Predicting Academic Optimism Based on Teachers' Role Competencies in Online Distance Education

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Abstract **– The primary purpose of this research is to investigate the relationship between the role competencies of teachers in online distance education and teachers' academic optimism. Correlation and regression analysis were used in the research. The research sample consists of 400 primary school teachers working in Northern Cyprus. The data were collected using a scale consisting of three parts: demographic variables, the scale for assessing the role competencies of teachers in online distance education, and the scale of teacher academic optimism. A simple random sampling method was used to take the sample. The data were analyzed using ANOVA, Pearson product-moment correlation coefficient, and regression analysis. Findings provide conclusive evidence that teachers' role competencies in online distance education significantly predict their academic optimism. It has been found that there is a positive, moderate relationship between teacher pedagogical role competence and teacher academic optimism and between teacher communicator role competence and teacher academic optimism in online distance education.**

Keywords **– Education, distance learning, primary school teacher, teachers' role competencies in online distance education, teacher academic optimism.**

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1. Introduction

There are various definitions related to distance education in the literature. Distance education is a mechanism where education and training activities are carried out using technology without requiring the learner and the instructor to be in the same place [1]. Distance learning implies a type of education where the teacher and students are not in the same physical location [2]. In distance education, content, evaluation, and interaction items are transmitted to the learners via digital media. Individualized education-teaching activities in distance education allow students to learn independently [3]. Distance Learning, as it emerged in countries such as Germany, England, America, and Sweden in the 18th century, became widespread in the 19th century with the establishment of open universities in states such as Canada, France, China, Norway, Russia, Japan, and the Netherlands [1].

Various studies have examined the factors determining the efficiency of distance education. In [4], variables such as students' access to technological devices, gender, internet access, the department they study, and their attitudes toward distance education were analyzed. The study found a significant difference in the attitude scores between students who owned technological devices and those who did not. Similarly, in [5], [6], [7], it was emphasized that students face difficulties in participating in distance education due to inadequate home conditions and a lack of technological infrastructure (such as internet access and computers), which generally leads to negative attitudes toward continuing this education. The availability of equipment and the quality of education are critical factors in transforming these negative attitudes into positive ones [8]. Additionally, [9] indicated that educators who lack sufficient technological resources (such as computers and internet access) in virtual classrooms encounter challenges that negatively impact their performance.

Numerous studies have highlighted that the effectiveness of online education is closely linked to the teacher's role [10] and suggested that teachers should strengthen their teaching competence before conducting online instruction [11].

Despite all these difficulties in using online platforms, the costs of distance education have decreased since there are no time and space constraints [12]. Distance education has emerged as a crucial medium for maintaining the continuity of students' education during the COVID-19 pandemic, as highlighted by multiple studies [13], [14], [15]. Studies [16], [17] noted that the COVID-19 period provided educators with an essential opportunity to explore the digital learning environment and enhance their skills. To achieve this, it is necessary for teachers to effectively incorporate technology into their teaching strategies and utilize it within classroom activities, always aligning their practices with the intended learning objectives [18].

Given that the success of distance education largely depends on teachers' competencies, attitudes, and beliefs, it is important to explore the psychological and professional factors that contribute to effective online instruction. In this context, the concept of academic optimism offers valuable insights into how teachers' beliefs and self-efficacy influence educational outcomes.

There are limited studies focusing on teacher's academic optimism in the literature. Most studies dealt with concepts such as job satisfaction and organizational commitment. It was noted that there were correlations between academic optimism and teacher job satisfaction, as well as academic optimism and organizational commitment. Evidence from [19] highlights a strong connection between teachers' experiences and their self-efficacy in technology integration. Furthermore, in [20], the relationship between classroom teachers' technology use and their self-efficacy beliefs was examined, revealing positive, moderate, and significant correlations between these variables. The findings also showed that teachers' use of technology predicted their self-efficacy beliefs. The variable of technology use described in [20] is conceptually similar to the variable of teachers' role competencies in online distance education analyzed in the current study. Additionally, the dimension of self-efficacy belief identified in [20] represents one of the sub-dimensions of the concept of academic optimism examined in this research.

