Teacher Self-Efficacy in Student Engagement and Instruction during the COVID-19 Pandemic: An Examination of Group Differences and Predictors in Ethiopian Universities

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Abstract: *Teacher self-efficacy is relevant for universities, particularly in the COVID-19 context, since previous studies found it positively associated with their commitment to teaching. While there have recently been studies on teacher self-efficacy in the COVID-19 context, there is still very little empirical research on university teachers' self-efficacy in the literature, particularly in the sub-Saharan context. Based on a social cognitive theory framework, this study identified the extent of teachers' self-efficacy in the COVID-19 context in universities in Ethiopia and further examined differences and predictors across some personal, instructional, and institutional factors. F or this, the study used a cross-sectional survey design to collect quantitative data from teacher participants (n = 147) from four purposefully selected public universities in Ethiopia that completed the short form Teacher Sense of Efficacy Scale two dimensions: student engagement and instructional efficacy. The findings of the study highlight those teachers generally demonstrated average levels of self-efficacy, with low to moderate variations based on their academic rank and career stage (Cohen's d =.39-.46). Moreover, the results of the hierarchical regression analysis emphasized the significant predictability of perceived instructional quality and institutional support on teachers' self-efficacy. These findings underscore the importance of providing university teachers professional development opportunities to effectively fulfill their professional responsibilities in these circumstances and beyond. The implications of these findings are further explored in detail.*

Keywords: COVID-19; Ethiopia; Self-efficacy; Survey; University teacher

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Introduction

Teacher self-efficacy is defined as teachers'' belief in their ability to effectively teach and manage learning processes (Lazarides & Warner, 2020), and a key predictor of educational outcomes, such as student engagement, academic performance, and classroom management (Klassen & Tze, 2014). This construct becomes even more critical in times of crisis or rapid change, such as the global shift to online education prompted by the COVID-19 pandemic. (Baroudi & Shaya, 2022; Cataudella et al., 2021; Guoyan et al., 2021; Pressley & Ha, 2021).

Before 2020, much of the research on teacher self-efficacy focused on traditional, in-person teaching environments ((Tschannen-Moran & Hoy, 2001). However, the pandemic significantly disrupted these traditional settings, forcing educators, including university teachers, to adapt to online and hybrid teaching models, often with little preparation or support. (Moorhouse & Kohnke, 2021).

The COVID-19 pandemic triggered a rapid and unprecedented shift to online education across universities globally. Teachers faced challenges adapting to online platforms, maintaining student engagement, and managing technology, which may have impacted their self-efficacy. Studies show that teachers' sense of self-efficacy directly affects their ability to cope with new and challenging teaching environments. Hodges et al. (2020) coined the term "emergency remote teaching" to differentiate between thoughtfully designed online courses and the crisis-driven shift to online instruction during the pandemic. This emergency transition meant teachers had to adapt quickly without sufficient training, negatively impacting their confidence and self-efficacy in using technology effectively for learning. (Pokhrel & Chhetri, 2021).

COVID-19 has had a devastating impact on universities and university systems worldwide, damaging the academic, emotional, social, professional, and economic lives of teachers and students in unprecedented ways (Akour et al., 2020; Baltà-Salvador et al., 2021;

Leal Filho et al., 2021; Ross, 2020). During the lockdown and after the universities reopened, teachers had to modify their approach to instruction and research advising due to COVID-19 policies. (Bishaw et al., 2022; Mengistie, 2021; Peruzzo et al., 2022). Hence, students and teachers returned to universities facing drastically different academic and research environments, routines, and pedagogical approaches (Rashid & Yadav, 2020). This results in shifting away from face-to-face teaching to blended and online learning modalities (Egielewa et al., 2021; Webb et al., 2021) and taking the lead in using digital technologies to address research needs (Sokhulu, 2021).

Studies underscore the profound impact of the COVID-19 pandemic on university teachers' self-efficacy. For example, Pokhrel and Chhetri (2021) note that the lack of preparedness for online teaching significantly undermined teachers' confidence, especially among those unfamiliar with digital tools. Teachers previously engaged in online or blended learning had an easier time adapting and reported higher self-efficacy during the pandemic compared to their less experienced peers (Bubb & Jones, 2020).

Self-efficacy is a person's ‘belief in one's capabilities to organize and execute the courses of action required to produce given attainments’ (Bandura, 1997, p. 3). Teacher self-efficacy is relevant for universities, particularly in COVID-19, since previous studies have found that teacher self-efficacy is positively associated with their commitment to teaching (Zee & Koomen, 2016). Moreover, considerable research shows that teachers with higher self-efficacy are more willing to try new teaching methods (Hampton et al., 2020), display key planning and organization skills (Holzberger et al., 2013), generate effective ways of solving problems (Bray-Clark & Bates, 2003), and develop strategies for dealing with difficult teaching situations (Lazarides & Warner, 2020).

