ORIGINAL ARTICLE

Pre-service Science Teachers' Self-Efficacy Beliefs about Museums as an Educational Environment

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***Abstract**: This study aims to determine the self-efficacy beliefs of pre-service science teachers regarding museums as an educational environment and compare these beliefs based on whether they have taken a course on museums as an educational environment. In the study group, there were a total of 78 pre-service science teachers, 39 in the sophomore and 39 in the senior pre-service teachers. The sample of the study was determined through 'purposive sampling.' In the research, the 'Self-Efficacy Belief in Museum Education' scale was used. An independent sample t-test was applied to compare the data of sophomore and senior pre-service science teachers with normal distribution. According to the findings obtained as a result of the analysis, it was found that pre-service science teachers had a positive self-efficacy belief above the average. According to the independent sample t-test result, a statistically significant difference was found in favor of senior science teacher candidates who considered museums as educational environments. Senior pre-service teachers who take courses with education in museums are aware of what needs to be done before the excursion and how they can implement student-centered planning during the excursion.*

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Introduction

HUMAN beings have embarked on a journey to make sense of the world with a sense of curiosity since their existence. This journey is an active process that takes place as formal or informal learning, which is a part of the whole of life as it moves together with experiences (Ambrose and Paine. 2006). To make sense of life, individuals must feel competent, both in satisfying their curiosity and in solving problems. This competence requires confidence in one's own skills, beliefs, and abilities. The individual's belief that he/she can be self-efficacy and can do a job is called self-efficacy. The concept of self-efficacy is an important concept in Bandura's (1997) Social Learning Theory (Social Cognitive Theory). According to Bandura (1977), self-efficacy is defined as "the belief in one's own abilities to plan and carry out the courses of action needed to manage future situations." The core principle of self-efficacy is that individuals are more likely to engage in tasks where they feel competent and less likely to attempt those in which they feel inadequate. The higher the individual's self-efficacy, the easier it is for him/her to learn. Learning that takes place in all areas of life outside of school is defined as informal learning. Environments such as museums, historical places, libraries where informal learning takes place are defined as informal learning environments (Erdoğan, 2010; Türkmen 2010). In addition, informal learning environments are seen as facilitators of the learning process (Hein, 2004). Among these informal learning environments, museums meet a need in education with their integration into every course in education and their contribution to lifelong learning (Şahan, 2005). Museums are also the most frequently used source of help in learning to learn (Ayta çet al., 2021).

The emergence of the museum concept dates back to Elias Ashmole's explanation at Oxford University in 1682, while the history of modern museums dates back to 17th-century Europe (Ambrose and Paine, 2006).

Museums are defined as a permanent institution open to the public that embodies all tangible and intangible elements of cultural heritage, performs this task without profit, and supports education, entertainment, information, and mutual sharing (International Council of Museums, 2022). Throughout history, museums have aimed to exhibit and preserve the collected artifacts, provide information to societies, and pass on the past to future generations (Tural & Kala, 2018). In recent years, the popularity of museums, which continue to exist in many varieties, has increased rapidly among the masses as they appeal to people with different knowledge and at different ages (Shaby et al., 2019). Many researchers point to John Cotton Daha, who worked at the New Jersey-Newark Museum, as the beginning of

the history of education in museums and think that education in museums emerged after the existence of museums (Prottas, 2019).

However, as has been argued by researchers since the 19th century, museums, which store the memories of societies, have been seen as educational institutions since their existence (Hein, 2004). According to John Dewey, who was known for his interest in museums throughout his life, education in museums should be an integrator of new experiences. At the same time, Dewey argued that museums should occupy a central position in education and that museum visits should become a part of education, not a once-a-year event (Dabney et al., 2016). Museum visits based on education are an experience in itself that changes the visitor's perspective and perception of the events (Çetin & Dağ, 2024). Education in museums differs from the education given at school with many features. Instead of a solid learning plan in museums as an educational environment, there is a flexible learning plan that changes according to requests and needs in the process (Aytaç et al., 2021). Due to these flexibilities, learning in museums is referred to as "free-choice learning" as it can progress according to the learner's own pace and interests (Ambrose & Paine. 2006). Learning becomes more meaningful with the active participation of students and students who gain experience with concrete objects (Aytaç et al., 2021). This process also overlaps with the constructivist approach (Şanda & Demirel, 2024). Although education in museums provides effective learning for people of all ages by involving the five senses, this situation should only be realized under the guidance of experts with scientific knowledge of the disipline and pedagogy (Walsh-Piper, 1994). Students can visit museums alone, with peers, parents or teachers. Even if students who visit alone have the opportunity to interact with every object in the museum, there may be deficiencies in their learning. In museum visits with peers, on the other hand, students learn more by seeing each other and interacting with objects in the museum than when visiting alone. In addition, it is an undeniable fact that when museum visits take place with parents/teachers, taking into account their guidance and encouragement, students learn more than when they visit alone and with peers (Crowley et al., 2001). In addition, the level of education and the number of museum visits made by parents who visit museums with their students are directly proportional to their children's learning, but it is also inevitable that parents provide misinformation or misleading information, which can lead to incomplete or incorrect learning (Dabney et al., 2016). The same situation is also the case when museum visits are carried out with peers.