In the current research, the relationship between the concept of teacher role competencies in online distance education and the concept of teacher academic optimism has been examined. The study aims to determine to what extent primary school classroom teachers' role competencies in online distance education predict their academic optimism.

The researchers have not come across any studies examining these two concepts together in the literature. The research results are expected to make a significant contribution to the relevant literature and to education experts working on online distance education. The study's primary purpose is to reveal to what extent the role competencies of primary school teachers who have to undertake the responsibility in online distance education in Northern Cyprus predict their academic optimism.

Research Question (RQ): To what extent do gender, age, educational background, teaching experience, grade level taught, and teacher role competencies in online distance education predict teachers' academic optimism?

2. Theoretical Background

Building on the previous discussion, this section provides a theoretical background explaining the relationship between online teacher competencies and teachers' academic optimism. In the context of distance education, the efficacy of online instruction primarily depends on the abilities and expertise that teachers bring to the virtual classroom. This situation highlights the relationship between distance education and online teacher competencies [21]. Online teacher competencies are entirely different from teacher competencies in traditional classroom-based education. Teacher competencies in technology-based distance education are defined in the literature as "Online Teacher Competencies" [22]. Some of the online teacher competencies categories in the world can be seen in Table 1 [22].

In these studies, various classifications related to "online teacher competencies" are made: pedagogical competencies, technical competencies, communicative competencies, management competencies, professional competencies, and evaluation competencies. Although various universal principles regarding teacher competencies have been determined, the criteria should be renewed following the educational qualifications required by the age [23].

Table 1. Online teacher competencies categories

Reference	Competency Categories
[20]	Understanding the process, technical skills, online communication skills, domain expertise, personal characteristics
[20]	Technical knowledge, domain expertise, process management and facilitation, assessment, course management
[20]	Pedagogical knowledge, contact knowledge, domain expertise, technology knowledge
[20]	Management and design knowledge, process facilitation, evaluation, technical knowledge
[20]	Professional fundamentals, planning and analysis, design and development, implementation and management

Source: Adapted and translated from [22].

In addition to the technical and pedagogical skills that teachers should have in online education, academic optimism also shapes their attitudes and behaviors in the educational environment. For teachers to teach effectively in the digital environment, their belief in student success is as essential as their technological competence. Academic optimism related to teachers' beliefs that families and students should act together and be self-confident in adverse situations, thinking of making an educational difference among students [24].

In general terms, academic optimism is defined as the whole of a teacher's trust, collective efficacy, and academic emphasis, as shown in Figure 1. Teachers' trust represents their trust in families and students, namely the environment. Teachers' collective efficacy perceptions express their characteristics as their academic emphasis includes behaviors determining success [25], [26].

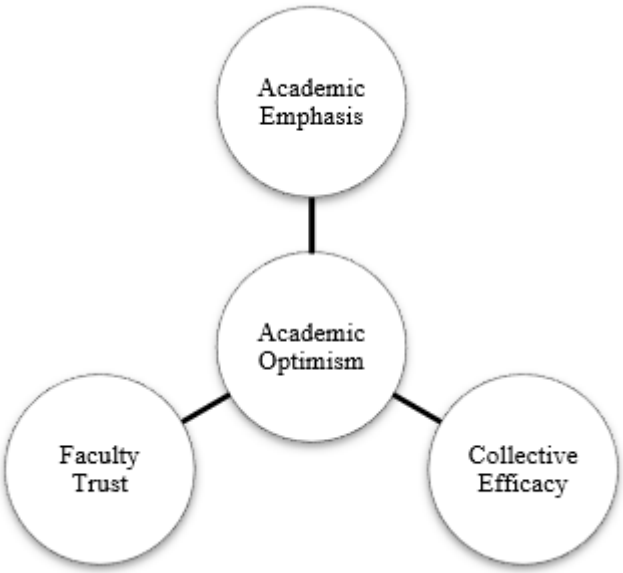

Figure 1. The relationship between academic optimism factors

When instructors use technology to create dynamic and engaging learning environments, their confidence in their ability to positively impact students' learning increases. Technically savvy educators are more likely to believe in their efficacy and their students' ability to succeed in an online environment, which is consistent with academic optimism [27].

