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EFFECT OF A RESEARCH METHODOLOGY COURSE ON PROSPECTIVE TEACHERS' RESEARCH ANXIETY AND SELF-EFFICACY

Abstract: The purpose of this study was to investigate the change in the levels of self-efficacy for research and anxiety about research among prospective teachers participating in a course on research methodology in education. This study was structured with an exploratory sequential pattern, which is a mixed method. Seventy-four prospective teachers attending a major university in Turkey and taking the course on research methodology in education participated in the study. A single group pre-test/post-test experimental pattern was used in the first phase of the study. The data were analyzed using the two-way ANOVA method. In the second phase of the study, the opinions of 12 prospective teachers were collected using a questionnaire consisting of open-ended questions. The results of the study showed that the 14-week course on research methods in education given to the prospective teachers was effective in increasing their self-efficacy levels for research, but there was no change in research anxiety. The qualitative data showed that different factors were effective on the self-efficacy and anxiety of the prospective teachers. In this context, the effectiveness of the research methodology course given to the prospective teachers was investigated. In light of the results, the importance of academic guidance offered to prospective teachers was noted and a number of recommendations were presented for researchers.

Keywords: Mixed-method, research anxiety, research methods, self-efficacy for research.

1. Introduction

A scientific research process usually involves more than collecting, analyzing, and reporting data on a problem that is considered worthy of study. In the process of conducting scientific research, how ready researchers feel to conduct research is just as important as how much they value the research. It is a known fact that issues such as the researcher's academic motivation, research self-efficacy, and research interest influence the process of conducting the research and the final experience (Bailey, 1999; Lambie, Hayes, Griffith, Limberrg, & Mullen, 2014). For this reason, it is necessary to address the benefits and challenges that research methodology courses provide to prospective teachers who are on their way to becoming researchers, and to present supportive recommendations in this regard. According to Earley (2014), some educators do not believe that doing research is necessary; instead, they

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believe that reading research related to their fields is adequate. However, for certain educators, going through the research process is a necessity, and these educators need to learn the process of research. In this regard, it was stated that the content and assessment of research methodology courses to be given to individuals should be shaped according to their specific needs. It is also important that prospective teachers find the right sources and achieve the right synthesis in the process of reading research related to their field only (Authors, 2019). Accordingly, it is possible to say that a course on research methodology in education is necessary.

For individuals who have no interest in conducting research, a research methodology course may not be considered very interesting. However, it has been found in the relevant literature that at the end of the course, many students' opinions on scientific knowledge, attitudes, and scientific models have changed (Authors, 2020; Lei, 2008; Oguan Jr., Bernal, & Pinca, 2014). In addition to these positive changes, there are also studies that address research anxiety and perceived self-efficacy for research. In these studies, different variables have been found to be effective on individuals' research anxiety (Onwuegbuzie, 1997; Unrau & Beck, 2004). These variables also appear as elements that increase or decrease anxiety (Lei, 2008). In addition, self-efficacy for research is influenced by the variables of age, number of published studies, and attitude towards research (Green & Kvidhal, 1990). These results are especially guiding for teacher educators who follow the research results. Thanks to these results, it is possible for teacher educators to guide the course that they are responsible for and to develop supplementary practices that reduce anxiety and encourage research. In this study, we investigate the effects of a research methodology in education courses given at the undergraduate level on the research anxiety and self-efficacy of prospective teachers. For this purpose, we have tried to elaborate the findings obtained with quantitative data by qualitative data and to reveal the factors affecting anxiety and self-efficacy. To this end, we first try to conceptualize the perception of anxiety and self-efficacy in the research process in the following sections. In this way, the experiences of prospective teachers in the research process are associated with the concepts of anxiety and self-efficacy.