Traditional educational settings were severely disrupted by the COVID-19 pandemic, which compelled university teachers to adjust to hybrid and remote learning (Dhawan, 2020). This sudden shift necessitated the development of new skills and strategies, including mastering digital platforms, adapting curriculum, and managing students remotely (Moorhouse & Kohnke, 2021). Teachers' self-efficacy (belief in their ability to manage and succeed in these new environments) became critically important.

Additionally, the COVID-19 pandemic has posed significant challenges to the teaching profession, particularly in higher education, where instructors were often forced to teach online with little prior experience or training. While teacher self-efficacy is a well-established construct in educational research, there is a need for more focused studies on how university teachers' self-efficacy was impacted by the sudden shift to online education during the COVID-19 pandemic.

This study is significant for informing educational policy, particularly in how schools and institutions can support teachers during crises. It could lead to policies that focus on providing teachers with the necessary tools, resources, and training to maintain high self-efficacy in challenging times. The insights from the study can guide the development of university teachers' professional development programs that prioritize building self-efficacy, especially in areas such as digital literacy, classroom management during disruptions, and emotional resilience. By focusing on teachers' self-efficacy, we can help build more resilient education systems to sustain students and educators during future global crises, such as pandemics or climate-related disasters.

Statement of the problem

The adversities of the COVID-19 pandemic on university academia and research endeavors have been enormous, primarily disrupting routine teaching and learning and research advising (Börgeson et al., 2021; Goldstone & Zhang, 2022). From the teachers' perspective, the

disturbances included technological issues related to internet access, forcing university teachers to take on new approaches to planning and instruction (Yang et al., 2023), and taking various professional development (PD) opportunities to learn new technologies for communicating with students and to teach courses (Klusmann et al., 2022).

It is argued, based on Bandura (1978) reciprocal determinism theory, that instructional behavior and actions, such as teachers' constructivist beliefs and use of constructivist learning practices, are significantly positively related to teachers' self-efficacy (Guangbao & Timothy, 2021; Nie et al., 2013). Additionally, Holzberger et al. (2013) noted a substantial positive relationship between teacher self-efficacy and instructional quality. Moreover, another study on Korean middle school teachers found that a problem-based learning (PBL) instructional strategy greatly improves teacher self-efficacy, especially regarding instructional practice (Choi et al., 2019). According to another study, teachers with higher levels of self-efficacy also had higher levels of job satisfaction and lower stress levels at work (Burić & Moè, 2020). Thus, given its significant impact on instructional practices and teaching performance, teachers' self-efficacy is crucial in universities (Klassen & Tze, 2014).

Researchers have examined how COVID-19 has affected university professors since its pandemic in March 2020 (Mengistie, 2021). However, the current literature focuses primarily on the difficulties and problems encountered by teachers when making the switch to online teaching (Chen et al., 2020; Maison et al., 2021; Mockaitis et al., 2022), as well as the crises of the Higher Education institutions (HEIs) and the system (Bhagat & Kim, 2020; Marinoni et al., 2020).

While there are recent studies on teacher self-efficacy in the COVID-19 context (Culp-Roche et al., 2021; Guoyan et al., 2021; Pellerone, 2021; Pressley & Ha, 2021; Rabaglietti et al., 2021; Weißenfels et al., 2022), there is still very little empirical research on university teachers' self-

efficacy in the literature, particularly in the sub-Saharan context. Therefore, this study aims to investigate self-efficacy in student engagement and instruction among university teachers in Ethiopia during the COVID-19 pandemic and examine group differences and predictors. More specifically, this study is designed to address the following three basic research questions:

(1) What is the extent of teacher self-efficacy in instruction and student engagement in Ethiopian universities during the COVID-19 pandemic?
(2) What are the key differences in self-efficacy among university teachers during the COVID-19 pandemic?
(3) What are the main predictors of teachers' self-efficacy in student engagement and instruction among university teachers during the COVID-19 pandemic?

Studying university teachers' self-efficacy in this form is relevant as the findings can inform policies on professional development, equity in academic rank, and career stage in higher education, particularly in response to future crises that may require similar shifts in teaching modalities. Identifying the specific predictors that influenced teacher self-efficacy during the pandemic can help universities tailor their support systems to enhance teacher resilience and adaptability in the future.

This study significantly advances our understanding of teachers' self-efficacy during a global crisis, offering insights into university teachers' resilience, adaptability, and psychological well-being. It has direct implications for improving teacher training, shaping educational policy, supporting teacher well-being, and ensuring better educational outcomes, particularly during crises or emergencies.