The research indicates that teachers' beliefs are essential in students' development and performance at school [28], [29], [30], [31]. A positive relationship exists between academic optimism and school success [32]. Teachers with an optimistic character focus on the positive characteristics of the students in their classes, the schools they are in, and the society they live in rather than the negative ones.

Teachers with academic optimism think all their students can succeed if proper conditions are created. A person who believes that s/he will succeed in his work has more effort on that job [33]. It is also seen that teachers with high academic optimism show more effort to increase students' success, performing the responsibilities brought by the profession most efficiently [34]. In [35], it was reported that teachers who demonstrate an optimistic approach to their lessons encourage positive student behavior and achieve greater academic success. Thus, optimistic teachers bring academic success [36], [37], [38]. Findings in [39] indicate a positive relationship between academic optimism and student achievement among teachers in Hualien, Taiwan.

3. Materials and Methods

Research was conducted to determine the relationship between the role competencies and academic optimism of teachers working in primary schools in Northern Cyprus in online distance education. For this reason, a multivariate correlational design was used in one of the quantitative research designs. The objective was to predict the dependent variable by examining the relationships between various independent variables. It is used if the predictor variable is two or more [40]. The study defined teachers' demographic characteristics and role competencies in online distance education as predictive (independent) variables and academic optimism as criterion (dependent) variables. Descriptive statistics were used to explain the collected data.

3.1. Participants

The study's target population includes teachers employed in primary schools across Northern Cyprus.

One of the researchers of the current study is a primary school teacher, observed that during the pandemic period, primary school teachers felt inadequate because of being unprepared for Online Education, which negatively affected their motivation. For this reason, the researchers preferred including primary school teachers as participants in this study. The research sample comprises 400 teachers randomly selected from Northern Cyprus from five different cities (Nicosia, Famagusta, Kyrenia, Güzelyurt, and Iskele). The sample size for this study was determined using the guidelines for sample size estimation provided in [41]. According to the study, for a finite population of 1200 primary school teachers, a sample size of at least 291 participants is required to achieve a 95% confidence level with a 5% margin of error. To enhance the statistical power and ensure balanced representation across the five largest cities of Northern Cyprus, the study included 400 teachers, details of which are provided in Table 2. This approach exceeds the minimum required sample size, thus increasing the validity and reliability of the findings.

Table 2. Demographic information of the study group

Variable	Category	Number	Percentage (%)
Gender	Female	259	64.75
	Male	141	35.25
Age	22 – 30 years old	76	19.00
	51 – 60 years old	116	29.00
	41 – 50 years old	133	33.25
	51 – 60 years old	75	18.75
Educational Background	Bachelor	312	78.00
	Master Ph.D.	88	22.00
Teaching Experience	1 to 5 years	46	11.50
	6 to 10 years	58	14.50
	11 to 15 years	65	16.25
	16 to 20 years	53	13.25
	21 to 25 years	69	17.25
	26 and 30 years	72	18.00
	30 years and above	37	9.25
Professional Seniority	1st Grade Teachers	43	10.75
	2nd Grade Teachers	47	11.75
	3rd Grade Teachers	51	12.75
	4th Grade Teachers	53	13.25
	5th Grade Teachers	47	11.75
	Subject Teachers	159	39.75

3.2. Instruments

Three scales were used in this study:

1. Demographic variables
2. Scale for assessing role competencies teachers in online distance education
3. Teacher academic optimism scale

The explanations about the scales mentioned are as follows.

3.2.1. Demographic Variables

The demographic details section has been developed to obtain population-sample information and perform statistical analyses on quantitative findings.

