect of the emergency transition to online instruction due to COVID-19 on faculty self-efficacy for online teaching. Data were collected via survey in January 2022 from 83 faculty at a private, science and technology-focused university in the United States. Overall, respondents showed a mean increase in online teaching self-efficacy of 7.4%. Notably, not only did the mean self-efficacy increase, but the dispersion decreased, which suggests that the experience of the emergency transition to online teaching may have had an equalizing effect on online teaching self-efficacy. Additionally, the change in online teaching load from pre-COVID to post-COVID was a significant predictor in the post-COVID time period, indicating that having a higher percentage of their teaching load as online courses improved faculty's post-COVID online teaching self-efficacy. Administrators should consider diversifying the modalities in which faculty teach to provide ongoing exposure to online teaching, which will support faculty online teaching self-efficacy and, thus, help better prepare universities for any future unexpected transition to online instruction.

Keywords: *online teaching self-efficacy, teaching self-efficacy, online teaching, online instruction*

1. Introduction

In today's higher education landscape, universities are faced with the challenge of adapting to constantly changing technologies and evolving educational delivery models^[6]. In March 2020, these challenges became urgent as the COVID-19 pandemic required most universities to emergently transition to online instruction, a disruptive experience for many faculty and students^[12].

Self-efficacy is defined as a person's expectations about how effectively they will perform at a given task, which determines whether they will initiate coping behaviors in the face of obstacles^[2]. Previous research has demonstrated that high self-efficacy for teaching is correlated with positive student outcomes^[1], teachers' ability to be flexible in the classroom^[3], and a decrease in teacher stress^[11]. However, context is crucial because teachers' sense of self-efficacy is not consistent across all situations^[14]; therefore, even if teachers had high teaching self-efficacy prior to the pandemic, the transition may have caused them to re-evaluate those beliefs^[4]. When faculty have a greater sense of self-efficacy, they gain more flexibility in their ability to integrate current skills into new contexts^[9] and in the specific context of online instruction, length of experience teaching online correlates with higher online teaching self-efficacy^[13]. Therefore, faculty with higher teaching self-efficacy and with more previous experience teaching online were likely better able to persist through the difficulties of teaching during the pandemic. A better understanding of the effect of this experience would assist administrators in prioritizing strategies to improve faculty online teaching self-efficacy, the impacts of which could include improving student learning outcomes in online courses, increasing faculty satisfaction teaching online, shifting institutional culture^[7], and better preparing universities for possible future unexpected disruptions. Consequently, the purpose of this study was to examine the impact of the emergency transition to online instruction due to COVID-19 on faculty self-efficacy for teaching online at a private, science and technology-focused university in the United States.

2. Methodology

Survey data were collected in January 2022 from 83 faculty at a private, science and technology-focused university in the United States. The survey revised 22 items from the Online Teaching Self Efficacy Inventory^[5] into a four-point Likert scale retrospective pre-test (pre-COVID) and post-test



(post-COVID) design. Items from the Teacher’s Sense of Efficacy Scale^[14], a self-efficacy scale non-specific to online teaching, were also included. For data analysis the items were combined into depth scales, which assumed that a value selection on the Likert scale represented the intensity of the respondent’s agreement.

3. Results

Respondents were predominately white (58, 69.9%), male (59, 71.1%), had doctoral degrees (51, 61.5%) and were employed as full-time faculty (63, 75.9%). The mean age of the respondents was 53.9 years and the mean length of experience was 16.3 years. In total, most respondents taught at both the undergraduate and graduate level (38, 45.8%), while 25 (30.1%) taught at only the undergraduate level and 20 (24.1%) taught at only the graduate level. For the 63 respondents who taught at the undergraduate level, teaching in-person was preferred (30, 47.6%). For the 58 respondents who taught at the graduate level, most preferred hybrid (36, 62.1%).

Respondents were asked “Prior to March 2020, how would you have rated your confidence with online teaching?” on a scale of 0-100 with a score of 100 being the most confident possible. This variable, referred to as Pre-COVID Confidence Rating, had a mean of 78 out of 100 with a standard deviation of 22.44. Respondents teaching only undergraduates had lower ratings than those teaching only graduate students, likely because prior to the pandemic most graduate programs were hybrid; thus, faculty teaching in graduate programs had more experience teaching online.

Overall, respondents showed an increase in the depth of their online teaching self efficacy from pre-COVID to post-COVID of 7.4%. Notably, not only did the mean increase, but the dispersion decreased, which suggests that the experience of the emergency transition to online instruction may have had an equalizing effect on online teaching self-efficacy.

