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Research Article

Examining the Science Teaching Self-Efficacy Beliefs of Prospective Classroom Teachers in terms of Various Variables

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Abstract

The objective of this study is to examine the science teaching self-efficacy beliefs of prospective classroom teachers according to various variables. The survey model was utilised in the study. The study group consisted of 216 classroom teacher candidates. The data were collected using the Science Teaching Self-Efficacy Belief Scale. Analysis of the findings indicated that the scores of prospective teachers on the Science Teaching Self-Efficacy Belief Scale were above average. When the scores of prospective classroom teachers from the scale were examined according to gender and longest lived residential area variables, it was determined that there was no significant difference. However, a significant difference was detected in the result expectation sub-factor scores of the scale only in terms of grade level variable. Consequently, the outcome expectation sub-factor scores of the second, third and fourth grade prospective teachers were found to be higher than the first grade prospective teachers' scores.

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Introduction

It is acknowledged that the notion of self-efficacy, which occupies a pivotal position within the framework of social learning theory, constitutes a salient variable exerting influence on the learning process. This concept represents the fundamental source of influence that shapes an individual's success within and beyond the academic environment. Social Learning Theory is a learning theory developed by psychologist Albert Bandura. This theory posits that human beings acquire knowledge not only through first-hand experience, but also by observing others, emulating their behaviours, and evaluating the consequences of those behaviours. A teacher who holds a strong conviction in their own self-efficacy can foster their students' self-confidence and encourage the development of a positive attitude.

Lee (2005) posits that the effective cultivation of self-efficacy beliefs entails the demonstration of capabilities, the provision of opportunities for self-realisation, the utilisation of positive reinforcement and exemplary models, the accentuation of positive behaviours, and the eschewal of superfluous comparisons.

These are beliefs that have been proven to effectively demonstrate an individual's capabilities. Furthermore, these beliefs have been demonstrated to influence human behaviours (Bandura, 2006). The impact of these beliefs on behaviour is a key consideration. In the context of this discussion, it can be posited that a teacher's self-efficacy belief level refers to their perception of their capabilities with respect to the various stages of teaching. This belief system has been shown to play a significant role in the success of individuals (Arslan, 2017; Zayimoğlu-Öztürk, 2011). Self-efficacy can be defined as an individual's belief in their own capabilities to accomplish a specific task. Within an academic environment, self-efficacy is defined as a student's confidence in their capacity to comprehend lessons, complete assignments, and demonstrate proficiency in examinations. In this regard, it can be posited that the cultivation of students' self-efficacy beliefs in educational processes constitutes a critical strategy for enhancing success. The correlation between teachers' self-efficacy beliefs and their professional success is well-documented (Şahin, 2000). One method of assessing the efficacy of the teaching process is through self-evaluation by the teacher (Aldan-Karademir, 2013). The teacher's self-perception is a critical factor in overcoming the challenges they face during their professional journey (Çiftçi, 2016).

As noted by Ekinci (2015), belief in one's capabilities—self-efficacy—is central to teaching competence. Teachers confident in their ability to instruct challenging subjects are more effective in delivering content and achieving success. Such educators possess the belief, skill, knowledge, and attitude necessary for success (Üstüner et al., 2009). Self-efficacy is shaped by effective classroom management and profession-specific traits; recognizing these traits reflects high self-efficacy in teaching, especially in science. As self-efficacy increases, teachers create more positive classroom environments and provide immediate, helpful feedback, enhancing instructional quality (Bıkmaz, 2013). Student self-efficacy also plays a key role and is shaped by teachers, families, learning settings, and internal motivation.