It consists of 5 sections and includes personal, educational, and professional information. It is as follows:

1. Gender
2. Age
3. Educational background
4. Teaching experience
5. Grade level taught

3.2.2. Scale for Assessing Role Competencies of Teachers in Online Distance Education

The scale presented in [42] was utilized in the research. It explained 66% of the total variance, with a Cronbach's Alpha coefficient of 0.943, indicating high reliability. However, 1 item was removed from the scale because it was unsuitable for the study, and a 5-point Likert type (Never, Rarely, Sometimes, Often, Always) new scale of 19 items was created. In the examination of the scale of "The Role Competencies of Teachers in Online Distance Education", the Kaiser – Mayer – Olkin (KMO) coefficient was found to be 0.906. Bartlett's test result ($\chi 2$=4906.283; sd=171; p=0.000 < 0.05) was found to be significant (Table 3).

Table 3. Result of KMO and Bartlett's test

Kaiser – Meyer – Olkin		.906
Bartlett's Test of Sphericity	chi-square value	4906.283
	Sd	171
	p	.000

note. p < .05

Exploratory Factor Analysis (EFA) was conducted to identify the factor structure of the 19-item scale.

The analysis revealed three distinct factors, which were named as follows:

1. Pedagogical role competence
2. Technical role competence
3. Communicator role competence

Once these factors were identified, the Cronbach's alpha internal consistency test was reapplied to the scale.

The internal consistency coefficient for the 'Role Competencies of Teachers in Online Distance Education' scale was determined to be 0.922.

The scale's content validity and language clarity were evaluated through expert review. Feedback was obtained from five experts.

3.2.3. Teacher Academic Optimism Scale

The scale presented in [43] was used in the study. The scale explained 58.56% of the total variance, with a Cronbach's Alpha coefficient of 0.92, indicating high reliability. However, since the academic optimism of teachers in online distance education will be addressed instead of face-to-face teaching, six items that were suitable for the research were removed from the scale. A new scale consisting of 26 items in total was created. In the analysis performed on the "Teacher Academic Optimism" scale, the Kaiser-Mayer-Olkin (KMO) value was obtained as 0.923. According to the data obtained in this study, the KMO value was excellent. Bartlett's test result ($\chi 2$=6826,777; sd=325; p=0.000 < 0.05) was found to be significant (Table 4).

Table 4. Result of KMO and Bartlett's test

Kaiser – Meyer – Olkin		.923
Bartlett's Test of Sphericity	chi-square value	6826,777
	Sd	325
	P	.000

note. p < .05

Exploratory Factor Analysis (EFA) was conducted to uncover the factor structure of the 26-item scale. The analysis revealed four distinct factors, which were labeled as follows:

1. Self-efficacy
2. Trust in students
3. Trust in managers
4. Trust in parents

After identifying these factors, the Cronbach's alpha internal consistency test was applied again to the scale. The Cronbach's alpha coefficient for the 'Teacher Academic Optimism' scale was determined to be 0.934.

The scale's content validity and language clarity were evaluated through expert review. Feedback was obtained from five experts.

3.3. Data Collection and Analysis

All necessary permissions were obtained for the scale in the study. Teachers involved in the study primarily responded to the scale during their professional working hours. In addition, the scale was created online, and the data was collected via the Internet. The participation in the study was voluntary.

The Statistical Package for Social Sciences (SPSS) program was used to analyze quantitative data in the research. Kaiser-Mayer-Olkin (KMO) and Bartlett's test, Factor Analysis, and Cronbach's Alpha Reliability Tests were applied to the scales used in the study. Frequency analysis was applied to determine the distribution of teachers according to their demographic characteristics, and the results were presented in frequency distribution tables.

Multiple linear regression analysis was used to predict the value of the dependent variable based on the values of two or more independent variables [41]. It aimed to predict academic optimism using gender, age, educational background, teaching experience, grade level taught, and teachers' role competencies in online distance education as shown in Figure 2. Therefore, multiple linear regression analysis was used. The research question was answered by interpreting the statistical data from the analysis.

Demographic variables such as gender, age, educational background, and teaching experience could have potential confounding effects on academic optimism. Therefore, these variables were included as covariates in the analysis and multiple regression analysis was used to assess the independent effect of each variable. Ensuring the validity and reliability of the scales employed is crucial for minimizing the influence of confounding variables. Therefore, validity and reliability analyses were conducted for the scales measuring teacher role competencies and academic optimism.