For teacher-led museums as an educational environment, planning should be carried out before, during, and after the museum visit. Before the museum visit, teachers who will carry out education in the museum regarding the relevant curriculum subject should visit the museum and make

the necessary planning in order to obtain information in advance. Before the museum visit, conducting activities that will reveal students' prior knowledge and providing information about the activities to be carried out in the museum play an effective role in attracting students' interest. Carrying out activities and workshops that will stimulate students' senses and enable them to use their creative and critical thinking skills effectively during the museum visit will increase the effectiveness of the education in the museum. In addition to traditional evaluations after the museum visit, exhibiting the products that emerged as a result of the activities and workshops carried out during the museum visit, asking interview questions, and making self- and peer evaluations are among the evaluation methods that can be used (Aytaç et al., 2021; Güleç & Alkış, 2003; Türkmen, 2010).

Teachers need to be sensitive to students' interests and requests and listen to them in order to ensure effective learning during museum visits (Walsh-Piper, 1994). Open communication is the best way to improve students' behavior and learning in museums (Anderson et al., 2008). In addition, during the museum visit, instead of showing every object to the students, it is necessary to show the objects of interest and not to make any positive or negative judgments against the students (Aytaç et al., 2021). Any other behavior will lead to the restriction of students' creativity. In addition, all activities to be carried out before, during and after the museum visit should be related to daily life and overlap with the facilities of the relevant museum (Aytaç et al., 2021). Establishing a relationship with daily life and objects in the museum will keep students' interest alive throughout the process.

When the purpose and scope of the cooperation protocol signed between the Turkish Ministry of National Education and the Ministry of Tourism in 2016 are examined, it is seen that the knowledge and skills of teachers and students in the artistic and cultural field should be explored, developed and supported. In this context, education in museums is an important resource for the development of what exists and the completion of what is missing. Again, the 2023 Vision of the Turkish Ministry of National Education (2019), it was stated that teachers should integrate museums with education and classroom learning should be moved to realistic learning environments, and it was deemed necessary to prepare various training and certification programs for teachers for these goals. Considering all these, it is estimated that determining the self-efficacy belief levels of pre-service teachers, who will educate future generations, towards education in museums will be a pioneer for future studies. Universities also provide theoretical information on museums as an educational environment to pre-service teachers as an elective or compulsory course at the undergraduate/graduate level within the scope of 'Out-of-School Learning Environments' or "Education in Museums".

When the studies conducted with pre-service teachers on museum and education are examined in the literature, there are many studies. In 2012, Metin-Taş examined the views of 209 4th grade pre-service Primary School teachers on education in museums with the survey research method, and found that even though pre-service teachers had positive views on education in museums, they thought that education in museums should be used more in social studies courses. In 2017, Bolat-Aydoğan conducted interviews with 6 pre-service Visual Arts teachers who took the "Museum Education and Practices" course and found that the pre-course expectations were satisfied, they liked the way the course was conducted, and they learned scientific knowledge more easily. Interestingly, while they could not relate the course to their professions before taking the course, they said that they could relate it after the course.

In another study conducted in 2017 by Erem, 25 pre-service Preschool teachers who took the elective course "Museum Education" took their opinions. At the end of the study, while the teachers expressed their positive opinions about the course and its content, they also stated that this course should be compulsory in the curriculum. Çıldır and Karadeniz (2017) took the opinions of 4th grade 62 pre-service Preschool teachers who took the elective course "Museum Education" about the changing perception of museums. As a result of this study, pre-service teachers were able to prepare activities in museums and expanded their existing knowledge about education in museums. In Tuna's phenomenology study conducted in 2018 with 25 4th grade pre-service Art and Painting teachers who took the "Museum Education and Practices" course, teachers found the creative writing activity carried out for the purpose of education in the museum to be imagination-developing, informative and fun. İşlek (2019) conducted a mixed-method study to determine the self-efficacy beliefs and opinions of 30 pre-service preschool teachers regarding the use of museums as an educational environment. As a result of the research, it was determined that pre-service teachers considered themselves inadequate in using museums as an educational environment because their level of knowledge about using strategies, methods and techniques related to education in museum was insufficient, and accordingly, their self-efficacy beliefs were not at a sufficient level. Görmez (2020) conducted a survey research with 209 pre-service Social Studies teachers. As a result of the study, it was revealed that the majority of pre-service teachers had never been to a museum or had not taken any course on education in museums, and even if they recognized the importance of education in museums, they thought that making plans for related education should be done after they started their profession. Uslu (2021), in his study in which 114 pre-service social studies teachers were asked for their opinions on the use of museums as an educational environment, found that there are both positive and negative aspects of using