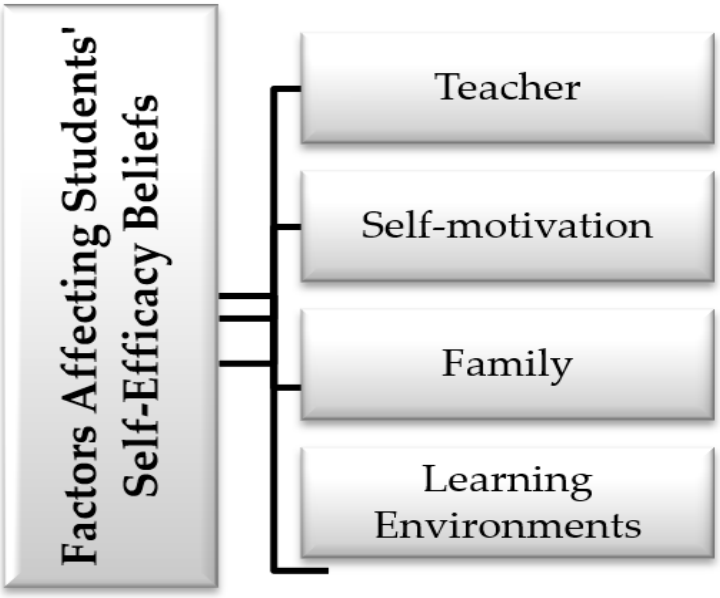

Figure 1. Factors affecting students' self-efficacy beliefs

It is widely acknowledged that educators play a pivotal role in fostering students' self-efficacy beliefs. It is widely accepted that the formation of these beliefs begins in the family environment and is subsequently developed during school. A student who believes in themselves also has a high level of self-confidence. When confronted with challenges, such students demonstrate resilience and persevere until they achieve success. Conversely, students with low self-confidence may encounter difficulties in their professional lives. Conversely, an enhancement in the self-efficacy belief levels of students whose initial levels are found to be deficient has been observed to be directly associated with the self-efficacy beliefs held by their teachers. (Kiremit, 2006).

Teachers who possess elevated levels of self-efficacy have a tendency to ascribe their students' academic success or failure to their own efforts. Conversely, teachers who exhibit low levels of self-efficacy have been observed to evade responsibility for student failure (Güvenç, 2010). The effectiveness of teaching methods, strategic planning, and assessment processes is influenced by the teacher's belief in self-efficacy (Tepe & Demir, 2012). Research findings indicate that student self-efficacy levels exhibit an upward trend as the grade level progresses, with female students demonstrating particularly elevated levels of self-efficacy. This necessitates teachers developing self-efficacy-based support strategies for different student groups (Bulut & Kaman, 2025). Moreover, the heightened self-awareness, sense of responsibility, and social relationships observed in students with high self-esteem indirectly influence teachers' perceptions of self-efficacy (Aktepe & Bulut, 2024). Teachers who possess

high levels of self-efficacy have been shown to encourage their students to succeed, while those with low self-efficacy are unable to provide the necessary academic and social support (Özata, 2007).

Fostering a positive attitude towards science is a key aim in the scientific community (Uyanık, 2016). Similarly, self-efficacy belief plays a vital role in science education and refers to teachers' confidence in their ability to teach science effectively and enhance student success. The degree of this belief directly affects the effectiveness of educational activities (Bolat & Karamustafaoğlu, 2023; Schriver & Czerniak, 1999). Teachers with high self-efficacy are more likely to use student-centred, inquiry-based methods, while those with lower self-efficacy often rely on traditional, less interactive approaches (Schriver & Czerniak, 1999).

In order to enhance the quality of educational institutions that have the capacity to influence the future generations of society, it is imperative that teachers, as a fundamental component of the educational system and the individuals responsible for its implementation, possess a strong sense of conviction. The principle that high levels of belief in one's capabilities invariably lead to superior performance in a given role is a well-documented one (Çeliköz & Çetin, 2004). In this regard, the importance of studies that assess the level of self-efficacy of teacher candidates is underscored. This research is considered valuable in determining the levels of science teaching self-efficacy beliefs of teacher candidates enrolled in the undergraduate programme in classroom education, and in contributing to other studies planned to develop the science teaching self-efficacy of teachers who will serve as classroom teachers throughout Turkey in the later stages of their careers. The objective of this research is to examine the science teaching self-efficacy beliefs of prospective classroom teachers according to various variables. In order to achieve this objective, the following sub-problems were investigated:

1) What are the levels of science teaching self-efficacy beliefs of prospective classroom teachers?

2) Do the prospective classroom teachers' science teaching self-efficacy beliefs show a significant difference according to the gender variable?

3) Do the prospective classroom teachers' science teaching self-efficacy beliefs show a significant difference according to the residential area variable?

4) Do the prospective classroom teachers' science teaching self-efficacy beliefs show a significant difference according to the grade year variable?

Method

Research Design

The survey model was utilised in the present study. Research employing this model is characterised by its significantly larger sample size compared to other studies that participate in a given topic or event (Fraenkel & Wallen, 2006).