1.1. Research Anxiety

Onwuegbuzie (1997) stated that students are required to enroll in a research methodology course throughout their educational life, that they are asked to write at least one research proposal in this course, and that they are burdened with anxiety in the process. Onwuegbuzie categorized these anxieties according to three themes: (1) library anxiety, (2) statistics anxiety, and (3) composition anxiety. These themes actually correspond to the stages of literature review, data analysis, and reporting the results obtained by comparing them with the literature, which is needed in the process of conducting research. There are different findings in the literature about these categorized stages. For example, although these stages, which should be included in a research process, triggered negative emotions in some students (Papanastasiou, 2005), there was no relationship between anxiety types and other psychological variables aimed at conducting scientific research in some students (Abd Hamid & Sulaiman, 2014). Additionally, the study conducted with undergraduate students by Keeley, Zayac and Correia (2008) showed that having a certain amount of statistical anxiety has a positive effect on performance. Sizemore and Lewandowski (2009) explained that research methodology courses that include research-related and statistical information contribute to students in terms of knowledge, but it is difficult to change attitudes towards conducting research. Therefore, it is clear that students' anxiety about conducting research cannot be linked to a single variable. Lei (2008) attributed these negative emotions among students to research fatigue, research anxiety, and task difficulty, mentioning that students can be

supported by activities aimed at diversifying their interests and increasing their self-efficacy. Schulze (2009), on the other hand, noted that it is possible to motivate students in a research methodology course by directing them towards teamwork, more authentic learning contexts, and more authentic measurement and evaluation activities. Therefore, research anxiety can sometimes be associated with different variables, and measures can be taken to prevent such anxiety. Along with this, the research anxiety of students is also influenced by superficial teaching, linking theory with practice, unfamiliarity with and difficulty of concepts and content, creation of an integrated picture of research in order to really understand it, and negative attitudes toward these studies (Murtonen & Lehtinen, 2003). These influences give students anxiety, decrease their motivation, and lead to misconceptions about research (Earley, 2014). These results negatively affect students' learning. This negative situation is quite concerning since it is not possible for students who have negative feelings and anxiety about research to look critically at other studies. Moreover, these students may have trouble synthesizing their own research results (Papanastasiou & Zembylas, 2008). Indeed, Wilson and Onwuegbuzie (2001) noted that individuals with low anxiety read more research papers and turn more readily to research. Reading more research papers and turning to research can contribute to increased self-efficacy for research.

1.2. Self-Efficacy for Research

The term "self-efficacy" is essentially based on Bandura's (2001) theory of social cognition and is influenced by previous experiences or performances. It is also associated with the presentation of other people's experiences to the individual through persuasion. The self-efficacy beliefs of individuals are effective on their goal choices and influence goal-oriented efforts and emotional experiences (Schunk, 1995). Emotional experiences of individuals lead them to think about whether or not the task presented to them is difficult or easy and to associate their failure with low capability or, on the contrary, to believe that they are in control of their lives. Therefore, the self-efficacy beliefs of an individual affect his or her motivation, as well (Schulze, 2010). Ensuring self-efficacy in different areas satisfies the person. For researchers working in scientific fields, it is important to ensure self-efficacy beliefs in conducting research. Forester, Kahn, and Hesson-McInnis (2004) defined self-efficacy in science as "*one's confidence in successfully performing tasks associated with conducting research (e.g., performing a literature review or analyzing data)*" (Forester, Kahn, & Hesson-McInnis, 2004: 4). The self-efficacy of undergraduate students for research has been associated with understanding the functioning of science and the way scientists work in the relevant literature (Kardash, 2000; Sadler, Burgin, McKinney, & Ponjuan, 2010). Hunter, Laursen, and Seymour (2007) argued that undergraduate students should be encouraged to research to develop critical thinking and problem-solving skills. In this vein, in the study of the Authors (2020), prospective teachers reported that they learned to look at the same subject from different perspectives thanks to the various types of texts they read during the research process. Furthermore, although the research method course given at the undergraduate level is perceived as not as important as the graduate or doctoral education, it will provide many contributions to the undergraduate students. For example, it will help students learn science "in action" (Ciarocco, Lewandowski, & Van Volkom, 2013), and thus, students will familiarize themselves with the research process (Love, Bahner, Jones, & Nilsson 2007).

In studies conducted to increase self-efficacy for research, it seems that the results of interventions are effective. For, example, Unrau and Grinnell Jr. (2005) reported that a research methodology course helped students with different achievements and particularly increased their self-confidence in conducting research. Additionally, it has been found that establishing healthy relationships with supportive peers and supervisors has positive effects

on research self-efficacy (Love et al., 2007). Similarly, the use of active participation-based teaching approaches in the research methods course has been shown to increase both research self-efficacy and research self-confidence (Boswell, 2014).