museums as an educational environment. The positive aspects were defined as "providing permanent learning", "enabling students to learn better by seeing/living" and "providing information about the past", while the negative aspects were defined as "the possibility of students damaging historical documents and objects", "financial problems" and "difficult classroom management". In 2020, Gürbey et al. conducted a phenomenology study with 172 pre-service Science teachers through semi-structured interview forms. As a result of the study, it was determined that most of the pre-service teachers did not take any courses or trainings on the education in museum, while it was revealed that they mostly thought of museums as out-of-school learning environments, but they stated that the experts/guidance in museums was not sufficient about education in museum. In the study conducted by Şanda and Demirel in 2023 with 806 pre-service teachers in different programs of 3rd and 4th grade, it was found that pre-service teachers at two different grade levels evaluated museums differently and that pre-service teachers who took museum courses had a more positive attitude towards educational practices in museums than those who did not. In a qualitative study conducted by Çetin and Dağ in 2024 with 14 pre-service Primary School teachers, it was investigated how teachers perceive and conceptualize museums and what kind of museum schema they have in their minds. The results of the study showed that pre-service primary school teachers perceive museums in three different contexts, "history and culture", "learning and personal development" and "material evidence", and that teachers tend to define museums according to their relationship with the museum. Kala and Tural (2024) examined the self-efficacy beliefs of 1, 2, 3 and 4th grade pre-service teachers about education in museum in relation to certain variables. Pre-service teachers' self-efficacy beliefs were found to be 'high'. However, while no significant difference was found for the gender variable, a significant difference was found according to the class level and course taking status variables.

When the curriculum of pre-service science teachers, who are the study group of the research, is examined, the 4th grade program includes the 'Out-of-School Learning Environments in Science Teaching' course. Throughout this course, it is aimed to plan, implement and evaluate appropriate teaching methods and techniques in science teaching in various out-of-school environments, including museums, and prepare pre-service teachers for museums as an educational environment. When the studies conducted with pre-service teachers in the literature are examined, it is found that education in meseum can be integrated with every course, but the studies conducted for science teachers are relatively fewer than the studies conducted with other teachers. In addition, there are almost no studies in the literature examining pre-service science teachers' self-efficacy beliefs towards education in museums. Accordingly, the aim of this study is to

determine pre-service science teachers' self-efficacy beliefs towards museums as an educational environment and to compare them according to the variables. Answers to the following questions were sought for this main purpose;

- What is the level of pre-service science teachers' self-efficacy beliefs towards museums as an educational environment?
- Do pre-service science teachers' self-efficacy beliefs towards museums as an educational environment vary according to whether they have taken a museum as an educational environment course before or not?

Method

In this study, the survey method, which aims to reveal the existing situation by describing it, was used.

Study Group

The population of the study consists of pre-service science teachers studying at 3 universities in a metropolitan city. The sample group was randomly selected from 1 of the 3 universities. The pre-service teachers in the Faculty of Education Science Teacher Education Program of the relevant university were selected through 'purposive sampling'. The study was carried out with a total of 78 pre-service teachers, 39 (50%) in the second year and 39 (50%) in the fourth year. Purposive sampling used in this study includes individuals who have certain characteristics and who are most suitable for the purpose of the research (Büyüköztürk et al., 2018). The reason why sophomore and senior pre-service science teachers were included in the study is that senior pre-service science teachers took the course "Out-of-School Learning Environments in Science Education", while sophomore pre-service science teachers did not take the course in this context.

Data Instruments

The "self-efficacy beliefs scale regarding museum education" developed by Uslu & Yeşilbursa in 2014 was used as the data collection tool in the study. The scale is a five-point Likert-type scale consisting of the answers "I am completely inadequate (1)", "I am inadequate (2)", "I am partially sufficient (3)", "I am sufficient (4)" and "I am completely sufficient (5)". The total correlation values of the items of the scale consisting of 24 items were determined as .32 to .57, while the item factor loadings were determined between .57 and .77.