Population and Sample

The study group consists of a total of 216 prospective teachers studying at all grade levels in the Classroom Education undergraduate programme of the Faculty of Education at Kastamonu University in the spring semester of the 2021-2022 academic year. Of the participants, 136 are female and 80 are male. The distribution of these prospective teachers by grade is as follows: 45 are in the first year, 59 in the second year, 41 in the third year, and 71 in the fourth year. In addition, 48 participants indicated that they had resided in the village for the longest time, 71 had resided in the district centre, and 97 had resided in the city centre. Descriptive statistics related to the sample of the research are shown in Table 1.

Table 1. Descriptive statistics related to the sample of the research

		n	
Grade Year	**Female**	**Male**	**Total**
First Year	28	17	45
Second Year	40	19	59
Third Year	25	16	41
Fourth Year	43	28	71
Total	136	80	216

Data Collection Tools and Procedure

The data for this study was collected by the researcher. The data were obtained through the administration of scales to prospective classroom teachers during the relevant academic year. In order to reach all prospective classroom teachers, data collection took place over a two-week period. The data collection process was protracted in order to encompass all participants. The collection of data was facilitated by the implementation of the "Self-Efficacy Belief Scale of Prospective Classroom Teachers in Science Teaching," a tool originally developed by Enochs and Riggs (1990) and subsequently adapted to Turkish by Hazır Bıkmaz (2002). The scale, once adapted to Turkish, was finalised with 21 items. The scale was administered to 216 prospective teachers enrolled in the Classroom Education undergraduate programme at Kastamonu University, Faculty of Education. The scale

utilised in the study exhibited two factors. Nine of the scale items are negative and 12 items are positive. The reliability level of the "Efficacy Belief" factor of the scale was determined as α= .86, while the reliability level of the "Outcome Expectation" factor was determined as α= .69. The reliability value for the entire scale was thus determined to be α= .85.

Data Analysis Process

The data collected during the course of the study were analysed and evaluated using the SPSS statistical package program. The normality of the data was determined through a series of statistical tests, revealing a normal distribution. To examine the research problems based on the programme analysis, an independent groups t-test was used for the gender variable, and descriptive statistics were used for the mean scores of the teacher candidates. Furthermore, one-way analysis of variance (ANOVA) techniques were employed to examine the impact of class level and settlement unit variables. The data were evaluated at the *p<.05 significance level.

Results

Findings Regarding the First Sub-Problem

The present study sets out to investigate the level of science teaching self-efficacy beliefs held by classroom teacher candidates. The descriptive statistics for analysing the science teaching self-efficacy beliefs of classroom teacher candidates according to this sub-problem are given in Table 2.

Table 2. Descriptive statistics for the sub-factor analysis of the science teaching self-efficacy beliefs of classroom teacher candidates

Sub-Factor	n	M	SD
Self-Efficacy Belief	216	47,87	6,80
Outcome Expectation	216	29,74	3,56

As demonstrated in Table 2, the items within the sub-factors were calculated by assigning scores between 1 and 5. The subsequent analysis of the sub-factors of the scale revealed that the average score of the pre-service teachers was M=47,87 in the self-efficacy belief sub-factor and M=29,74 in the outcome expectation sub-factor. The mean value of the self-efficacy belief sub-factor for the 216 pre-service primary school teachers participating in the study was found to be M=47,87. From this perspective, it is evident that the mean value of the participants' science teaching self-efficacy belief is higher than the mean value of the items, with M=39. The outcome expectation sub-factor, which contains eight items, exhibits a

range of scores from a minimum of eight to a maximum of forty. A subsequent analysis of the outcome expectancy sub-factor of 216 pre-service primary school teachers participating in the study reveals a mean value of M=29.74. This finding indicates that the mean value of the participants' outcome expectancy of science teaching is higher than M=24, which is the mean value of the items.

Findings Regarding the Second Sub-Problem

The present study investigates whether there is a significant difference in the science teaching self-efficacy beliefs of classroom teacher candidates according to gender variable. The results of examining the science teaching self-efficacy beliefs of teacher candidates in terms of the gender variable for this sub-problem are shown in Table 3.

Table 3. Independent t-test results for examining the scale sub-factors in terms of the gender variable

Sub-Factor	Gender	n	M	SD	df	t	*p*
Self-Efficacy Belief	Female	162	48,24	6,84	214	1,410	.162
	Male	54	46,75	6,63			
Outcome Expectation	Female	162	30,18	3,24	214	3,244	.001*
	Male	54	28,40	4,14			

*p<.05

Upon examination of Table 3, it was determined that there was no statistically significant difference in the "Self-Efficacy" sub-factor in relation to the gender variable ($t_{(214)}$=1.410, p>.05). The absence of a significant difference in terms of gender variable can be interpreted as meaning that both female and male teacher candidates have similar characteristics in this regard. The mean score for women was determined as M=48.24, and the mean score for men was determined as M=46.75. This finding indicates that the mean scores of both genders are above the scale's midpoint (M=39). However, it is evident that the mean of the female scores is greater than that of the male scores.

