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**A Review of Studies the Field of Educational Sciences within the
Context of Theory of Planned Behavior**

Sinan Erten¹, Pelin Köseoğlu²

¹Hacettepe University, Turkey, serten@hacettepe.edu.tr, ORCID ID: 0000-0001-9546-2387

²Hacettepe University, Turkey, ORCID ID: 0000-0002-5559-9052

ABSTRACT

This study aims to identify the gaps in the Theory of Planned Behavior literature and to determine the general trends in studies in the field of educational sciences within the context of the Theory of Planned Behavior, to generate recommendations on improving the educational processes by revealing the effect this theory has on educational processes. Designed to achieve this goal, this study is a systematic review of 77 titles. This review explains the characteristics of 77 studies and the general trends of their topics, conclusions, and recommendations by making a comparison of the national (Turkish literature) and international literature. Content analysis was used to determine the general trends in the studies, and the findings are explained in tables with frequencies and percentages. In the study's findings and results section, in addition to the diversity of the subjects of the studies included in the review, the conclusions and recommendations of the studies provide a common positive opinion regarding the contributions of the Theory of Planned Behavior to both teaching processes and educational sciences research.

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Introduction

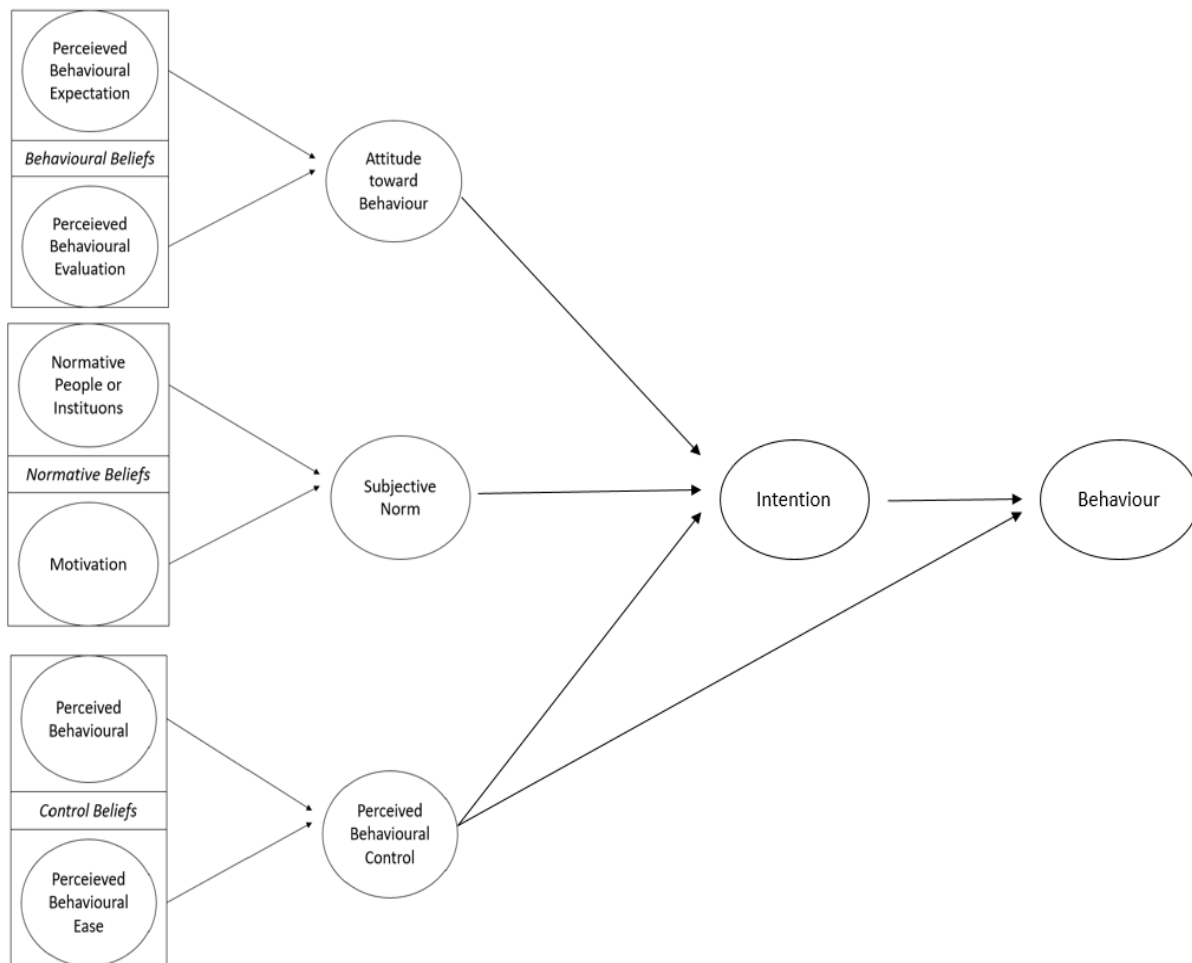
Education, in its most general terms, is a process of behavioral change. In the education process, individuals are expected to acquire attitudes and behaviors that will contribute to the society they belong to. In most of the studies on the acquisition of environmentally friendly behaviors, which take up a large part of environmental education, a key component of science education, the statistical relationship between general attitudes and behavior is seen to be quite low (Ajzen & Fishbein 1970; Diekmann & Preisendörfer 1992; Langeheine & Lehmann 1986; Madden et al., 1992; 1991; Wicker, 1969). This shows that an individual's development of a positive attitude toward something is not enough to form actual behavior. It also shows that the development and demonstration of behavior is a complex process involving many variables. Furthermore, it can be seen that the scales created as a result of the studies and the statistical techniques used were not organized well enough to measure attitude and behavior exactly (Eagle & Chaiken, 1993; Frey et al., 1993). Similarly, Lüdemann's (1993) study, which was conducted to develop environmental awareness and environmentally beneficial behavior, found a low relationship between these two dimensions. The striking result of that study is that the attitudes that are developed are not directed toward environmental protection behavior but the concept of the environment. This shows that there is some inconsistency between attitude and