When the total of the teachers' responses to the related scale were analyzed, the arithmetic mean value was found to be 3.66. This value corresponds to the ranges used in the 5-point Likert-type self-efficacy belief scales in the scale development study conducted by Yeşilbursa and Uslu in 2014 (arithmetic mean value between 1.00-1.79 is "Extremely Low", 1.80-2. 59 is "Low", 2.60-3.39 is "Moderate", 3.40-4.19 is "High", 4.20-5.00 is "Extremely High"), the level of self-efficacy beliefs corresponds to the score range of 'High' statement. Cronbach's Alpha value was calculated to determine the reliability coefficient of the scale and found to be 0.92. In order for a study to be considered reliable, the reliability coefficient should be 0.70 and higher than 0.70 (Büyüköztürk, 2011).

Data Collection Process

After the study group was determined, the scale was distributed to sophomore and senior pre-service science teachers at appropriate times. It took approximately 15-20 minutes for both classes of pre-service teachers to complete and submit the scale.

Data Analysis

The collected data were analyzed with SPSS 25 program. First, normality test was performed and the hypothesis test to be used in data analysis was decided. For the normality test, some researchers suggest using the Shapiro-Wilk test when the number of experimental and/or control groups is below 50 and the Kolmogorov-Smirnov test when the number is above 50 (Razali & Wah, 2011), while some researchers argue that this number should be 30 (Mayers, 2013). Since the senior group in our study consisted of 39 pre-service teachers and the sophomore group consisted of 39 students, we used both Kolmogorov-Smirnov and Shapiro-Wilk tests. Shapiro-Wilk test analysis values showed normal distribution (sophomore $p=0.741$ $p>0.05$ and senior $p=0.075$ $p>0.05$), Kolmogorov-Smirnov test analysis values showed normal distribution (sophomore $p=0.200$ $p>0.05$ and senior $p=0.200$ $p>0.05$) (**Table 1**).

The kurtosis and skewness values were determined by utilizing the normality test. The kurtosis and skewness values should be between ±1.5 for normally distributed results (Tabachnick & Fidell, 2013). When the kurtosis value (0.11) and skewness value (-0.721) for sophomore pre-service teachers and the kurtosis value (-0.639) and skewness value (1.248) for senior pre-service teachers are read separately, these results show that the data are normally distributed. In order to analyze the data of the normally distributed senior and sophomore students, it was decided to use the independent sample t-test, which is one of the parametric tests of hypothesis testing.

Table 1.Tests of Normality.

Groups	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Sd	Sig.	Statistic	Sd	Sig.
Sophomore	0.105	39	0.200	0.981	39	0.741
Senior	0.096	39	0.200	0.949	39	0.075

Table 2. Independent Sample T-Test Results.

Groups	n	x̄	Ss	Sd	t	p
Sophomore	**39**	**3.3718**	**0.56997**			
Senior	**39**	**3.9594**	**0.38551**	**76**	**-5.333**	**0.000**

Findings

The results of the independent sample t-test, there was a statistically significant difference between the senior (taken a course related on education in museum) and sophomore (not taken a course related on education in museum) pre-service science teachers in terms of self-efficacy beliefs in favor of the senior pre-service science teachers, $t(76) = -5.333$, $p<0.05$. The arithmetic mean value of the sophomore pre-service science teachers was 3.37 and the arithmetic mean value of the senior pre-service science teachers was 3.95. (**Table 2**)

When the data obtained from the self-efficacy beliefs scale were analyzed on a question basis, 20 statistically significant differences were observed, while no statistically significant difference was observed in the remaining 4 questions (5-8-11-14). The distribution of the arithmetic averages of the data was analyzed for each item in accordance with the scoring in the study conducted by Yeşilbursa and Uslu in 2014. There were no items with arithmetic means between 1.00-1.79 for "Very Low" and 1.80-2.59 for "Low" self-efficacy beliefs in both grade levels. While sophomore students had 9 items regarding "Moderate" self-efficacy beliefs with an arithmetic mean 2.60-3.39, senior students had 1 item. There are 15 items for sophomore students and 22 items for senior students for "High" self-efficacy beliefs with an arithmetic mean 3.40-4.19. There were no items for the "Extremely High" self-efficacy belief with an arithmetic mean between 4.20-5.00 for sophomore students and 1 item for senior students (**Figure 1**).