A significant difference was determined in the "outcome expectation" sub-factor in terms of gender variable ($t_{(214)}$=3.244, *p< .05). The mean score for female was determined as M=30.18; the mean score for male was determined as M=28.40. This finding indicates that the mean scores of both genders are higher than the standardised mean score of M=24, which is considered the average score that can be obtained from the scale. However, a significant difference was found in favour of female. This disparity can be attributed to the lower level of self-efficacy exhibited by male teacher candidates participating in the study when compared to their female counterparts. This finding suggests that as the self-efficacy belief

level of a teacher candidate for a course diminishes, their expectations for that course also decrease.

Findings Regarding the Third Sub-Problem

The present investigation will explore the existence of a significant difference in the science teaching self-efficacy levels of classroom teacher candidates according to the variable of the place of residence where they have lived the longest. In addressing this sub-problem, the findings pertaining to the examination of the science teaching self-efficacy levels of teacher candidates in relation to the aforementioned variable are presented in Table 4, categorised according to the scale's self-efficacy belief and outcome expectation sub-factors.

Table 4. ANOVA results for examining the scale sub-factors in terms of the longest lived place variable

Sub-Factor	Settlement Unit	n	M	SD	F	*p*
Self-Efficacy Belief	Village	48	47,54	6,61	,688	.795
	District	71	47,28	6,45		
	City	97	48,46	7,16		
Outcome Expectation	Village	48	29,29	3,45	1,176	.310
	District	71	29,49	3,12		
	City	97	30,14	3,89		

*p<.05

An examination of Table 4 reveals that no statistically significant differences were identified between the residence variable and the "self-efficacy belief" and "outcome expectation" sub-factors. In addition, the self-efficacy belief sub-factor did not demonstrate a significant difference in relation to residence unit (F: 0,688 p>.05). The scale for the self-efficacy belief sub-factor ranges from 13 to 65, with a mean of 39 and a median of 47. The analysis revealed that the average score of teacher candidates residing in the village as their longest residence unit was M=47.54, the average score of teacher candidates residing in the district as their longest residence unit was M=47.28, and the average score of teacher candidates residing in the province as their longest residence unit was M=48.46. The results of these analyses indicate that the scores of the teacher candidates in the longest residence unit variable were above the scale mean. The analysis further revealed that the teacher candidates whose residence unit had resided in the province for the longest duration attained the highest mean in the self-efficacy belief sub-factor. Conversely, the lowest mean was observed among teacher candidates whose settlement unit had been in the district for the longest period.

No significant difference was determined in terms of the longest residence in the outcome expectation sub-factor (F: 1.176, p>.05). For the outcome expectation sub-factor, the maximum attainable score on the scale is M=40, the mean score is M=24, and the minimum score is M=8. The mean score of teacher candidates who had spent the longest time residing in a village was determined to be M=29.29, in a district M=29.49, and in a province M=30.14. The results of this study indicate that the scores of teacher candidates in the longest residence unit variable exceed the scale average. The absence of a statistically significant discrepancy in the scale scores of teacher candidates with regard to their place of residence suggests that these candidates do not demonstrate divergent characteristics based on their geographical location. In summary, it can be concluded that the place of residence variable has no effect on teacher candidates' science teaching self-efficacy beliefs.

Findings Regarding the Fourth Sub-Problem

The present investigation will explore the existence of a significant difference in the science teaching self-efficacy levels of pre-service teachers according to grade year. The results of the examination of the science teaching self-efficacy belief levels of pre-service teachers in terms of the class level variable for this sub-problem are shown in Table 5.