Therefore providing students with a wider range of action allows them to improve their research skills, and it is also known that research skills and self-efficacy affect career planning (Adedokun, Bessenbacher, Parker, Kirkham, & Burgess 2013). Unrau and Beck (2004) compared the research self-efficacy of students enrolled in both research and practice courses and students enrolled in practice courses only; they concluded that students enrolled in both courses had higher self-efficacy. This result indicates that attention should be paid to these issues when planning and conducting research methodology courses to ensure that students have improved self-efficacy. In the current study, a research methodology course was presented to undergraduate students with both a theoretical and practical framework and the effects of the course on research self-efficacy were investigated.

1.3. Research Problem and Questions

Considering the studies in the relevant literature, it seems that many students have research anxiety. However, various practices appear to reduce anxiety and influence perceived self-efficacy. Based on this point, the present study sought to investigate the effects of a course on research methodology in education given to prospective teachers on their anxiety and self-efficacy related to research. The sub-problems established for this purpose are as follows:

1. What was the impact of the research methodology in education courses given to prospective teachers on their anxiety and self-efficacy related to research?

2. How did prospective teachers describe their anxieties and self-efficacy towards designing and conducting research after the research methods course in education?

2. Method

2.1. Research Design

This study was structured in an exploratory sequential pattern, which is a mixed-method involving a combination of quantitative and qualitative research methods. In the explanatory sequential pattern, first, the quantitative data are collected and analyzed, and then the qualitative data are collected and analyzed. In this pattern, researchers use qualitative research to explain the results of the quantitative research conducted in the first stage (Cresswell, 2014; Cresswell & Clark, 2014). In the quantitative part of the study, a single group pre-test/post-test experimental pattern was used. In this pattern, the purpose was to determine the effect of the independent variable on the dependent variable in a single group (Campbell & Stanley, 1963). In the second phase of the study, phenomenology was used, which is a qualitative research pattern. Phenomenological research aims to reveal the meaning, structure, and essence of people or groups' experiences with the phenomenon (Patton, 2014).

2.2. Participants

The study was conducted in the Faculty of Education of a public university in the 2019-2020 academic year. The study group consisted of sophomore students enrolled in the Turkish Language Teaching (TLT), Primary School Mathematics Teaching (PMT), and Psychological Counseling and Guidance (PCG) programs of the faculty of education. 28 prospective teachers from the PMT program, 27 from the PCG program, and 19 from the TLT program participated

in the study. 45 of the prospective teachers were female and 29 were male. All of the participants are Turkish and they are in the second year of their undergraduate education.

12 prospective teachers participated in the qualitative phase of the study. The study group was formed using the appropriate sampling method. In this context, four prospective teachers from each of the three programs participated in the study. When forming the study group, care was taken to include two female and two male participants from each program and to ensure that the participants had different course grades in terms of academic achievement (low, high, and medium according to the university's scoring system). The following symbols were used when encoding the data obtained from the interviews held with the prospective teachers: T_1, T_2, T_3, T_4 (prospective teachers in TLT), C_1, C_2, C_3, C_4 (prospective teachers in PCG), and M_1, M_2, M_3, M_4 (prospective teachers in PMT).

2.3. Measurements

2.3.1. Research Anxiety Scale (RAS)

The research anxiety scale developed by Buyukozturk (1997) was used to measure the anxiety levels of the prospective teachers towards research. The scale consists of 12 items and one factor. The responses to the items in the scale were scored from 5 to 1 from "totally agree" to "totally disagree". The reverse of this process was applied for the reverse items in the scale. Additionally, a high score on the scale indicates high anxiety, while a low score indicates low anxiety. Büyüköztürk reported that the RAS is a psychometrically valid and reliable scale and its reliability coefficient is .87. The Cronbach's alpha coefficient for this study was calculated as .89.

2.3.2. Self-Efficacy Scale for Scientific Research (SRSE)

The self-efficacy scale for scientific research developed by Tuncer and Ozeren (2012) was used to measure the self-efficacy levels of the prospective teachers for research. The SRSE consists of 12 items and four factors: literature, method, conclusion and discussion, and suggestions, and reference writing. The items of the 5-point Likert scale are rated from "strongly agree" to "strongly disagree". There are no reverse items in the scale. A high score from the overall scale indicates high self-efficacy, a low score indicates low self-efficacy. Tuncer and Ozeren determined the reliability coefficient of the SRSE as .84. The Cronbach's alpha coefficient for this study was calculated as .87. Table 1 shows sample items from the scales.