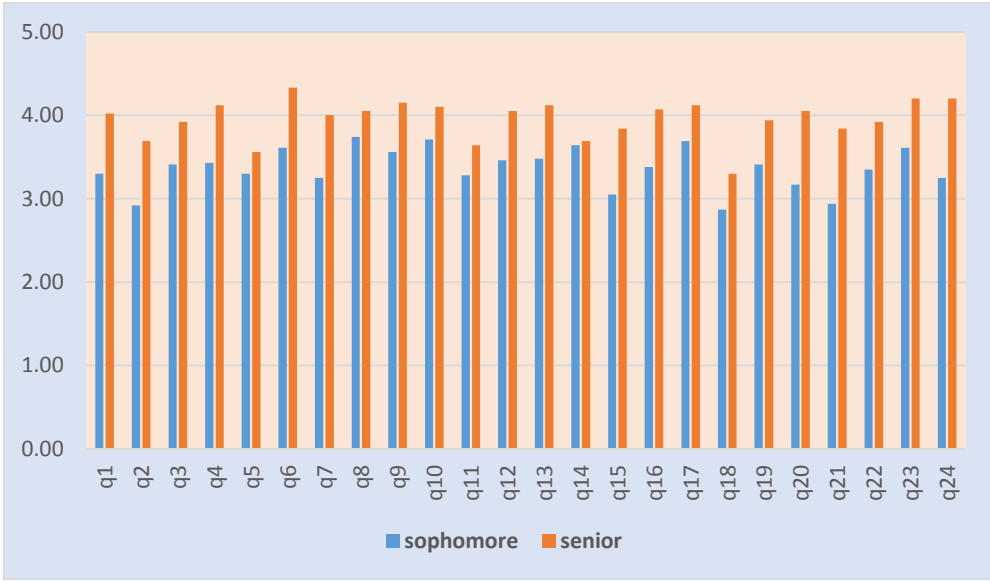

Figure 1. Mean scores of self-efficacy beliefs scale regarding museum education.

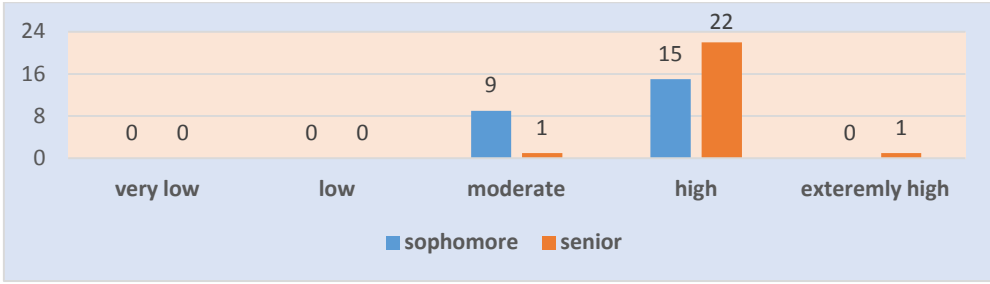

Figure 1. Mean scores of sophomore and senior pre-service teachers.

In this study, the score range in which the arithmetic mean values obtained from the answers given by both groups of pre-service teachers to the items correspond to the self-efficacy belief level expressed as "High". The highest arithmetic mean of sophmore pre-service teachers was the 10th question (I can create a better learning environment during museum trips by planning activities that students may enjoy) with 3.71, while it was the 6th question (I can benefit from virtual museums when it is not possible to organize a museum visit in real environment) with 4.33 for senior students. The lowest arithmetic mean of sophmore and senior pre-service teachers was determined as question 18 (I can create a school museum that will encourage

other students by cooperating with administrators within the school facilities) with 2.87 and 3.30, respectively (**Figure 2**).

Each item was analyzed throughout the self-efficacy beliefs scale and the questions with statistically significant differences at both sophomore and senior pre-service teachers were determined. While statistically significant differences were observed in 20 questions (1-2-3-4-6-7-9-10-12-13-15-16-17-18-19-20-21-22-23-24) of the self-efficacy beliefs scale, no statistically significant difference was observed in the remaining 4 questions (5-8-11-14).

These 4 questions, which did not differ significantly, were about using time effectively, providing information before the excursion, and creating an observation corner in the classroom after the excursion. The questions with significant differences are the questions related to the trip planning process and the questions related to spending the moment of the excursion efficiently. Especially in the process of the excursion moment, it is noticeable that students are interested in choosing and using methods and techniques for discovery, collecting data in cooperation with each other, interpreting and making sense.

In addition, there are differences in associating the objects in the museum environment with the achievements in the curriculum, associating with previous knowledge, reinforcing previous knowledge, and making the excursion process interesting. In this study, the self-efficacy beliefs scale item with the highest arithmetic mean was question-8, "I can create an excursion-observation corner and enable students to share their experiences," with 3.74 for sophomore pre-service teachers and question-6, "I can benefit from virtual museums when it is not possible to organize a museum visit in real environment," with 4.33 for senior pre-service teachers. The self-efficacy belief scale item with the lowest arithmetic mean of pre-service teachers is question-18 "I can create a school museum that will encourage other students by cooperating with administrators within the school facilities" with a mean of 2.87 for sophomore pre-service teachers and 3.30 for senior pre-service teachers.