Theoretical Framework: Social Cognitive Theory

Social cognitive theory (SCT) uses triad reciprocal causation to explain psychological functioning. Reciprocal determinism, as described by Albert Bandura (1986), is a key idea in his SCT. In this reciprocal determinism concept, the individuals (including their thoughts and feelings), their surroundings, and the behavior itself are the three components that affect behavior (Bandura, 1977). He uses the phrase "triadic reciprocal causation" to describe how the three factors—environment, behavior, and person—are mutually influenced. As a result, interactions between these three factors lead to human activity. According to Bandura's Triadic Reciprocal Model of Causality, an individual's behavior and actions are influenced by the interaction of their internal and external circumstances (Bandura, 1986).

According to SCT, a person's motivations are driven by various capabilities (Bandura, 1986). The ability of a person to perform a certain task is influenced by their surroundings, actions, and personal characteristics. According to Bandura (1977), this perspective on one's ability to produce a given outcome is known as self-efficacy.

Teachers' self-efficacy and associated factors

To complete a certain teaching assignment in each setting, a teacher must believe in her or his abilities to plan and carry out the necessary steps (Tschannen-Moran et al., 1998). Along with the four primary factors that affect self-efficacy (mastery experiences, vicarious experiences, verbal persuasion, and affective state), other factors such as personal traits, interpersonal connections, and institutional settings may also have an impact on self-efficacy (Bandura, 1997; Fackler et al., 2021; Tschannen-Moran et al., 1998).

According to earlier research, factors such as teacher sex, years of experience, and job stress all impacted teachers' self-efficacy (Klassen & Chiu, 2010). Furthermore, Hoy and Woolfolk (1993) discovered that teachers with more teaching experience had higher levels of self-efficacy. Moreover, Tschannen-Moran and Hoy (2007) identified disparities in instructional efficacy by examining the self-efficacy of novice and experienced teachers. Teachers' self-efficacy also increases due to mastery experiences, such as academic performance and favorable feedback from observers (Bandura, 1997). Additionally, self-efficacy was influenced by contextual factors, including peer collegiality and university climate (Ismayilova & Klassen, 2019).

According to Tschannen-Moran and Hoy (2007), the institutional environment does affect university teacher self-efficacy. These environments tend to have university teachers with high, attainable goals and favorable learning environments (Wolters & Daugherty, 2007). The interactions among university professors may also affect their sense of competence. For instance, those who establish greater connections with other university professors typically perform better than those who do not (Siciliano, 2016).

Methodology

Study Design

In this study, the authors employed a cross-sectional survey design to collect quantitative data from Health and Medical Sciences college teachers in four purposefully selected public universities in Ethiopia (n = 147). Given that this study was conducted during the COVID-19 pandemic season, the cross-sectional survey design was suitable for figuring out how the pandemic affected university teachers' self-efficacy. The study's focus, which looked at group differences and predictors while also assessing the magnitude of teaching self-efficacy among university teachers, was determined to be a good fit for this design. This

cross-sectional study design allowed for examining various factors without their influence in the given study period.

Study participants and sampling

This study targeted health science and medical college teachers from four purposively selected universities with an academic rank of assistant professor and higher during the 2021–2022 academic year. A three-stage sampling was used to choose participants for the teacher survey. A three-stage sampling method was applied to select the study participants. In the first stage, four public universities were purposefully selected based on their generation and geographic location representation in the country.

In the first sampling stage, four public universities were purposefully selected based on their generation and geographic location representation in the country. All selected universities were first-generation to maintain the study target population similarities. Each university was found in the country's Northern, Southern, Southwest, and Center to present the study participants geographical representation. In the second stage, the College of Health and Medical Sciences was purposefully selected because the pandemic had a greater impact on educators than other faculty members at the university. As a result, these educators likely experienced increased pressure to stay informed about the rapidly evolving information and to address the heightened concerns of their students regarding the pandemic.

In stage three, teachers (n=40) from each university were included in the sample using a stratified random sampling method. This method used the three program variants—health sciences, medical sciences, and public health sciences—academic ranks—assistant professors, associate professors, and professors—as well as sex—female and male serving as strata according to the existing data in the Human Resource Division.

The sample size was determined using a single proportion formula with 160 participants selected from a total population of 800, ensuring a 95% confidence level, 80% power, and an adjusted margin of error of approximately 0.1 (10%). This approach balanced statistical significance with practical considerations. 160 participants completed the survey, with 147 usable questionnaires retained after accounting for missing data.