Table 1. *Sample Items*

Scale	Factor of Scale	Sample Item
RAS	Single Factor	Item 1. I do not want to do research unless I have to.
		Item 7. Even the thought of doing research makes me nervous.
SRSE	Literature	Item 3. I can clearly describe the aim of the research.
	Method	Item 6. I can accurately determine the research method.
	Conclusion and Discussion	Item 8. I can interpret analysis results.
	Suggestions and Reference Writing	Item 12. I can conduct my research in accordance with international reference writing rules.

2.3.3. Questionnaire Form Consisting of Open-Ended Questions

A questionnaire consisting of open-ended questions was used to investigate the research anxiety and self-efficacy beliefs of the prospective teachers in-depth and to obtain their opinions. When preparing the form, the relevant literature was first reviewed, and then the questions prepared in accordance with the literature were presented for expert opinion. After relevant suggestions and corrections were obtained from the experts, the final form was delivered to the prospective teachers via Google Forms. The form was administered upon receiving consent from the voluntary prospective teachers included in the sample. The form asked the prospective teachers questions such as: "How has your research anxiety changed with the course?" "How has your faith in yourself changed when it comes to doing research?" "How would you feel if you were given a research task?" The prospective teachers were given one week to answer the questions.

2.4. Procedure

The present study was conducted with 74 prospective teachers from the TLT, PCG, and PMT programs of the faculty of education and enrolled in the research methodology in education course (RMEC). The RMEC is a credit course in Turkey, recommended to be given as a compulsory course in all programs in education faculties by the Council of Higher Education. The prospective teachers took this course for two hours a week for 14 weeks. However, due to the COVID-19 pandemic, the first four weeks of the course were carried out face-to-face and the last 10 weeks were carried out online. In this process, the prospective teachers followed the course with distance learning tools and continued to do the assignments defined for them every week. Table 2 shows the subjects and assignments covered by the RMEC for 14 weeks. As part of the study, the prospective teachers were asked to identify a research topic related to their field at the beginning of the academic year and conduct the research as a group study. During the entire year, the prospective teachers were asked to complete the planning, implementation, and reporting stages of research and were expected to submit reports in article format. However, at this stage, the candidates did not actually collect data from participants. Because prospective teachers were not taught statistical knowledge to analyze the data within the scope of the course. They were required to do a literature search for a research topic relevant to their discipline, generate research questions, and build a theoretical basis for draft papers as part of the course. They were then asked to select the research model and design a sample for these research questions. They were given the task of deciding which data collecting methods they should employ to answer their research questions. Except for the data analysis phase, they followed the steps of a research method step by step. They were responsible for choosing a research topic in groups and writing the relevant phase of the draft article for that research question each week. Ethical standards, citation, and bibliographical writing requirements were also highlighted during the article's writing process. They wrote down different stages of the draft article each week for 14 weeks and eventually presented a report. Those reports were considered as a requirement to pass the course. It was stated that the research reports needed to be completed by the specified date, that research ethics needed to be followed, that reports needed to be prepared as a group, and that assistance needed to be received from other groups in the evaluation process. As part of the study, the RAS and SRSE were administered to the prospective teachers as pre-tests at the beginning of the academic year. After the pre-test, the subjects in the syllabus were taught for 14 weeks. At the end of the academic year, the same scales were administered online to the prospective teachers as post-tests and the data from the scales were analyzed. The data were collected from the determined sample with the help of an online form to conduct a more in-depth investigation of the quantitative results.

Table 2. *RMEC Syllabus and Homework*

	Syllabus	Homework
Week 1	Pre-test. Introduction, icebreaking activities, providing information about the course, sharing the syllabus, defining class rules	Sample readings related to the course*
Week 2	Basic concepts and principles of research methods	Defining a field-specific research topic and forming a group
Week 3	Research process - identifying the problem, determining the problem and sample, collecting and analyzing data, interpreting the results	Reading and reporting on the research topic
Week 4	General characteristics of data collection tools	Reading and reporting on the research topic
Week 5	Sample selection methods	Reading and reporting on the research topic
Week 6	Data analysis and assessment	Reading and reporting on the research topic
Week 7	Access to articles, dissertations, and databases for research; access and review of resources in the library; literature review	Reading and reporting on the research topic
Week 8	Midterm evaluation	Midterm evaluation of reports
Week 9	Basic paradigms in scientific research; quantitative, qualitative, and mixed research patterns; similarities and differences	Applications related to the research topic
Week 10	Sampling quantitative, qualitative, and mixed research patterns; similarities and differences	Applications related to the research topic
Week 11	Validity and reliability in qualitative research	Applications related to the research topic
Week 12	Validity and reliability in quantitative research	Applications related to the research topic
Week 13	Research reporting and APA style	Applications related to the research topic
Week 14	Research reporting and APA style	Presentations
Week 15	Post-test. Presentation of research reports	Presentations

*Basic and auxiliary resource readings related to the course were spread throughout the term.