Conclusion & Discussion

In this study, in which the self-efficacy beliefs of pre-service science teachers towards education in museum were determined and these self-efficacy beliefs were compared according to the status of taking courses related to "education in museum", it is seen that the self-efficacy beliefs of sophomore pre-service teachers towards education in museum are at moderate level, while senior pre-service teachers are at high level. This is obviously linked to the course content, teaching method, practical opportunities. Because the reason for the increase in self-efficacy in the individual is that the individual receives the necessary scientific information

for teaching in out-of-school learning environments such as museums and participates in the necessary applications, both by observation and by developing sample applications in himself, the belief in the capacity to achieve what is needed has increased.

The independent sample t-test of the normally distributed data revealed that there was a statistically significant difference between the self-efficacy beliefs of pre-service science teachers towards education in museum in favor of the pre-service teachers who took courses related to education in museum. This result is in line with the study conducted by Yeşilbursa and Uslu in 2018 with pre-service Social Studies teachers. It is obvious that the reason for the significant difference in favor of the pre-service teachers who took a course on education in museums is that the course was a source of pre-service teachers' feeling of competence.

In a study conducted by Gürbey et al. in 2020, it was found that pre-service science teachers who had experience of visiting museums wanted to take their students to museums as an out-of-school learning environment, when they start their professional life, whereas pre-service science teachers who had never experienced museums did not have such a goal.

From this point of view, a teacher who feels competent can plan an effective lesson plan in museum for his/her students. Museums can only become places frequently visited by children if they are in the hands of teachers and if teachers are trained for education in museum before they start their careers as pre-service teachers. In the study of Şanda and Demirel (2023), it was revealed that pre-service teachers studying in different branches can be taught how to use the education in museum through courses related to education in museums and in this way, it will increase the knowledge, skills and equipment of pre-service teachers.

While there was a statistically significant difference in 20 questions of the self-efficacy belief scale, there was no statistically significant difference in the remaining 4 questions. Senior pre-service teachers who take courses with education in museum are aware of what needs to be done before the excursion and how they can implement a student-centered planning during the excursion. In particular, it was seen that they have the belief that they can choose the necessary techniques to use scientific process skills to their students and manage the moment of the excursion in cooperation. They also think that they can use the museum learning environment from a multidisciplinary point of view to provide students with scientific gains not only for that science course but also to establish connections with other courses.

Limitation

While analyzing the contributions of the study, it is also necessary to acknowledge its limitations. One of these limitations is the small size of the study groups; findings may differ when analyzed on larger study groups. In addition, our study group is limited to a single region, which prevents generalization of our results. Socio-cultural differences obviously affect the results. In future studies, similar research can be conducted with a larger sample and with students from different regions.

Suggestion

- In order for pre-service teachers to learn education in museum and to reach the self-efficacy belief in which they feel competent, courses on education in museum can be given in earlier grades in universities.
- In order to increase the impact of the courses on education in museum, the content should be expanded with an interdisciplinary perspective and the course should be implemented in the form of planning and practicing.
- Furthermore, it is necessary to conduct such studies in different courses and to demonstrate that museums are an important learning environment for every field.

Reference

Anderson, D., Piscitelli, B. ve Everett, M. (2008). Competing agendas: Young children's museum field trips. Curator: The Museum Journal, 51(3), 253-273. https://doi.org/10.1111/j.2151-6952.2008.tb00311.x

Ambrose, T. ve Paine, C. (2006). Museum basic. (2. Baskı). Routledge Yayınevi

Aykaç N., Güneroz C. ve Aykaç M. (2021). Müze eğitimi yaratıcı drama uygulamaları. Pegem Akademi Yayınevi.

Bandura, A. (1977) Self-efficacy: Toward a Unifying Theory of Behavioral Change-PsychologicalReview. 34 (2): 191-215. http://www.uky.edu/Chapter2:http://samples.jbpub.com/9781449689742/Chapter2.pdf

Bolat-Aydoğan, K. E., (2017). Görsel sanatlar öğretmen adaylarının görüşleri bağlamında müze eğitimi ve uygulamaları dersi. Anadolu Journal of Educational Sciences International, 7(1), 71-106. https://hdl.handle.net/11421/24226

Büyüköztürk, Ş. (2011). Sosyal bilimler için veri analizi el kitabı (28. Baskı). Pegem Akademi Yayınevi.

Büyüköztürk, Ş., Çakmak, E., Akgün, Ö. E., Karadeniz, Ş. ve Demirel, F. (2018). Bilimsel araştırma yöntemleri (26. Baskı). Pegem Akademi Yayınevi.