Study model to examine relationships

This study examined a model of teachers' perception of efficacy using hierarchical regression analysis in which many factors predicted university teachers' efficacy in student engagement and instructional strategies. More specifically, instructional and institutional factors and teacher characteristics were included (Chang et al., 2011; Klassen et al., 2011). Our research's central hypothesis considers three interconnected layers (from proximal to distal) that may impact a university teacher's self-efficacy. These include (i) the individual characteristics of the teacher, such as demographics and personal circumstances; (ii) the instructional features, such as mode of instruction and teaching engagement; and (iii) institutional support, such as university location and satisfaction with the institution's response and support system.

The three-step hierarchical multiple regression analyses were developed based on earlier study findings indicating the factors that affect the outcomes of teaching self-efficacy (Klassen et al., 2011). In this model, common demographic characteristics and qualities of teachers are among personal variables. Teachers' academic standing and prior HE (college and university) teaching experience were also considered as personal variables because they were believed to be educationally beneficial and because it was demonstrated that these constructs correlated with the chosen response variables, including teachers' self-efficacy in student engagement and instruction (Cataudella et al., 2021; Pressley & Ha, 2021).

Measures

In this study, the authors collected demographic information on university teachers, including sex and age. Also, the authors collected contextual information such as academic rank, years of teaching experience, instructional type, and university location. A binary sex categorization (male/female) was applied. Sex and age were identified based on the participant's responses to the self-reported questionnaire.

Regarding age, following a career stage theory (Super, 1980), teacher participants' ages were categorized into five career stages: early career stage (18–29 years of age), developing career stage (30–39 years), consolidating career stage (40–49 years), late-career stage (50–59 years) and pre-retirement stage (age 60+) (Cohen, 1991; Veiga, 1983). The age groups were divided into two categories due to the smaller number of participants in some categories. The first category includes early and developing career stages (27-39 years), while the second category includes consolidating career, late-career, and pre-retirement stages (40 years and above). Moreover, university teaching experiences were classified based on Palmers and his colleague's (2005) recommendations to use 5 categories to group teachers: TE1 (Below 5 years), TE2 (5-10 years), TE3 (11-15 years), TE4 (16-20 years), TE5 (Above 20 years).

Due to its generally easier administration, it was decided to employ the survey questionnaire as the only means of gathering data. Because statistical analysis was the study's main objective and there was a large sample size, standardized responses made it easier to measure and analyze. Additionally, the short form of the Teachers' Sense of Efficacy Scale (TSES) (Tschannen-Moran & Hoy, 2001) was used, which has seven items and measures instructional and student engagement efficacies. The TSTE short form's 12 items were originally intended to measure teaching self-efficacy in three areas: classroom management, instructional effectiveness, and student engagement. Instead of doing a validity study of the short-form self-efficacy instrument, the researcher

adopted the two dimensions based on Pressley and Ha (2021) recommendations and considered the pragmatic character of the research to assess instructors' levels of self-efficacy during the COVID-19 pandemic. The TSES uses a 5-point scale that asks university teachers to rate from 1= nothing, 2= very little, 3= some influence, 4= quite a bit, and 5= a great deal. Example questions include, "How much can you do to get postgraduate students to believe they can do well in academic and research work?" and "How much can you use a variety of assessment strategies?" Since the Likert scale employed has 5 points, 3 was chosen as the scale's middle or neutral point, aiding in quickly identifying middle-ground or neutral responses during response analysis.

One of the major factors influencing teachers' beliefs in their abilities to deliver their professions is perceived instructional quality (Klassen et al., 2012). The researcher utilized a single three-item component to assess instructional quality. A set of physical resources, procedures, or services that a university makes available to its faculty members to facilitate their effective performance is called institutional support. The institutional support measure utilized had three items and a single component.

The authors in this study adopted teachers' self-efficacy measures for several reasons. Firstly, university teachers' self-efficacy, their belief in their ability to influence student outcomes, is connected to teaching practices and student achievement. By measuring self-efficacy in this study, there would be a better understanding of how confident teachers are in handling challenges, which directly impacts their teaching effectiveness. Also, teachers with higher levels of self-efficacy are often associated with improved student outcomes, such as academic performance and student engagement. In this study, the authors utilized self-efficacy measures to investigate this relationship and identify factors that could enhance or hinder teacher confidence. Within the context of this study, measuring teacher self-efficacy allowed for an exploration of the impacts of the COVID-19 pandemic.

A measurement and evaluation specialist and a health professional educator first examined the questionnaire items for content validity. They provided inputs that guided the refinement of the teachers' self-efficacy and other parts of the questionnaire. They ensured that the items were clear, relevant, comprehensive, and appropriate for the context in which it was used. The feedback led to rewording, adding or removing items, and adjusting the response scales as needed.