2.5. Data Analysis

In the analysis of quantitative data, it was first examined whether or not the data showed normal distribution. According to the results of that examination, the values of Skewness and Kurtosis showed a distribution within ≤|2|. The result of the Kolmogorov–Smirnov test conducted at a level of significance for this purpose was $p>0.05$. These values indicate that the data showed a normal distribution (Joanes & Gill, 1998). After the normality analysis, two-way ANOVA 2 (Time: Pre, Post) x 3(Group: TLT, PMT, PCG) was conducted separately for both variables (research anxiety and self-efficacy for research). SPSS 22 software was used for data analysis.

In the qualitative part of the study, it was aimed to address the lived experiences of the participants based on hermeneutical phenomenology (van Manen, 2016). Moustakas (1994) stressed that researchers should be independent of their own experiences when explaining these experiences to approach the phenomena under study objectively. In the interpretation of the data, the researcher creates sets of meanings and presents experiences related to context by making a textural description of the experiences of the participants. Finally, these experiences are explained to the reader in a holistic approach (Marshall & Rossman, 2010). The resulting general phenomenon is an indicator of what the participants experienced in this

context. Therefore, in this study, textural and structural descriptions and research experiences of prospective teachers were revealed.

2.6. Ethical Consideration

Written consent to participate in this study was obtained from the prospective teachers. The research conforms to the provisions of the Declaration of Helsinki (as revised in Brazil, 2013). This means that all of the prospective teachers took part in the research willingly. Written permission was also granted by the Ethics Committee of Bartin University (Protocol Number: 2020-SBB-0084).

3. Results

This section gives the results of the analysis related to the impact of the 14-week RMEC on the research anxiety and self-efficacy of prospective teachers.

Table 3. *Pre-test and Post-test Mean Scores for Variables*

Variables	Pre-test		Post-test	
	M	SD	M	SD
Self-efficacy for Research	40.45	6.10	47.93	5.68
Research Anxiety	27.57	7.71	28.00	8.20

Table 3 shows the prospective teachers' research anxiety and self-efficacy for research before and after the courses. There was a significant difference between the pre-test and post-test scores of self-efficacy for research ($F_{(1, 71)} = 55.767$, $p<.05$). As a result of the 14-week course, there was also a significant increase in the mean pre-test and post-test scores of self-efficacy for research. Accordingly, the self-efficacy for research appears to have increased significantly in the post-test results (M = 47.93). Additionally, the impact of the RMEC on the self-efficacy for research of the prospective teachers was calculated as partial $\eta^2 = .98$. This value is considered to indicate a large impact as suggested by Cohen (1988).

However, there was no significant difference between the pre-test and post-test research anxiety scores of the prospective teachers ($F_{(1, 71)} = 0.035$, $p > .05$). There was a very small increase in the post-test scores related to the post-test anxiety of the prospective teachers (M=28.00). In addition, the measurements showed that there was no significant difference between the groups ($p > .05$). The absence of a significant difference was evaluated together with the impact size. According to the analysis results, the impact of the course given to the prospective teachers on their research anxiety was calculated as partial $\eta^2 = .92$. Although there was no significant difference between the groups, this value indicates a large impact size. In order to understand what these values mean and to obtain in-depth findings, qualitative findings are given in the second part of the study. In this context, qualitative findings are discussed separately for self-efficacy for research and research anxiety.

3.1. Perceived Self-Efficacy for Research

After the post-test measurements, qualitative data were collected with the help of open-ended questions to examine the change in the perceived self-efficacy of the prospective teachers in depth. The findings showed that the perceived self-efficacy for research clustered within the contents of self-efficacy belief, frustration, and self-confidence.