Crowley, K., Callanan, M. A., Jipson, J. L., Galco, J., Topping, K. ve Shrager, J. (2001). Shared scientific thinking in everyday parent-child activity. Science Education, 85(6), 712-732. https://doi.org/10.1002/sce.1035

Çetin, M. ve Dağ, N. (2024). İlkokul öğretmenlerinin müzeye ilişkin algıları. Türkiye Sosyal Araştırmalar Dergisi, 28(1), 335-354. https://doi.org/10.20296/tsadergisi.1352066

Çıldır, Z. ve Karadeniz, C. (2017). Okul öncesi öğretmen adaylarının görüşleri

bağlamında müze ve müzede eğitim. Milli Eğitim Dergisi, 46(214), 359-383. https://dergipark.org.tr/en/pub/milliegitim/issue/36135/405944#article_cite

Dabney, K. P., Tai, R. H., & Scott, M. R. (2016). Informal science: Family education, experiences, and initial interest in science. International Journal of Science Education, Part B, 6(3), 263-282. https://doi.org/10.1080/21548455.2015.1058990

Erdem, E. (2017). Okul öncesi öğretmenliği öğretim programında yer alan seçmeli müze eğitimi dersinin gerekliliğine ilişkin öğrenci görüşlerinin incelenmesi. Yaratıcı Drama Dergisi, 12(2), 31-42. https://doi.org/10.21612/yader.2017.011

Erdoğan, İ. (2010). Eğitime yeni bir soluk: Müzeler. http://www.irfanerdogan.com.tr/index.php/egitime-yeni-bir-soluk-muzeleradresinden5Eylül2024tarihinde alınmıştır

Field, A. (2009). Discovering statistics using SPSS: Book plus code for E version of text (896. Baskı). SAGE Publications Limited.

Görmez, E. (2020). A study on social studies teacher candidates' views on museums and museum education. Ilkogretim Online, 19(3), 1464-1475. https://doi.org/10.17051/ilkonline.2020.730966

Güleç, S. ve Alkış, S. (2003). Sosyal bilgiler öğretiminde müze gezilerinin iletişimsel boyutu. Uludağ Üniversitesi Eğitim Fakültesi Dergisi, 17(1), 63-78. https://dergipark.org.tr/en/download/article-file/153217

Gürbey, Z. B., Efe, H. ve Mertoğlu, H. (2020). Fen bilgisi öğretmen adaylarının okul dışı öğrenme kapsamında müze eğitimine ilişkin görüşleri. Journal of Sustainable Education Studies, 1(1), 13-25. https://dergipark.org.tr/tr/pub/seader/issue/66466/1040683

Hein, G. H. (2004). John Dewey and museum education. Curator: The Museum Journal, 47(4), 413-427. https://doi.org/10.1111/j.2151-6952.2004.tb00136.x

International Council of Museums. (24 August 2022). Museum Definition.

Museum Definition - International Council of Museums -International Council of Museums (icom.museum) adresinden 5 Eylül 2024 tarihinde alınmıştır.

İşlek, D. (2019). An Analysis of The Pre-service Preschool Teachers' Self-Efficacy Beliefs and Views Towards Using Museums As an Educational Environment. Elementary Education Online, 2019; 18 (4), 1434-1447.https://orcid.org/10.17051/ilkonline.2019.630387

Kala, F. N. ve Tural, A. (2024). Self-sufficiency beliefs of class teacher candidates on museum education. Bartın University Journal of Faculty of Education, 13(2), 319-331.https://doi.org/10.14686/buefad.1194035

Mayers, A. (2013). Introduction to statistics and SPSS in psychology. Pearson Education Limited

Prottas, N. (2019). Where does the history of museum education begin?. Journal of Museum Education, 44(4), 337-341. https://doi.org/10.1080/10598650.2019.1677020

Razali, N. M. & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests. Journal of Statistical Modeling and Analytics, 2(1), 21-33. https://www.nrc.gov/docs/ML1714/ML17143A100.pdf

Shaby, N., Ben‐Zvi Assaraf, O. ve Tal, T. (2019). An examination of the interactions between museum educators and students on a school visit to science museum. Journal of Research in Science Teaching, 56(2), 211-239. https://doi.org/10.1002/tea.21476

Şanda, E., & Demirel, İ. N. (2024). Pre-service teachers' opinions on educational practices in museums. Anadolu Journal of Educational Sciences International, 14(1), 89-113. https://doi.org/10.18039/ajesi.1337006

Şahan, M. (2005) Müze ve eğitim. Türk Eğitim Bilimleri Dergisi, 3(4), 487-501. https://dergipark.org.tr/en/pub/tebd/issue/26122/275182

Tabachnick, B. G. ve Fidell, L. S. (2013). Using Multivariate Statistics (7. Baskı). Pearson Yayınevi

Tas, A. M. (2012). Primary-grade teacher candidates' views on museum education. Online Submission, 6, 606-612. https://eric.ed.gov/?id=ED535482