Using a pilot sample of teachers from the College of Education and Behavioral Studies at Addis Ababa University (n = 25), estimates of internal consistency for the factor scores of the two components of teachers' self-efficacy, instructional quality, and institutional support were calculated. Since the aim was not to make definitive conclusions or generalize findings to a broader population in the pilot study but to prepare for a larger study, we thought the sample size of 25 was appropriate for evaluating whether our methods and instruments are working as expected. Internal consistency estimates for the pilot study were between 0.85 and 0.91 for all variables. These Cronbach alpha coefficients are considered acceptable in the literature on educational research (Nunally & Bernstein, 1994).

Study Procedures

The data for the present study was collected during the 2021-2022 academic season (between June 10 and July 14, 2022). Trained data collectors handled the data collection. Each participating teacher was asked for their approval to participate before the data collection. The study's general information was provided to help with this. The data collectors encouraged the participants to give their sincere comments and allowed them to ask questions for clarification. The completed surveys were collected in the strictest of confidence, and they were not specifically associated with any one participant. The survey was voluntary, and teachers who participated could skip any questions or stop taking them at any moment.

Data Analysis

All statistical analyses were completed using SPSS Version 26. The survey data collected were examined at three different levels in this study. First, descriptive statistics like means, standard deviations, or frequency distributions were employed to characterize the participant teachers' characteristics and teachers' self-efficacy in student involvement and instruction. In addition, the independent sample test was used to calculate group differences. Hierarchical multiple regression was used to examine how predictor variables contribute incrementally to explaining the variance in a dependent variable beyond what other sets of predictors account for. This method allows us to sequentially and structurally explore the impact of different groups of variables by entering them into the model in three steps or "blocks".

Results

Results are divided into three sections. Section one addresses the first research question by exploring the descriptive statistics of the efficacy in instruction and student engagement, instructional quality, and institutional support. Section two presents the analysis of the group difference tests to which instructional and student engagement efficacies differ across selected personal, instructional, and institutional characteristics. Section three presents the results of a three-stage hierarchical regression analysis conducted on the two components of teachers' self-efficacy (instructional and student engagement) reported by the teacher participant sample.

Descriptive statistics

Descriptive statistics of the measured scales for the total sample

The sex composition was 17% female and 83% male, with a mean age of 39 years and a standard deviation of 7.70. Also, the teaching experience of the sample ranged from the 1st to the 38th year of teaching,

with an average of 13.85 years of teaching experience. The sample included teachers who taught in universities, with 44 identifying their current university in the capital or center and 103 in the regional universities. For the instructional type, the sample included 90 teachers teaching in a blended mode and 54 teaching face-to-face (144 because of missing data). As for academic ranking, 103 were assistant professors, 36 were associate professors, and 7 were professors.

This study examined each factor separately using a principal component analysis with an oblique rotation for dimensionality reduction (Hotelling, 1933). The authors used three extraction criteria: an eigenvalue greater than one, a scree plot, and interpretability. The analysis of the self-efficacy items identified two factors, accounting for approximately 77 percent of the variance in the variable set. The perceived instructional quality and institutional support factors were single factors used to delineate the components.

Also, a reliability analysis of the items was conducted for the efficacy in student engagement, efficacy in instruction, instructional quality, and institutional support items. For the current sample, the descriptive statistics results (Table 1.) show that the reliability coefficients of the measured four variables are above 70, and these reliability scores are acceptable in education research (Nunnally, 1978).

Table 1. Descriptive Statistics for Teachers' Efficacy, Instructional Quality, Institutional Support Factors.

Variable	n	No of items	Cronbach alpha	M	SD
1. Self-efficacy in student engagement	143	3	.87	3.92	0.89
2. Self-efficacy in instruction	138	4	.89	3.95	0.81
3. Perceived instructional quality	143	3	.91	4.19	0.88
4. Perceived institutional support	145	3	.85	2.74	0.72

As shown in Table 1, the levels of self-efficacy and perceived instructional quality averages were above the scale mean (3 for a 5-point scale) for the total sample. However, the institutional support average (2.74) was lower than the scale mean (3).

Descriptive statistics of the teacher self-efficacy components across selected variables

In this study, we collected information on teachers, including sex, age, academic rank, teaching experience, instructional type, and university location. Table 2 presents the means, and standard deviations of the student engagement and instructional efficacies scores for the teacher participant sample across a range of personal, instructional, and institutional variables of interest. As shown in Table 2, the overall means for the total sample were 11.75 and 15.80, respectively.

Table 2. Descriptive statistics across some personal, instructional, and institutional Factors.