behavior. In addition, he says that developing a positive attitude toward a subject is not the same as developing a behavior toward that subject (as cited in Erten, 2001).

The inconsistencies mentioned between attitude and behavior are explained and eliminated by Ajzen's (1991) Theory of Planned Behavior (PBT). According to the PBT, the social behaviors of individuals are influenced by particular variables/factors and occur for particular reasons and in a planned manner. For an individual to behave in a particular way, *the intention to do so* needs to exist first. The attitude toward the behavior, the expectations of people who are important to the individual for them to perform that behavior, and the individual's perception of how easy or difficult the behavior is all play an important role in the formation of the intention to perform a behavior. These are all factors that form the basis of the PBT (Figure 1).

Figure 1

*Theory of Planned Behavior**



Note: Yüzüak & Erten, 2018

Attitude Toward Behavior is the positive or negative attitude of the person who is to engage in that behavior, toward that same behavior. Subjective Norm states that people (reference persons), institutions, or organizations that are important to the person who will engage in the behavior expect a particular behavior to take place or not. Perceived Behavior Control is the belief of the person who is to engage in a particular behavior regarding how easy or difficult it will be to engage in that behavior. This factor can directly explain the behavior if control of the behavior is not voluntary. As a general rule, the more positive the "Attitude Towards Behavior" is, the more acceptable the "Subjective Norm" is, and the stronger the "Perceived Behavior Control" is. In short, the greater the degree of control over

the behavior is, the more powerful the person's intention to engage in that behavior will be. These factors are named as the core model of the PBT (Ajzen, 1985; 1991; Erten, 2000; 2002).

The second aspect of the model is Beliefs. "Attitudinal beliefs" are positive or negative attitudes toward the behavior that will occur. "Normative beliefs" refers to an obvious social pressure, such as anxiety about how other people will greet what I am about to do. Such beliefs are expressed with the "Personal Norm" variable. The "control beliefs" show the assumed control over the behavior, in other words, how easy or difficult it will be. For example, a child's beliefs as to whether or not his parents are going to pay attention to his recommendations about saving energy at home fall under this heading. "Attitudinal beliefs," "Normative beliefs," and "Control beliefs" comprise the second part of the model in the theory and make it possible to treat and control the beliefs in the desired behavior at the cognitive level (Bamberg, 1994; 1996). Empirical studies on behavior observed in individuals are limited. Because observing the behavior of the individuals participating in studies requires a lot of time, money, and manpower. This is a limitation for any studies that are to be made. Therefore, the PBT is of great importance in revealing true behavior (Ajzen, 1985; 1991; Erten, 2000; 2002).