Table 5. ANOVA results for examining the scale sub-factors in terms of the grade year variable

Sub-Factor	Grade Year	n	M	SD	F	*p*
Self-Efficacy Beliefs	First	45	46,37	5,88	1,831	.142
	Second	59	47,08	6,04		
	Third	41	48,90	6,65		
	Fourth	71	48,87	7,83		
Outcome Expectation	First	45	30,24	3,86	,674	.569
	Second	59	29,33	3,62		
	Third	41	30,02	3,03		
	Fourth	71	29,59	3,62		

*p<.05

An examination of Table 5 reveals that no statistically significant differences were found between the grade year variable and the self-efficacy belief and outcome expectancy subfactors. In the context of the self-efficacy belief sub-factor, the analysis revealed that there was no statistically significant difference in terms of the grade year (F: 1.831 p>.05). The scale for the self-efficacy belief sub-factor ranges from 13 to 65, with a mean of 39 and a median of 40. The mean score of first-year teacher candidates was found to be M=46.37, second-year candidates M=47.08, third-year candidates M=48.90, and fourth-year candidates M=48.87. The results of these analyses indicate that the average scores of the teacher candidates in the

grade year variable were above the scale average. The highest mean score in the self-efficacy belief sub-factor was attained by the third-year teacher candidates, while the lowest mean score in this area was obtained by the first-year teacher candidates. The grade level variable revealed that the third and fourth-year teacher candidates demonstrated notably higher scores compared to other grade years. This was attributed to the fact that teacher candidates pursued teaching courses such as science and life science instruction starting from the third year. The findings of this study indicate that there are no statistically significant differences in science teaching self-efficacy beliefs among teacher candidates based on the variable of the year of study. This state of affairs may indeed require rigorous scrutiny. The present study sets out to explore the reasons why teacher candidates' self-efficacy beliefs regarding the teaching of this course have not increased despite the courses taken in higher education related to science teaching. This noteworthy issue can be investigated in future studies.

Discussion, Conclusion and Limitations

The present study set out to ascertain the levels of science teaching self-efficacy belief held by teacher candidates enrolled in the undergraduate programme in classroom education. The investigation sought to ascertain whether these levels varied according to gender, grade year, and the place of residence where they had resided for the longest period.

The investigation revealed that the mean scores attained by the participants in the study exceeded the established cut-off point on the scale. A subsequent examination of the pertinent literature revealed that the average score of the teacher candidates in the self-efficacy belief sub-factor of the scale was M=48,89, and the average score of the teacher candidates in the result expectation sub-factor was M=30,51 (Bıkmaz, 2002). Consequently, it was determined that the scale average scores of the teacher candidates were higher than the average score of the scale (Self-efficacy belief M=39, outcome expectation M=24). When the results of the study conducted by Akbaş and Çelikkaleli (2007) on science teaching self-efficacy beliefs in predicting the attitudes of classroom teacher candidates towards science course were examined, the scores of the classroom teacher candidates were higher than the average score that could be obtained from the scale.

In their study, Duban and Gökçakan (2012) examined the science teaching self-efficacy beliefs of classroom teacher candidates and their attitudes towards science teaching. The results indicated that the average scores of the participants from the scale's self-efficacy belief sub-factor exceeded the average score of the scale. Conversely, the average scores of

the teacher candidates from the scale's outcome expectation sub-factor were lower than the average score they could potentially achieve from the scale's outcome expectation sub-factor. Kaya (2013) conducted a study to ascertain the change in classroom teacher candidates' science teaching self-efficacy beliefs depending on the science teaching course. The results of the scale applied to the classroom teacher candidates demonstrated that the average self-efficacy belief sub-factor score was M=44.12, while the average outcome expectation sub-factor score was M=28.99. The scale scores of the teacher candidates were, in summary, higher than the average scores of these two sub-factors.

In the study conducted by Yener and Yılmaz (2017), the learning-teaching concept and self-efficacy beliefs of teacher candidates were examined. It was observed that the average score that the teacher candidates received from the scale was higher than the average score of the scale. The high average scores of the teacher candidates participating in the study can be attributed to the fact that the teacher candidates, especially those in the third and fourth grades, increased the average because they took courses such as science teaching, life sciences and social studies teaching.

An examination of the scores of the classroom teacher candidates from the self-efficacy belief and outcome expectation sub-factors of the scale revealed that the scores of the teacher candidates who participated in the study were higher than the average score that could be obtained from the sub-factors of the scale. A subsequent examination of the pertinent literature revealed the results of a study titled "Examination of the Self-Efficacy Beliefs of the Classroom Teacher Candidates in Science Teaching According to Gender, Type of Education and Universities" by Akbaş and Çelikkaleli (2007). This study indicated that female participants had higher scores than their male counterparts in the self-efficacy belief sub-factor and outcome expectation sub-factors according to the gender variable. Moreover, a significant difference was found in favour of women in the outcome expectation sub-factor in the gender variable.