Variable	*N*	*Efficacy in Student Engagement*		*Efficacy in instruction*	
		M	*SD*	*M*	*SD*
Overall	143	11.75	2.67	15.80	3.25
Sex					
Women	24	10.83	2.81	14.92	3.44
Men	119	11.93	2.61	15.98	3.20
Age[1]					
Early and developing career stages	78	11.28	2.71	15.56	3.32
Consolidating and late-career and pre-retirement stages	51	12.33	2.51	16.00	3.30
Academic rank					
Assistance professor	95	11.33	2.71	15.45	3.40
Associate or full professor	41	12.54	2.41	16.71	2.83
Teaching Experience					
TE1 (Below 5 years)	40	11.28	2.70	15.55	3.45
TE2 (6-10 years)	41	11.95	2.43	15.51	3.37
TE3 (11-15 years)	29	11.38	2.92	16.50	2.80
TE4 (16-20 years)	18	12.22	3.08	15.05	3.81
TE5 (Above 20 years)	15	12.60	2.06	16.60	2.47
Instructional Type					
Blended	87	11.60	2.69	15.37	3.41
In-person	53	11.98	2.70	16.38	2.92
University Location					
Center or Capital	43	12.28	2.61	16.14	2.80
Regional State	100	11.52	2.67	15.64	3.44

Note: Due to missing data, the n for each variable may not be summed up to the total sample, n=147.

[1] Age was categorized into two groups based on a modified version of the career stage theory (**Super & Jordaan, 1973**) due to the uneven distribution of samples across the categories.

Results of group differences

Before performing the independent sample t-tests, the authors confirmed that the independence, homogeneity of variance, and normality assumptions were satisfied. The authors verified through Levene's test that the homogeneity of variance assumption is tenable for an independent samples t-test across age and academic rank. Levene's test assessed whether the variances of the two groups were equal for each variable compared.

The authors used group differences using t-tests to assess the mean differences in student engagement and instructional efficacies across a range of groups categorized by sex, age, academic rank, instructional type, and university location. However, none of these mean difference tests were found to be significant except for the mean difference across academic rank and age. Hence, we present here the summary of only the independent sample t-test results based on academic rank and age.

The authors used an independent sample t-test to compare university teachers' efficacy in student engagement and instruction based on academic rank (between assistant professors and associate/full professors) and age (early and developing career stages versus Consolidating and late-career and pre-retirement stages). Table 3 presents the summary results.

Table 3. Teaching self-efficacy across academic rank and Career stage

Variable	Assistant Professors (n = 95)		Associate or Full Professors (41)		***df***	***t***	
	M	*SD*	*M*	*SD*			Cohen's d
Efficacy in engagement	11.33	2.71	12.54	2.41	(2, 134)	2.47*	0.46
Efficacy in instruction	15.45	3.40	16.71	2.83	(2, 134)	2.07*	0.39
Variable	Early and Developing career stages (n = 78)		Consolidating, late-career, & pre-retirement stages (n = 51)		*df*	*t*	
	M	*SD*	*M*	*SD*			Cohen's d
Efficacy in engagement	11.28	2.71	12.33	2.51	(2, 127)	2.22*	0.40
Efficacy in instruction	15.56	3.32	16.00	3.30	(2, 127)	0.73	0.13

Note: [1] Efficacy in instructional strategies means the difference between assistant professors and professors.

Table 3 shows a significant difference in teachers' engagement efficacy scores between assistant professors and associate/full professors, $t(134) = 2.47$, p = 01. The magnitude of the difference was intermediate, Cohen's d = 0.46, indicating a moderate effect of academic rank on teachers' efficacy in engagement. Similarly, the results suggest a significant difference in the teachers' efficacy in instruction scores between assistant professors and associate/full professors, $t(134) = 2.07$, p =.03. The magnitude of the difference was small, Cohen's d = 0.39, indicating a small effect of academic rank on teacher's efficacy in instruction.

Also, Table 3 shows that the results of the independent sample t-test between early and developing career and Consolidating, late-career, and pre-retirement were significant in the teachers' efficacy in student engagement, $t(127) = 2.22$, $p = .03$. The magnitude of the difference was small, Cohen's $d = 0.39$, indicating a small effect of academic rank on teacher's efficacy in instruction. However, the independent sample t-test results across ages for the teachers' efficacy in instructional efficiency were not significant based on age.

Taken together, these results suggest that the academic ranks of university teachers influence self-efficacy in student engagement and instruction. Specifically, our results suggest that university teachers with the academic rank of a professor have higher self-efficacy in student engagement and instruction than assistant professors.

Predicting teachers' efficacy in student engagement and instruction

Before performing the hierarchical regression analysis, the authors conducted tests to confirm key assumptions. The Q-Q plot indicated that the residuals were normally distributed. Additionally, residual plots were used to check for linearity and homoscedasticity, and no violations were apparent. Furthermore, the variance inflation factors (VIF < 2.0) affirmed that multicollinearity was not a significant concern. Before verifying these assumptions, the authors ensured that the dependent variables were continuous, the observations were independent, and that the data set was free of outliers.