T.C. Milli Eğitim Bakanlığı ve T.C. Kültür ve Turizm Bakanlığı. (2016). T.C. Milli Eğitim Bakanlığı İle Kültür Ve Turizm

Bakanlığı Arasında İş Birliği Protokolü. https://teftis.ktb.gov.tr/Eklenti/49309,milli-egitim-bakanligi-ile-kultur-ve-turizm-bakanligi-arasinda-isbirligi-protokolupdf.pdf?0adresinden

T.C. Milli Eğitim Bakanlığı. (2018). 2023 Eğitim Vizyonu Açıklandı. https://www.meb.gov.tr/muzede-egitim-basliyor/haber/18739/tradresinden

Tuna, S. (2018). Öğretmen adaylarının müze eğitimi ve uygulamaları dersi kapsamında yaratıcı yazma etkinliğine yönelik görüşleri. Journal of Mehmet Akif Ersoy University Social Science Institute, 10(24), 262-270. https://doi.org/10.20875/makusobed.429839

Tural, A. Ve Kala, F. (2018). Sosyal bilgiler öğretmen adaylarının müze eğitimine yönelik özyeterlik inançları. The Journal of Limitless Education and Research, 3(1), 108-121. https://doi.org//10.29250/sead.402086

Türkmen, H. (2010). İnformal (sınıf-dışı) fen bilgisi eğitimine tarihsel bakış ve eğitimimizeentegrasyonu. Çukurova Üniversitesi Eğitim Fakültesi Dergisi, 3(39), 46-59

Uslu, S. (2021). Teacher candidates' opinions about the use of museums as educational environments in social studies lessons. International Journal of Education and Literacy Studies, 9(1), 33-43. https://eric.ed.gov/?id=EJ1285545

Uslu, S. ve Yeşilbursa, C. C. (2014). The study of development "self-efficacy beliefs scale regarding museum education" for pre-serviceteachers. Journal of Human Sciences, 11(2), 1306–1319. https://doi.org/10.14687/ijhs.v11i2.2850

Walsh-Piper, K. (1994). Museum education and the aesthetic experience. Journal of Aesthetic Education, 28(3), 105-115. https://doi.org/10.2307/3333404

Yeşilbursa, C. C. ve Salih, U. (2014). Sosyal bilgiler öğretmen adaylarının müze eğitimine yönelik öz-yeterlik inançları, Uluslararası Avrasya Sosyal Bilimler Dergisi, 5(16), 410-418. https://www.ijoess.com/DergiTamDetay.aspx?ID=192&Detay=Ozet

Yüksek Öğretim Kurumu [YÖK] (2018). Fen bilgisi öğretmenliği lisans programı. Ankara Yayınevi.

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APPENDIX 1.

Self-Efficacy Belief Scale for Museum Education

1. By informing about the trip to be organized, I can enable students to predict what they will encounter.

2. I can realize museum education efficiently for students to make comparisons between their own cultures and other cultures in the world.

3. I can provide a more systematic educational environment by coordinating with school administrators about museum education.

4. I can guide students to improve the knowledge they acquire in the museum.

5. During the museum trip, I can make students do an improvisation activity related to the lesson subject.

6. I can benefit from virtual museums when it is not possible to organize a museum visit in real environment.

7. I can offer students the opportunity to learn while having fun by using interdisciplinary methods and techniques in museum education.

8. I can create an excursion-observation corner and enable students to share their experiences.

9. In order to get a better efficiency from museum education, I can organize in-class activities (drama, drawing, text writing, presentation, etc.) related to the work done during the trip after the museum trip.

10. I can create a better learning environment during museum trips by planning activities that students may enjoy.

11. I can prevent the trip from deviating from its purpose by providing continuous information during the trip.

12. I can create study groups where students can share their experiences during the museum trip.

13. I can inform the museum staff in advance so that they can contribute to the purpose of the study.

14. I can use the time allocated for the museum visit efficiently.

15. I can make interdisciplinary associations with other courses in line with the achievements of the course to be taught in the museum.

16. I can enable students to make comparisons between the conditions of today and the past through the artifacts exhibited in the museum.

17. I can make the trip interesting by providing information about the organized museum trip.

18. I can create a school museum that will encourage other students by cooperating with administrators within the school facilities.

19. I can decide on the museums to be visited in the light of students' interests, expectations and opinions and in line with the objectives of the course.

20. I can use methods and techniques appropriate to the level of students in museum education.

21. I can guide students to recognize other cultures through museum education.

22. I can associate the objects exhibited in the museum with the acquisitions in the curriculum.

23. After the trip, I can prepare an environment where students can evaluate the trip and share their experiences.

24. I can use museums to reinforce previously acquired learning outcomes.