Hamurcu's (2006) study revealed a statistically significant relationship between gender and the science teaching self-efficacy beliefs of classroom teacher candidates. When Yener and Yılmaz (2017) examined the answers given by the teacher candidates, they found that there was no significant difference between the sub-factors of the scale and the gender variable. The absence of a significant difference in the self-efficacy belief sub-factor can be attributed to the evolving societal roles of women, marked by an increase in their

participation in business life, thereby enhancing their sense of self-assurance. The outcome expectation sub-factor exhibited a significant disparity in favour of women, attributable to a higher propensity among women to pursue a career in teaching, accompanied by a stronger sense of preparation and suitability for this profession.

An examination of the science teaching self-efficacy belief levels of the teacher candidates participating in the study, the self-efficacy belief of the scale, and the scores they received from the result expectation sub-factors in terms of the gender variable revealed that there was no statistically significant difference. While the highest average in the result expectation sub-factor was found in the teacher candidates whose settlement unit they had lived in was a province, it was determined that the lowest average in this area belonged to the teacher candidates whose settlement unit they had lived in was a village. The rationale behind the absence of a substantial discrepancy in the variable of the maximum lifespan can be elucidated by the elements in their environment that can cultivate self-efficacy beliefs, irrespective of the settlement unit in which they reside. To illustrate this point, consider an individual residing in a village setting. This individual's relationship with nature is inherently integrated, a consequence of the village environment and its associated learning processes, which are primarily experiential and hands-on. It can be hypothesised that this environment exerts a positive influence on the individual's self-efficacy belief level. Conversely, an individual residing in a shair perceives the advantages of technology more acutely, and when confronted with uncertainty regarding a subject, he is able to swiftly ascertain the truth about the subject in question.

An examination of the science teaching self-efficacy belief levels of the prospective teachers in terms of the grade year variable revealed no significant difference. However, a statistically significant relationship was identified between the scores obtained from the outcome expectation sub-factor of the scale and the grade year variable. Specifically, it was observed that the scores obtained from the scale by prospective teachers in their first year were lower than those obtained by prospective teachers in their second, third and fourth years. A subsequent examination of the extant literature revealed a statistically significant discrepancy between the grade levels of the prospective teachers and the scores they received from the self-efficacy belief scale by Yaman, et al. (2004). This study examined the self-efficacy belief levels and problem-solving skills of the prospective teachers. The significant difference that emerged was in favour of the prospective teachers studying in the

second, third and fourth years, in comparison to those studying in the first year and those in the second, third and fourth years.

In the study conducted by Berkant and Ekici (2007) on the relationship between the science teaching self-efficacy belief levels of classroom teacher candidates and intelligence types, it was observed that there was no difference when the teacher candidates participating in the study were examined according to their grade years. When the findings of this study are compared with the results of the two aforementioned studies, a similarity is observed. In the study conducted by Duban and Gökçakan (2012) on the science teaching self-efficacy beliefs and attitudes of classroom teacher candidates, it was found that there was no difference in terms of grade year in the result expectation sub-factor of the scale, but a significant difference was found in the self-efficacy belief sub-factor between the first and second years, the first and third years, and the first and fourth years. The rationale for this phenomenon can be attributed to the fact that teacher candidates who have recently commenced their undergraduate programme in classroom teaching, particularly in the third and fourth years, are engaged in teaching courses. This pedagogical experience is hypothesised to contribute to an augmentation in their self-efficacy beliefs.

The research findings indicate that prospective classroom teachers generally hold high self-efficacy beliefs in science education, suggesting that teacher training programmes in this domain are conducive to positive outcomes. This is of particular significance, as it demonstrates that prospective teachers have cultivated favourable attitudes towards science education and augmented their confidence in their professional competence. In practice, the integration of more practical science teaching activities, microteaching applications, and school experience-focused content within teacher education programs can contribute to the maintenance and further development of positive self-efficacy levels. The lower outcome expectation scores of first-grade teacher candidates indicate the need to support self-efficacy in the early stages of professional development. In this context, the development of self-efficacy-enhancing content and mentoring practices for the early years of teacher education programs would be beneficial.

In future research, it is recommended that similar studies be replicated at different universities with larger and more diverse samples. Furthermore, qualitative data collection techniques (e.g. interviews, observations) can be utilised to explore the thoughts, feelings and experiences that underpin teacher candidates' self-efficacy beliefs in greater depth.