A three-step hierarchical regression was conducted, guided by the research model, to investigate the relationships between the two elements of teachers' self-efficacy, the two instructional factors, and the two institutional variables. It was started by entering four distinct factors as predictors in the first step, including sex, age, academic standing, and teaching experience. The outcomes of this step assess the relationships between the variables at the person level and the self-efficacy aspects. Results from Step 1 of the regressions acted as the control and are

shown in Table 4. The two instructional elements were combined as predictors in the second step. The last step involved combining the two institutional factors as predictors.

This three-step procedure was chosen to adhere to a general model in which individual, instructional, and institutional characteristics are considered to predict university teachers' self-efficacy. This technique also made it possible to assess how much variation in the two self-efficacy components was explained by institutional and instructional factors taken as a whole. Table 4 presents the results of the three-step hierarchical regression.

Table 4. Summary of a three-step hierarchical regression predicting efficacy in student engagement & instruction.

Variable	Efficacy in student engagement			Efficacy in instruction		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Step 1						
Sex	1.46	.56	.20*	1.59	.69	.19*
Career stage	.49	.36	.15	.16	.45	.04
Academic rank	.73	.45	.15	1.25	.55	.21*
Teaching experience	-.16	.24	-.08	-.24	.30	-.10
Step 2						
Instructional type	.21	.46	.04	.65	.59	.10
Instructional quality	.48	.08	.46***	.32	.11	.25**
Step 3						
University location	.23	.52	.04	-12	.66	-.02
Institutional support	.13	.10	.10	.43	.12	.30***

Note. n = 147. Efficacy in student engagement: R^2 = .09, p = .023, for Step 1; R^2 = .30, p < .001, for Step 2. R^2 = .32, p = .383, Step 3.
Efficacy in instruction: R^2 = .08, p = .033, for Step 1; R^2 = .18, p = .001, for Step 2. R^2 = .27, p = .001, Step 3.
*p < .05. ** p < .01, ***p < .001.

In the first step, the four control variables explained 8% of the variance in efficacy in instruction, [$F(4, 124) = 2.94$, $R^2 = .09$, $P = .023$]. Adding the two instructional variables in Step 2 increased the amount of variance explained in student engagement efficacy [$F(2, 122) = 19.05$, $R^2 = .30$, $P < .001$], which is a significantly large amount. Furthermore, adding the other two institutional variables in step 3 explained an additional 2% of the variance in teachers' efficacy in student engagement, [$F(2, 120) = 0.97$, $R^2 = .32$, P = .383] in this step, however, the F change was not significant. Hence, none of the institutional variables individually accounted for a significant portion of the variance in teachers' efficacy in student engagement. In the final analysis, after accounting for the effects of controlling variables, perceived instructional quality was found to be a significant predictor of teachers' perceived efficacy in student engagement ($\beta = .46$). Also, sex was significantly positively associated with teachers' efficacy in student engagement ($\beta = .20$).

Teachers' efficacy in instruction. In the first step, the control variables explained 8% of the variance in efficacy in instruction [$F(4, 121) = 2.72$, $R^2 = .08$, P = .033]. Adding the two instructional variables in the second step explained an additional 10% of the variance in efficacy in instruction [$F(2, 119) = 6.99$, $R^2 = .18$, P = .001] in this step. Furthermore, adding two other institutional variables in the third step explained an additional 9% of the variance in teachers' efficacy in instruction, [$F(2, 117) = 7.04$, $R^2 = .27$, P = .001] in this step. On average, university teachers who perceived higher instructional quality reported higher efficacy in instruction. This effect was supported by the positive bivariate correlation between efficacy in instruction, instructional quality, and institutional support (Table 4).

Hence, instructional quality and institutional support were significantly positively associated with teachers' efficacy in instruction after accounting for the effects of the control variables. Institutional support was the strongest predictor ($\beta = .30$) of teachers' efficacy in instruction compared with the other predictors. Also, sex and academic rank were

significantly positively associated with teachers' efficacy in instruction, with *β* coefficients of .19 and .21, respectively.

Discussion

Using the SCT framework, in this study, the authors explored self-efficacy in student engagement and instruction among university teachers in Ethiopia in the COVID-19 context. Further, they examined group differences, correlations, and predictors. We investigated differences in student engagement and instructional efficacies with the group difference tests due to sex, age, academic rank, teaching experience, instructional type, and university location. Also, in terms of prediction, the predictability of some personal, instructional, and institutional factors of teachers' self-efficacy in student engagement and instruction were investigated.