Table 1: Summary of Descriptive Statistics

Variable		\bar{x}	s	Min	Max
Pre-COVID Confidence Rating (out of 100)		78.10	22.44	1.00	100.00
Online Teaching Self Efficacy Depth Scale Score (in points)	Pre-COVID	67.12	11.41	34.00	87.33
	Post-COVID	73.61	9.20	49.67	88.00

Pre-COVID and post-COVID regression models were estimated using the Online Teaching Self-Efficacy Depth Scale as the dependent variable. In the post-COVID equation, four variables proved significant. The Age and the Business/Data Sciences Content Area variables were both negative, while the Pre-Covid Confidence Rating and Change in Mean Percentage of Online Teaching Load variables were positive. The gender and race/ethnicity variables were not significant.



Table 2: Post-COVID Regression Results

Variable	Regression Coefficient b	t
(Constant)	51.534	7.479
Gender = Male	-1.817	-1.031
Race/Ethnicity = White	-.514	-.282
Age (in years)	-.301	-3.508***
Teaching Experience (in years)	.125	1.556
Content Area = Business/Data Sciences	-1.718	-.906
Pre-COVID Confidence Rating	.130	3.108**
Change in Mean Percentage of Online Teaching Load	.065	2.035*
Non-Specific Teaching Self-Efficacy Depth Scale Score	.372	4.733***

Dependent variable: Post-COVID Online Teaching Self-Efficacy Depth Scale, $R^2 = .429$, $F(8, 74) = 6.95$, $p < .00$

* $p < .05$ level. ** $p < .01$ level. *** $p < .001$ level.

In comparing the pre/post models, the age coefficient was negative in both equations. The older a person was, the lower their self-efficacy score; however, the effect was less in the post-COVID period, suggesting older respondents experienced a greater change in their online teaching self-efficacy than younger respondents. Also, the positive relationship between Pre-COVID Confidence Rating and online teaching self-efficacy was significant both pre- and post-COVID; however, the coefficient in the post-COVID model ($b = .130$, $p < .01$) was half that of the pre-COVID model ($b = .266$, $p < .001$), suggesting that respondents with lower Pre-COVID Confidence Ratings had a greater improvement in their online teaching self-efficacy scores. The experience acted as a confidence equalizer. Additionally, the change in mean percentage of online teaching load from pre- to post-COVID was significant ($B = .065$, $p < .05$) indicating that having a higher percentage of their teaching load as online courses improved faculty's online teaching self-efficacy. Lastly, the positive relationship between scores on the Non-Specific Teaching Self-Efficacy Depth Scale and online teaching self-efficacy was significant in both pre and post-COVID equations, but non-specific teaching self-efficacy had a greater effect on online teaching self-efficacy after two years of teaching online than it did pre-COVID.

4. Limitations

The study relied on a relatively small ($n=83$) convenience sample from a single university limited to science and technology fields. Also, data collection relied upon the respondents' self-reported introspection of their own perceptions; however, since the concept of self-efficacy is based in introspection, this is unavoidable. Lastly, the retrospective pre-test design required that the respondents recall their perceptions from two years prior. Therefore, while the findings of the study are thought-provoking, they cannot be assumed to generalize to the broader field of higher education unless the study is replicated. Opportunities for further research include adapting this study to use a standard pre-test/post-test design and implementing it at institutions of differing size, content focus, etc. Additionally, longitudinal studies will be crucial in examining whether online teaching self-efficacy persists over time without ongoing exposure to teaching online.

5. Implications

Much of the education sector was understandably unprepared for the emergency transition to online instruction due to COVID-19, negatively impacting both students and educators^[8]. The idea that a major disruption will not happen again is comforting, but likely not reality. The yearly probability of extreme epidemics may increase up to threefold in the coming decades^[10]. Also, the number of natural disasters has increased by a factor of five over the 50-year period since 1970^[15]. No matter the cause, institutions need to be better prepared for the possibility of unexpected future disruption.



High teaching self-efficacy is correlated with overcoming many of the challenges educators faced during the COVID-19 disruption and, to put it simply, teaching online improves online teaching self-efficacy. Educators with more experience teaching in the online environment have higher online teaching self-efficacy. Whether online teaching self-efficacy persists over time without continued exposure to online teaching is unknown, but given the constant evolution of educational technologies, it is likely there will be some need for ongoing maintenance of relevant skills. Administrators should consider policies that expose new faculty to online teaching early on and diversify the modalities in which all faculty teach. These strategies will help support ongoing faculty online teaching self-efficacy and better prepare the university for any potential future unexpected transition to online instruction.

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