Furthermore, by analysing different variables such as age, academic achievement level, and teaching experience, factors affecting self-efficacy can be identified in a more comprehensive manner. Ultimately, longitudinal studies can be conducted to track the development of teacher candidates' self-efficacy over time. This will enable the development of more sustainable and effective strategies for teacher education.

Ethical Committee Permission Information

Name of the board that carries out ethical assessment: Kastamonu University Scientific Research and Publication

Ethics Board The date and number of the ethical assessment decision: 17.05.2022/2022.10.05

Author Contribution Statement

Ramazan YILDIRIM: *Conceptualization, literature review and investigation, data curation and analysis, methodology, implementation, original draft, language editing, organization, and writing*

Gökhan UYANIK: *Language editing, organization, writing check, consulting*

References

Akbaş, A., & Çelikkaleli, Ö. (2007). Sınıf öğretmeni adaylarının fen bilgisi dersine yönelik tutumlarını yordamada fen bilgisi öğretimi öz-yeterlik inançları. [Science teaching self-efficacy beliefs in predicting pre-service primary school teachers' attitudes towards science course]. *Mersin Üniversitesi, Eğitim Fakültesi Dergisi, 3(1), 21-34.*

Aktepe, V., & Bulut, A. (2024). A mixed-method study on student's self-esteem skills. *Participatory Educational Research, 11*(5), 188–207. http://doi.org/10.17275/per.24.70.11.5

Aldan-Karademir, Ç. (2013). *Öğretmen adaylarının sorgulama ve eleştirel düşünme becerilerinin öğretmen öz yeterlik düzeyine etkisi*. [*The effect of pre-service teachers' questioning and critical thinking skills on teacher self-efficacy level*]. (Doktora tezi). Adnan Menderes Üniversitesi, Aydın.

Arslan, A. (2017). Ortaokul öğrencilerinin dinleme kaygıları ve akademik özyeterlik inançlarının çeşitli değişkenler açısından incelenmesi. *International e-Journal of Educational Studies (IEJES), 1* (1), 12-31.

Bandura, A. (2006). *Guide for constructing self-efficacy scales, self-efficacy beliefs of adolescents.* Information Age Publishing, ss. 307-337.

Berkant, H.G., & Ekici, G. (2007). Sınıf öğretmeni adaylarının fen öğretiminde öğretmen öz – yeterlik inanç düzeyleri ile zekâ türleri arasındaki ilişkinin değerlendirilmesi. [Evaluation of the relationship between teacher self-efficacy belief levels and intelligence types of prospective primary school teachers in science teaching]. *Çukuroca Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 16(1), 113 – 132.*

Bıkmaz, F. H. (2002). Fen öğretiminde öz–yeterlik inancı ölçeği. [Self-efficacy belief scale in science teaching]. *Eğitim Bilimleri ve Uygulama 1,* (2), 197-210.

Bıkmaz, F. H. (2013). Öz yeterlik inançları, eğitimde bireysel farklılıklar, Y. Kuzgun, & D. Deryakulu (Ed.) içinde, [Self-efficacy beliefs, individual differences in education], *rehberlik ve psikolojik danışma* [*guidance and psychological counselling*] (s. 291-310). Nobel.

Bolat, A., & Karamustafaoğlu, S. (2023). The effect of question preparation training program that measures higher order thinking skills on the self-efficiency of science teachers. *International e-Journal of Educational Studies, 7* (15), 568-583. https://doi.org/10.31458/iejes.1314305

Bulut, A., & Kaman, Ş. (2025). Öğrencilerin özetleme öz yeterlik algılarının incelenmesi. *International Social Mentality and Researcher Thinkers Journal, 11*(2), 409–416. https://doi.org/10.5281/zenodo.15068255

Çeliköz, N., & Çetin, F. (2004). Anadolu öğretmen lisesi öğrencilerinin öğretmenlik mesleğine yönelik tutumlarını etkileyen etmenler. [Factors affecting the attitudes of Anatolian teacher high school students towards teaching profession]. *Milli Eğitim Dergisi, 162*(1), 139-157.

Çiftçi, C. (2016). *Sınıf öğretmenlerinin öz yeterlik algıları ile kaynaştırmaya yönelik tutumları arasındaki ilişkinin incelenmesi. [Examining the relationship between classroom teachers' self-efficacy perceptions and their attitudes towards inclusion]* (Yüksek lisans tezi), Çukurova Üniversitesi, Adana.