In the study, most of the prospective teachers (n=9) reported increased faith in their self-efficacy for research. For example, M_3 stated: "*Since now I have more knowledge about*

conducting scientific research since I know how to do it, my belief in myself has increased", whereas C_1 said: "*I know where to get articles and theses for scientific research. Maybe I believe in myself a little more for that reason. I know what sources are reliable or not. I know the importance of citing sources and giving references*". The opinions clustered in this content indicate that the prospective teachers learned how to access scientific knowledge; therefore, their belief in themselves increased. This also seems to have led to an increase in their belief in self-efficacy for research.

As part of the study, the prospective teachers were expected to research in accordance with the steps of a scientific study, and the submission of a research report was one of the requirements to pass the course. However, this practice was observed to have negative effects on some of the prospective teachers. The prospective teachers considered researching a burden. In this context, M_4, who received a lower grade than expected and was disappointed, said: "*My faith in scientific research increased, of course. I have done so much research and studied articles to be able to do the assignments given in the desired way. However, just when I was thinking like that, the grade I got disappointed me*". M_2, on the other hand, expressed a feeling of inability to conduct research as follows: "*I now have suspicions about an academic career because I believe that this job needs dedication. If I choose this path, I question whether I really want it, because I will be more occupied with theses and articles, because it requires more attention to detail than I can pay, or I still do not have knowledge about it. I now have more question marks about an academic career, and I question whether I am good enough for the job*". It seems that the practice of conducting research, which was a compulsory activity for the course, led to frustration with the course for some prospective teachers.

It was found that self-confidence increased in four of the prospective teachers interviewed. C_2 explained: "*I had more confidence with every article I researched and I wanted to research more and more as I researched and made references*". Similarly, T_1 stated: "*I did not know what to do where at the beginning of the semester, but I was able to write articles at the end of the semester with what I had learned about the research steps. Knowing what to do at each step and writing at least one sentence has improved my self-confidence*". This indicates that what the prospective teachers learned while practicing conducting research contributed to their increased self-confidence.

3.2. Research Anxiety

After the 14-week course given to the prospective teachers, the quantitative data were analyzed and there was no change in anxiety for research in a statistical sense. After the analysis process, the prospective teachers were interviewed to reveal the reasons why the anxiety level did not change. M_4, for example, said the following: "*My level of anxiety towards the course has definitely increased. I definitely do not want to take this course again*". In this context, we explored the reasons behind the increased anxiety of some of the prospective teachers. The answers given to the questions were analyzed and the reasons for research anxiety were found to be identifying the research problem, the plethora of information sources, data collection, reporting of the research, lack of research experience, and the COVID-19 pandemic process. The factors other than the lack of research experience and the COVID-19 pandemic are the steps that constitute the research process. Therefore, it seems that the research process itself was a factor that led to anxiety in the prospective teachers. These prospective teachers in the second year of their undergraduate studies experienced the research process for the first time, and this seems to have triggered an element of anxiety. Most of the prospective teachers who responded to the interview questions (n=7) highlighted an increase in anxiety levels at the stage of reporting the research. For example, T_4 explained:

"*Conducting research on a topic and putting it on paper increased my level of anxiety, because I had to explain an idea in my article without digressing and avoiding unnecessary information, which gave me anxiety*". Two prospective teachers attributed their anxiety to their lack of research experience. C_3 said the following on the topic: "*I can say that what decreased and increased my anxiety level in this process was the same thing. Having fresh knowledge reduced my anxiety, but being inexperienced was a factor that increased my anxiety. Since I felt like I was very likely to make a mistake, I felt a certain level of anxiety*". M_3 explained how identifying the research problem caused anxiety as follows: "*The steps of scientific research that increased my anxiety were identifying the problem and building a hypothesis, because if I fail to identify the problem correctly, my research will be wrong from start to finish. It is exhausting to constantly build a wrong hypothesis and to constantly build a new hypothesis, and this issue increased my level of anxiety*". Referring to the difficulty of collecting data during the research process, C_2 said: "*We certainly could not do the research literally because of the data we could not collect, and it bothered me that our research was always flawed. I was worried about this*". T_4 explained how having too many sources of information caused anxiety as follows: "*There is a lot of information on the Internet, but the issue of how to know if this information is reliable was the second thing that gave me anxiety*".