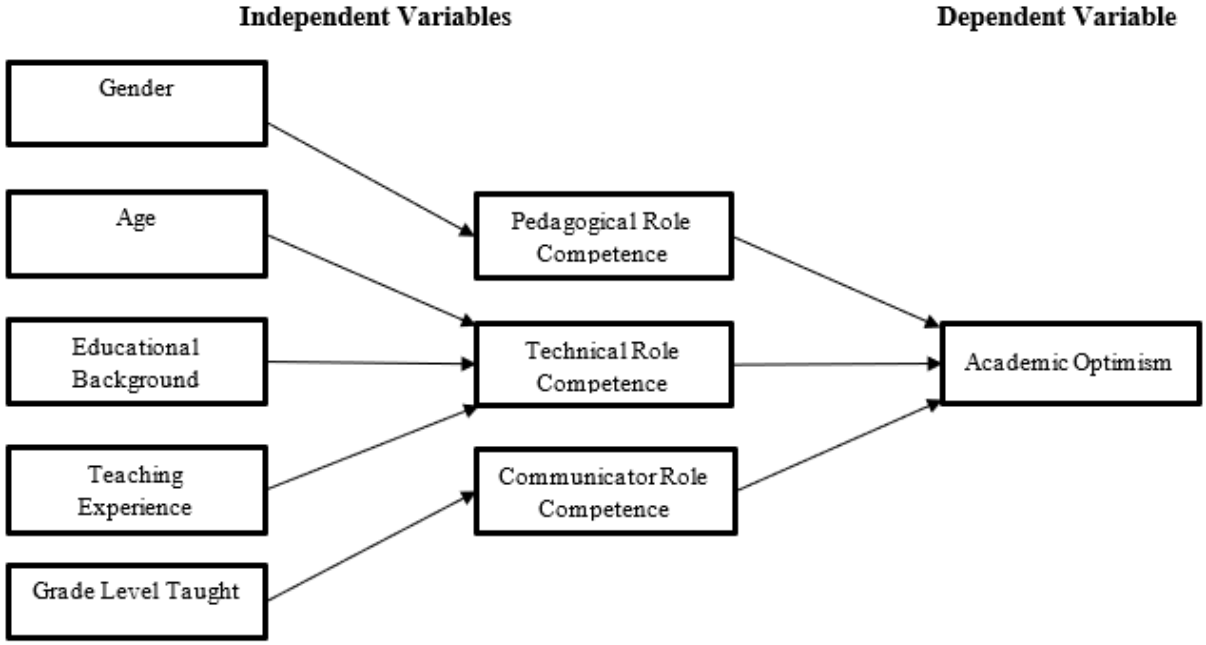

Figure 2. Research model

4. Results

The researchers investigated how much gender, age, educational background, teaching experience, grade level taught, and teacher role competencies in online distance education predict teachers' academic optimism. It is considered necessary that the relationship (r) between the independent variables should be less than 0.90.

However, in the first analysis, it was found that there was a very high positive correlation between the independent variables of age and teaching experience, $r = 0.907 > 0.900$. In addition, the variables' Variance Inflation Factor (VIF) values should be below 5 [41]. The analysis determined that the VIF values of age and teaching experience variables were above 5; the teaching experience variable was excluded from the model.

Since the research is related to online distance education, the age variable was kept in the model, considering that it could have a significant effect.

Considering the Pearson Correlation Coefficients calculated between the research variables in Table 5, a very weak negative correlation was found between teacher academic optimism and gender (r = -.160), as well as between teacher academic optimism and age (r= -.017), and between teacher academic optimism and the grade level they taught (r= -.109).

It was observed that there was a very weak positive correlation between teacher academic optimism and educational background (r= .042). In addition, it was determined that there was a weak positive relationship between technical role competence, one of the role competences factors of teachers in online distance education, and teacher academic optimism (r= .295). A positive, moderate relationship was found between pedagogical role competence and teacher academic optimism (r= .525) and between communicator role competence and teacher academic optimism (r= .524).