Duban-Yıldız N., & Gökçakan N. (2012). Sınıf öğretmeni adaylarının fen öğretimi öz- yeterlik inançları ve fen öğretimine yönelik tutumları. [Prospective primary school teachers' science teaching self-efficacy beliefs and attitudes towards science teaching]. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 21(1), 267 – 280.*

Ekinci, N. (2015). The relationship between pre-service teachers' teaching approaches and teacher self-efficacy beliefs. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 30* (1),62-76.

Enochs, L. G., & Riggs, I. M. (1990). Further development of an elementary science teaching efficacy belief instrument: A preservice elementary scale. *Journal of School Science and Mathematics, 90*(8), 694-706.

Fraenkel, J. R., & Wallen, N. E. (2006). *How to design and evaluate research in education*. McGraw-Hill International Edition.

Güvenç, H. (2010). Pre-service teacher students' perceptions of professional self-efficacy and perceptions of responsibility for student achievement. *Journal of New World Sciences Academy, 6* (2), 1410-1421.

Hamurcu, H. (2006). Sınıf öğretmeni adaylarının fen öğretimine yönelik öz yeterlik inançları. [Prospective primary school teachers' self-efficacy beliefs towards science teaching]. *Journal of Educational Research,* 24, 112-122.

Kaya, S. (2013). Sınıf öğretmeni adaylarının fen öğretimi öz- yeterlik inançlarının fen öğretimi dersine bağlı olarak değişimi. [The change of pre-service primary school teachers' science teaching self-efficacy beliefs depending on science teaching course]. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 10*(1), 55-59.

Kiremit, H. (2006). *Fen bilgisi öğretmenliği öğrencilerinin biyoloji ile ilgili öz yeterlik inançlarının karşılaştırılması. [Comparison of science teaching students' self-efficacy beliefs about biology].* (Doktora tezi). Dokuz Eylül Üniversitesi, İzmir.

Lee, W. S. (2005). *Encyclopedia of school psychology*. Sage.

Özata, H. (2007). *Öğretmenlerin öz-yeterlik algılarının ve örgütsel yenileşmeye ilişkin görüşlerinin araştırılması. [Investigation of teachers' self-efficacy perceptions and their views on organisational innovation].* (Yayımlanmamış yüksek lisans tezi). Kocaeli Üniversitesi, Kocaeli.

Schriver, M., & Czerniak, C. M. (1999). A comparison of middle and junior high science teachers' levels of efficacy and knowledge of developmentally appropriate curriculum and instruction. *Journal of Science Teacher Education, 10(1), 21-42.*

Şahin, F. (2000). *Okul öncesi fen bilgisi öğretimi ve aktivite örnekleri*. *[Pre-school science teaching and activity examples].* Turan Ofset Baskı.

Tepe, D., & Demir, K. (2012). Self-efficacy beliefs scale of preschool teachers. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 12* (2), 137–158.

Uyanık, G. (2016). Effect of learning cycle approach-based science teaching on academic achievement, attitude, motivation and retention. *Universal Journal of Educational Research, 4*(5),1223-1230.

Uyanık, G. (2017). İlkokul öğrencilerinin fen bilimleri dersine yönelik tutumları ile akademik başarıları arasındaki ilişki. [The relationship between primary school students' attitudes towards science course and their academic achievement]. *TÜBAV Bilim Dergisi, 10*(1), 86-93.

Üstüner, M., Demirtaş, H., Cömert, M., & Özer, N. (2009). Secondary school teachers' self-efficacy perceptions. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi, 9* (17), 1-16.

Yaman, S., Koray, C. Ö., & Altunçekiç, A. (2004). A study on examining the self-efficacy belief levels of pre-service science teachers. *Türk Eğitim Bilimleri Dergisi, 2*(3), 355-366.

Yener, D., & Yılmaz M. (2017). Öğretmen adaylarının öğrenme öğretme anlayışları ve fen öğretimine yönelik özyeterlik inançları. [Pre-service teachers' conceptions of teaching and learning and their self-efficacy beliefs towards science teaching]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 17*(2), 1016 – 1038.

Zayimoğlu-Öztürk, F. (2011). *Sosyal bilgiler öğretmenlerinin ve öğretmen adaylarının ilköğretim sosyal bilgiler dersi öğretim programında yer alan öğrenme alanlarına ilişkin özyeterlik düzeylerinin incelenmesi.* [*Examining the self-efficacy levels of social studies teachers and pre-service teachers about the learning areas in the primary school social studies curriculum*]. (Doktora tezi). Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

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