Another factor that increased anxiety in this study was the COVID-19 pandemic. The prospective teachers were asked to conduct research as a group. They were expected to pay attention to the principles that must be followed in team work. Assistance was also to be received from other groups during the evaluation of research reports. However, the transition to distance education after the outbreak of the pandemic prevented the prospective teachers from working face-to-face. Those who had difficulty conducting a scientific study while contacting both their own groups and other groups stated that the process caused them to have anxiety. C3 explained this as follows: "*Due to the COVID-19 outbreak, there were question marks in my mind about how to carry out this process in a healthy way, as I thought that we would have problems applying what we learned in the course every week and there would be a disconnection between me and my group mates*". The prospective teachers who experienced difficulties accessing distance education tools since they had returned to their homes in villages were unable to participate in team work for conducting research.

In addition, the negative thoughts about the course expressed by senior students were found to trigger anxiety in the prospective teachers taking the course for the first time this semester. "*At the beginning of the semester, I felt that the course was very difficult, that writing articles was not so easy. These feelings inevitably caused me anxiety. But as the course progressed, I realized that the anxiety I had was actually unwarranted, that I had prejudices against the course based solely on what I had heard about it*" (T_1). "*When we started the course, I had a positive attitude toward the instructor teaching the course. That attitude made me feel relieved. In this process, which we carried out as a group, the healthy relationship with my group mates also contributed to this feeling of relief*" (T_3). These statements indicate that avoiding negative thoughts about the course and the instructor of the course reduced anxiety.

4. Discussion, Conclusion and Implications

This study, which investigated the effect of a research methodology course given to prospective teachers for 14 weeks on research anxiety and self-efficacy for research, yielded a number of striking results. According to the results obtained, the research methodology course was highly effective on self-efficacy for research. In interviews with these prospective teachers, they stated that their belief in themselves increased as they learned about the process of conducting research and how to access academic publications. Their belief in their

self-efficacy seems to have strengthened with each step they took successfully. This result of the study is consistent with the study of Adedokun et al. (2013). Accordingly, the belief of prospective teachers that they had research skills as they progressed in the course also increased their perceived self-efficacy for research. The statement "*I had more confidence with every article I researched*" may indicate that self-efficacy of prospective teachers who were included in the research process gradually increased during the period. Therefore, this result shows that the research methodology course given to the prospective teachers achieved its goal in terms of increasing self-efficacy belief. This indicates that the knowledge or competencies acquired by the individual, as stated by Bandura (2001), turn into action and also support the theory of social cognition. The relevant literature also showed that the information presented to prospective teachers with proper planning is effective (Authors, 2020; Baltes, Hoffman-Kipp, Lynn, & Weltzer-Ward, 2010).

In the research methodology course, where practical activities were carried out in addition to theory, the prospective teachers conducted research as a group and reported their research. This reporting process meant that the work of the prospective teachers was finished and ready for publication. Therefore, there was a study produced by the prospective teacher, or rather a candidate publication. This candidate publication may also have had an impact on self-efficacy. Hemmings and Kay (2010) pointed out that support for prospective teachers early in their careers should be multifaceted and that they should be encouraged to publish by offering them support because increased research experience also contributes to higher productivity. Moreover, being aware of research in their own field will enable undergraduate students to have relevant terminology for new research and learn science in action (Ciarocco et al., 2013. At this point, it can be very valuable to investigate the impact of this knowledge and interest that students have on academic publications later in their careers. For later periods, the degree and type of academic counseling offered to prospective teachers are also important. In this study, for example, the support offered to the prospective teachers within the scope of the course contributed to their self-efficacy. Therefore, at this point, the academic guidance to be offered to prospective teachers must be effective and balanced, ensuring student satisfaction, but it is necessary to avoid support that restricts student autonomy (Overall, Deane, & Peterson, 2011). For this purpose, Schulze (2010) pointed out that prospective teachers should be offered the necessary support and encouraged to carry out research projects in small groups; thus, their ability to successfully complete the task assigned to them may improve. In addition to these services, it is possible to contribute to their self-efficacy beliefs by offering additional activities that will allow prospective teachers to realize their true abilities and research projects that they can relate to daily life and where they can incorporate what they learned in the research method course (Unrau & Beck, 2004). In this context, increased self-efficacy for research can be considered as a result of the course and the academic guidance offered in the course.