It is worth noting that previous studies have found university teacher self-efficacy was associated with teaching experience (Hoy & Woolfolk, 1993; Wolters & Daugherty, 2007), but this was not the case in the present study. Senior teachers with many years of teaching experience have a higher mastery experience and show stronger self-efficacy beliefs than beginning (new) teachers (Klassen & Chiu, 2010). However, new challenges can lead to changes in self-efficacy beliefs (Tschannen-Moran et al., 1998). For example, new norms and forced modifications to the teaching environment of the COVID context are crucial. Regardless, when examining university teachers' self-efficacy scores, there were significant differences between the academic ranks of assistant professors and professors, and these differences produced moderate and high effects (Cohen, 1988).

Moreover, the regression results suggest that a combination of personal, instructional, and institutional factors were significant positive predictors of university teachers' efficacy in student engagement and instruction (Landino & Owen, 1988; Tschannen-Moran & Hoy, 2001). Thus, teachers' efficacy could be affected by their characteristics and

instructional features (Chang et al., 2011). Also, it was clear from the regression analysis results that the predictors were related differentially to the two domains of teachers' self-efficacy, and this supports the evidence in the literature in this field (Klassen et al., 2011; Mockaitis et al., 2022). Also, studies reported that a healthy institutional climate, which emphasizes academics was conducive to developing teachers' self-efficacy (Hoy & Woolfolk, 1993). Thus, investigating teacher self-efficacy and its malleable and context-specific nature is crucial if universities are to be revitalized and grow stronger in this unpredictable universe.

Limitations of the Study

The current study explored how personal, instructional, and institutional characteristics influenced university teachers' self-efficacy during the 2021/22 academic season. However, this study had some limitations. First, a cross-sectional survey design was used. Hence, there was no comparison to a non-COVID situation. Future studies should include quantitative and qualitative work investigating both effectiveness and implementations. Second, we used self-reports with no objective measures. Third, the current study had a limited sample size of university teachers. In addition, a sample of four universities may not be sufficient to mirror the prevailing situation in Ethiopia. Future studies should include larger sample sizes and more diverse samples of university teachers based on disciplinary major, locations, instructional type, and level.

Conclusions and Implications

Conclusions

This research seeks to understand how the COVID-19 pandemic has impacted university teachers' self-efficacy, focusing on identifying differences and predictors. The results of this study reveal significant differences in teachers' efficacy based on academic rank and career

stage. Assistant professors showed lower engagement efficacy than associate/full professors and had lower instructional efficacy but with a smaller or moderate effect (Cohen's d = 0.39-0.46). Similarly, teachers in the early/developing career stage had significantly lower engagement efficacy than those in the consolidating/latecareer/pre-retirement stage. Still, the effect was small (Cohen's d = 0.39). However, no significant difference was found in instructional efficacy between these two career groups. Overall, there is a difference in teachers' efficacy in student engagement across academic rank and career stage, but the effect on instructional efficacy is smaller or non-significant.

Moreover, the hierarchical multiple regression results showed that a combination of sex, instructional quality, and institutional support collectively predict teachers' efficacy in student engagement and instruction differentially. Of these predictors used in our regression models, instructional quality and institutional support were the strongest predictors of efficacy in student engagement and instruction, respectively.

Implications

With universities becoming accustomed to providing alternative instructional approaches, especially during the lockdown and after the reopening of universities, researchers and university administrators need to understand the potential factors associated with university teachers' self-efficacy. Since the problems of teaching and learning in the context of COVID-19 can increase job stress, we believe that developing instructional quality and increased institutional support can better enhance teachers' self-efficacy. To best build, adapt, and improve universities and the quality of teaching and advising postgraduate students in the future, university teachers need to feel supported with their academic and research advising duties.

The present study has advanced research, investigating university teachers' self-efficacy, going beyond previous person's level studies, and including some relevant instructional and institutional factors as predictors. Using Bandura's SCT, in this study, we showed that teachers' sex, academic rank, teaching quality, and institutional support are significant predictors of teachers' self-efficacy. These findings provide insight into how Ethiopian university teachers felt about their teaching efficacy in student engagement and instruction during the COVID-19 pandemic, identifying group differences and the potential factors affecting teacher self-efficacy beyond personal characteristics. To develop an environment that promotes university teachers' self-efficacy, senior managers should provide university teachers with strategies and feedback for their teaching (Bray-Clark & Bates, 2003; Zee & Koomen, 2016), opportunities to grow through PD (Fabriz et al., 2021; Noben et al., 2021), and opportunities to collaborate with other university teachers (Guo et al., 2011; Siciliano, 2016). Additionally, the teaching and learning environments should be equipped with the required resources to support university teachers through coaching, which helps enhance university teacher self-efficacy (Fackler et al., 2021).

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