Table 5. Correlation output for the relationship between research variables

	1	2	3	4	5	6	7	8	9
1. Academic Optimism	1.000								
2. Gender	-.160	1.000							
3. Age	-.017	.026	1.000						
4. Educational Background	.042	-.091	-.123	1.000					
5. Teaching Experience	.023	-.038	.907	-.115	1.000				
6. Grade Level Taught	-.109	.268	.118	.022	.063	1.000			
7. Pedagogical Role Competence	.525	-.148	-.024	.072	.030	-.116	1.000		
8. Technological Role Competence	.295	-.074	-.072	.099	-.045	.072	.538	1.000	
9. Communicator Role Competence	.524	-.089	-.087	.139	-.058	-.131	.552	.442	1.000

Before analyzing the research data, a histogram and standard distribution curve of the predicted variable were created. The data distribution was close to normal. After examining the normality assumption, this study tried to determine the predictive power of the determined variables on teacher academic optimism.

In this direction, multiple linear regression analysis was carried out. Table 6 shows the results of the multiple linear regression analysis conducted to answer the research question.

Table 6. Multiple linear regression analysis results in predicting teacher academic optimism

	Adjusted R^2	df	F	Non-standardized B Value	T	p	VIF
Regression	.356	3	74,532			.000	
Residual		396					
Total		399					
Constant				2,066	12,642	.000	
Gender				-.087	-2.023	.044	1.022
Pedagogical Role Competence				.214	6,733	.000	1,458
Communicator Role Competence				.284	6,985	.000	1.438

Predictive variables: (fixed), gender, pedagogical role competence, communicator role competence
Dependent variable: teacher academic optimism

A multiple linear regression analysis was conducted on two groups to forecast the teachers' academic optimism. In the first group, the variables of gender, age, educational background, teaching experience, and grade level taught were discussed; in the second group, the role competencies of teachers in online distance education (pedagogical role competencies, technical role competencies, and communicator role competencies) were discussed.

These variables' contribution to teacher academic optimism, considered the dependent variable, was examined. The t-test results in Table 8 showed that three independent variables contributed significantly to the regression model. Gender, pedagogical role competence, and communicator role competence were significant predictors of teacher academic optimism; it was determined that age, educational background, teaching experience, grade level taught, and technical role competence were not significant predictors of teacher academic optimism.

It was found that the predictive variables (gender, pedagogical role competence, communicative role competence) explained 36% of the total variance regarding teacher academic optimism.

Analysis of variance (ANOVA) result of teacher academic optimism is statistically significant, F (3, 396) = 74.532, p= 0.00 < 0.05. Since the variance analysis was critical, the relationship between dependent and independent variables is linear. When the parameters of the regression model are examined, the researchers found the following results: the standardized regression coefficients (β), the order of importance of the predictor variables on the academic optimism level of the teachers, teachers' communicative role competence (β= .336; t= 6.985; p= .00<.05), teachers' pedagogical role competence (β= .327; t= 6.733; p=.00<.05), gender (β = - .082; t= -2.023; p= .044<.05).

Since the ANOVA test was significant, p < 0.05, the regression model was accepted as usable. Using non-standardized B values, the following regression equation was obtained:

Estimated Teacher Academic Optimism = 2.066 + (-.087) *(Gender) + (.214) *(Pedagogical Role Competence) + (.284) *(Communicator Role Competence)

β = - .082 for gender
β = .347 for Pedagogical Role Competence
β = .354 for Communicator Role Competence

β values are examined, and it is seen that teachers' communicator role competencies (β = .354) make the most significant contribution to estimating teachers' academic optimism levels. It can be said that as the communicator role competencies of teachers increase, their academic optimism levels will also increase. It is seen that the gender variable contributes in a minor amount to the estimation of teacher academic optimism levels. The gender variable was coded as 1 for females and 2 for males. The negative coefficient (β = –.082) indicates that female teachers had higher levels of academic optimism than male teachers. According to R^2 values, gender explains 3% of the variance in predicting teacher academic optimism. Next, including the teachers' communicator role competence variable in the prediction increased the total variance to 29%. With the addition of the teachers' pedagogical role competence variable, the total variance increased to 36%.