As part of this study, the anxiety levels of the prospective teachers related to research were also addressed. The statistical analysis showed that the *p*-value was not significant; in other words, the research methodology course did not affect anxiety. However, along with the *p*-value, the impact was also considered and a fairly large value was found. This indicates that if the same study were conducted with a larger sample, different results may be obtained (Ozsoy & Ozsoy, 2013). In other words, if the study had been conducted with a larger sample, the results might have been different. This indicates that the research subject needs replication studies. In addition, these relevant analyses showed only the outcome of the situation. A longitudinal study is needed to further investigate why this is the case. However, despite these limitations, the study also included a qualitative part to collect in-depth data. In the interviews, the prospective teachers made statements that indicated that factors were

increasing their anxiety levels. When the relevant statements are examined, it is seen that there are factors that arise from the course itself and increase anxiety, as well as factors that are not related to the course. In this context, the prospective teachers mentioned their inexperience and their fear of not being able to fully fulfill the steps that make up the scientific research process as factors that led to an increase in their anxiety levels. Murtonen and Lehtinen (2003) categorized the challenges faced by students in the research methodology course within two sets: the experience of difficulty and prior conceptions and the experiences of difficulty. These themes appear to be directly related to the present study. In this study, the prospective teachers also mentioned that they had no previous experience with such research and therefore were not familiar with concepts and content specific to research methods. Thus, these difficulties that the prospective teachers experienced were encountered before. Moreover, these difficulties caused the prospective teachers to experience anxiety due to the course. The relevant literature showed that undergraduate and graduate students enrolled in research methodology courses often develop strong negative feelings about the course, and even after the course is completed, their fears persist (Lei, 2008). This fear can sometimes occur even in successful students. Oguan Jr. et al. (2014) noted that academic success does not affect belief in the usefulness of research, but that sample selection and sample size are factors that influence this situation.

As a result, it was revealed that the level of anxiety, which has an impact on prospective teachers' mental health, remained stable. Therefore, It would be beneficial for instructors to take measures to reduce prospective teachers' anxiety about the research methods course. The relevant literature indicated that prospective teachers at the undergraduate level are highly anxious in the research methods course (Papanastasiou & Zembylas, 2008). Because many applicants believe that the research methods course is worthless in their teaching careers (Pan & Tang 2004), and the fact that it is compulsory is perceived as a source of concern (Onwuegbuzie & Wilson 2003). The qualitative findings in this study are compatible with the literature. According to Papanastasiou and Zembylas (2008), undergraduate students suffer more anxiety than graduate students. Because anxiety lessens as the duration of schooling increases and the significance of conducting research is recognized. In this regard, prospective teachers should be taught the value of researching at the undergraduate level. Additionally, Onwuegbuzie and Wilson (2003) suggested that students should be encouraged and humor should be employed in classes. In this sense, it is important that the instructors also presents strategies for students to cope with anxiety. Instructors may adopt the performance evaluation approach to relieve students of grade pressure. They can use actual examples to demonstrate the importance of research methods in their teaching careers. In addition, instructors may encourage prospective teachers to produce solutions to problems experienced in schools using the relevant literature and scientific research methods. Teamwork can help with this as well.

In the research methodology in education course given to the prospective teachers in this current study, theoretical knowledge, as well as practical knowledge, was presented with group work, and self-efficacy for research and the research anxiety of the prospective teachers were examined. Although the results obtained from this study are valuable, the study has several limitations, as well. First, the sample of the study only included students from the faculty of education of one university. This may have caused a bias in the study's findings. In order to eliminate this bias, it may be useful to conduct the study with larger samples. The research methodology course is offered to prospective teachers in all departments of education faculties in Turkey. Therefore, different results may be found about self-efficacy beliefs or anxiety in a sample of different universities. Different variables, such as the influence of faculty members and the learning environment, may be effective on these

results. Finally, in this study, only the research self-efficacy and anxiety of undergraduate students were examined. After undergraduate studies, students who want to continue their academic careers can be followed and examined to determine whether they have similar affective characteristics during their graduate and doctoral studies. This review would be quite long-term and would require strict data monitoring. Therefore, it would significantly contribute to the work carried out in this field.

Note

This study's argument is addressed in the context of a general research methods course. The course does not separate between qualitative and quantitative research methods. In addition, the study addressed general research methods course anxiety. This anxiety condition does not contain specific anxiety types such as library anxiety or statistic anxiety.

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