5. Discussion

The research examined the relationship between teachers' role competencies and academic optimism in online distance education. In the research findings, it has been determined that teachers' role competencies in online distance education are a significant predictor of their academic optimism.

Among the sub-dimensions of teachers' role competencies in online distance education, pedagogical role competency, communicator role competency, and academic optimism, it was observed that there was a positive, moderate relationship. Among the examined teacher demographic variables, the gender factor was a significant predictor of teacher academic optimism. In this direction, a literature review was done, and no study was found in which the mentioned variables were considered together.

As measured in this study, teachers' academic optimism levels show parallels with previous findings [44], [45], [46], which examined the effect of gender on academic optimism. As a result, a significant difference was found between the academic optimism levels of female and male teachers. Similar to these studies, it was observed that female teachers' academic optimism levels were higher than those of male teachers in this study. Comparable results were also reported in other studies [47], [48], [49]. This result may be influenced by the fact that women enter the workforce later than men. Women have gained various rights that allow them to stand independently and become firmly committed to these values. Also, the proportion of women in primary school teaching may reflect female teachers' greater optimism. This trend can also be attributed to women's roles in society; their role as mothers may lead them to engage more closely with distance education students and to perceive themselves as more optimistic by developing their technological skills. In addition to the studies that reach results parallel to the findings obtained, some studies reveal different results. The findings in [50] indicated that teachers' academic optimism levels did not differ according to gender. Similar results were also reported in other studies [51], [52], [53], [54], [55], [56].

The current study showed no significant difference in teachers' academic optimism based on age. However, contrasting results were reported in [50] and [57], where teachers' academic optimism levels varied according to age. Differences between study groups and the years in which the research was conducted may cause the results to vary. The fact that the pandemic made online distance education mandatory and that the process was supported by organizing various in-service trainings for teachers in this field can be considered the reason for the change in the findings obtained in different years.

This study revealed that teachers' academic optimism did not vary significantly based on their educational background. The academic optimism levels of the teachers in the study group were found to be above average. However, a significant difference between teachers' education levels and their academic optimism was reported in [45]. Teachers who had completed graduate studies were found to have higher average levels of academic optimism compared to those with only undergraduate degrees.

The current study found no significant difference in teachers' academic optimism according to their teaching experience. A similar result was reported in [52]. This situation can be related to the possibility that both young and senior teachers had equal in-service training opportunities during distance education. This situation did not make much difference between them regarding academic optimism. In contrast, [57] reported a significant difference between teaching experience and academic optimism levels, indicating that as teachers' experience increased, their academic optimism also increased. It can be said that the difference between the findings is due to the long years that have passed since the studies and the changing conditions. While traditional classroom-based education was provided in schools in 2013, the research was conducted after the pandemic when distance education became mandatory.

The current study found no significant difference in teachers' academic optimism depending on the grade level they taught. Similarly, [58] reported no significant difference in teachers' academic optimism levels based on the branch variable. It has been concluded that whether teachers are in a class or branch area or teach different classes does not affect their academic optimism levels. This result shows that all teachers see themselves as professionally equal in their teaching regardless of their branch.

6. Conclusion

The findings prove that teachers' role competencies in online distance education significantly predict their academic optimism. It has been found that there is a positive, moderate relationship between teacher pedagogical role competence and teacher academic optimism and between teacher communicator role competence and teacher academic optimism in online distance education. Based on this relationship, every activity to increase teachers' role competencies in online distance education will positively increase teachers' academic optimism levels. Training for distance education can support teachers. Various course materials should be presented to teachers. The problems, such as the lack of tools and equipment, should be eliminated.

This study is limited only to primary school teachers working in public schools. A comparative study can determine the role competencies and academic optimism levels of teachers working in online distance education in private and state schools. Further research can be undertaken on factors to explore other possible predictors of teacher academic optimism, such as "hope and zest for work," "collective efficacy," "organizational climate," "student academic success," etc. This study only includes teachers working in primary schools.

Similar research can be conducted to include middle and high school teachers. This study is also limited to quantitative research methods. Qualitative research methods can be added to have an in-depth understanding of the phenomena under investigation.

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