Since its emergence, the PBT has been the subject of studies in many important fields such as sociology, psychology, and health. There are very few studies on the PBT in the field of education compared to other fields. Yet, the process of behavioral change lies at the basis of education. It will be useful to apply this theory, which explains how a behavior emerges with the variables that affect this behavior, in the field of educational sciences. In his doctoral study in 2000, Erten (2000) tested the applicability and adequacy of Ajzen's PBT, which is the basis of studies being made in many fields (e.g., sociopsychology, marketing, politics, etc.), for the first time in the environment and biology education. Erten's 2000 study covers teachers' behavioral purposes of giving practical lessons on topics involving environmental issues, using textbooks effectively, and conducting educational field trips. The study was a cross-cultural study involving 107 German and 180 Turkish science teachers. Furthermore, the study also investigated students' behavioral purposes of saving water and energy at home and of individual waste reduction. He revealed the statistical probability of the teachers and students engaging in the behavior in question. With his study, Erten showed the applicability of PBT in educational studies and as a matter of urgency emphasized that new studies are needed on why the information given in schools does not turn into behavior and cannot be transferred to daily life. There are many studies on this subject abroad. For example, Shuman & Ham (1997) explained the relationship between the teaching of environmental education and the use of PBT with examples but did not mention empirical studies. This study aims to identify the gaps in PBT literature and to determine the general trends of studies in the field of educational sciences within the context of PBT, to generate recommendations as to how to improve the educational processes by revealing the effect of this theory has on educational processes. Based on the purpose of the study, the research problem was identified as "*What are the general trends of studies in the field of educational sciences in the context of PBT?*". Guided by this research question, answers to the following sub-problems will be sought:

1. What are the characteristics of the studies conducted in the field of Educational Sciences within the context of PBT?
2. What subjects have been studied in the field of Educational Sciences in the context of PBT?

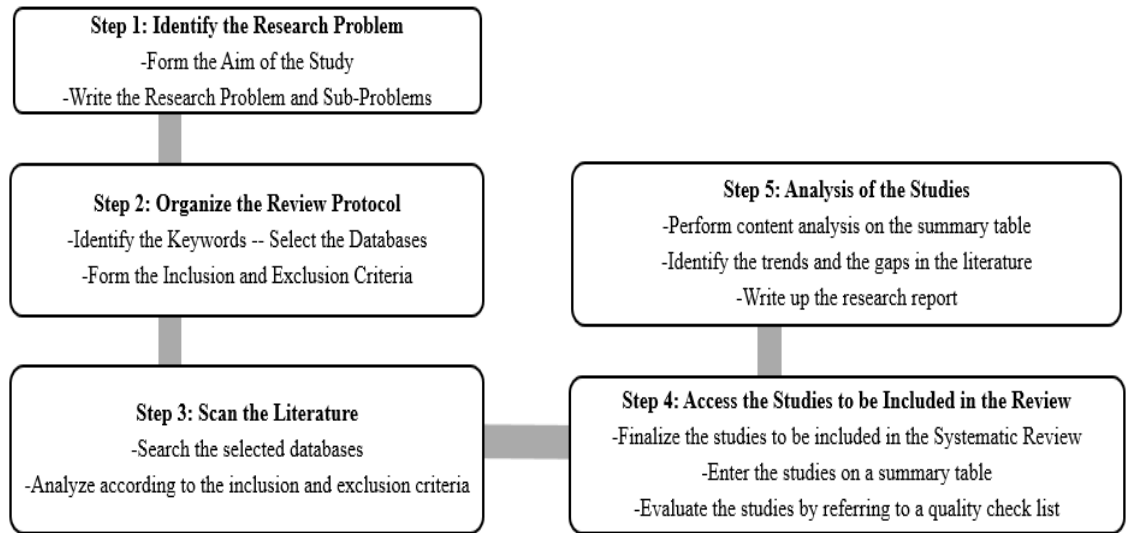
Methods

This study is a systematic review designed to identify the gaps in the PBT literature, reveal the effects of this theory on educational processes, and determine the general trends in studies done in this field. Systematic review studies involve a detailed and comprehensive review of all studies conducted on a particular subject, determining which studies to review within the framework of specified inclusion and exclusion criteria, and making an in-depth analysis to determine the trends of these studies (Burns & Grove, 2007; Higgins & Green, 2011). To achieve the goal set out in this study, studies in the field of educational sciences relating to PBT were systematically brought together and synthesized, the resulting situation was described, and the perception revealed by these studies was

examined. This process was carried out under the supervision of a published expert in the field of PBT and science education. The path followed in this study is as follows:

Figure 2

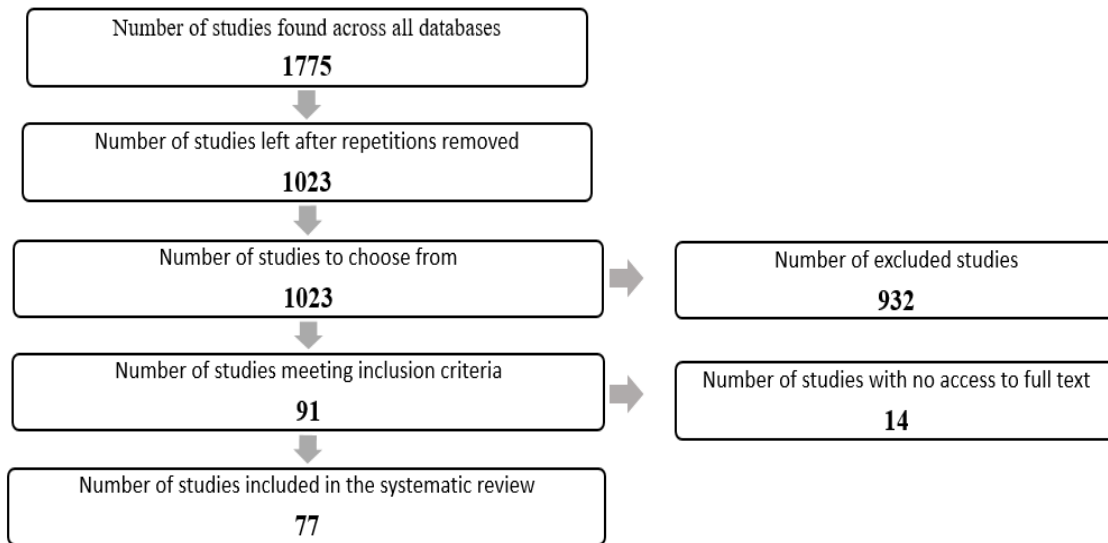
Systematic Review Process



Step 1: Identify the Research Problem: The first step in systematic review studies is to identify the purpose, problem, and sub-problem of the study. This study aims to determine the general trends of the studies in the field of educational sciences in the context of PBT. The research problem is re-written in line with the purpose. The topics studied in the field of education sciences in the context of PBT and the characteristics of these studies formed the basis of the sub-problems. The characteristics of the studies mentioned in the first sub-problem of the study were identified as the year of publication, the types of publication, national (Turkish literature)-international status, research method, and sample group and size. The second sub-problem of the study covered the subjects of these studies and the conclusions and recommendations reached on the subject.

Step 2: Organize the Review Protocol: In the second step of systematic review studies, it is necessary to identify the keywords to help find the studies that will be the subject of the review. The keywords in this study were identified as "planned behavior theory, education" and "the theory of planned behavior/behavior, education." Afterward, the databases were selected. The databases selected for this study are EBSCO, ERIC, Web of Science, ProQuest, Turkish Academic Network and Information Center, and the Council of Higher Education (CoHE) Thesis Center of Turkey. The inclusion and exclusion criteria were then set. Studies conducted in primary schools, secondary schools, high schools, and universities in which teachers, pre-service teachers, and students were selected as samples, and which focused on behaviors affecting all aspects of the teaching processes were included in the study. In addition, the focus was made on articles and theses published in English and Turkish between 1990 and 2020. In addition, the decision was made to exclude all studies in the fields of health, psychology, sociology, and economics that were based on the training given to the participants. This ensured that the scope of the study was the field of educational sciences only.

Step 3: Scan the Literature: The third step of the study is the literature scanning phase. In this step, the identified keywords were searched one by one in the relevant databases. The studies found as a result were analyzed according to the inclusion and exclusion criteria described in Step 2. The path followed in this process is as follows:

Figure 3*Literature Review Process*

The number of studies found across all databases during the literature review process is 1,775. When repeated studies (studies produced from theses, the same studies in different databases, studies published separately in English and Turkish in the same database, etc.) encountered in these databases were removed, the number of studies remaining fell to 1,023. When the inclusion and exclusion criteria and the titles and summaries of the studies were examined, it was decided that 91 studies were suitable for the study. Of these studies, 14 were excluded because the full text could not be accessed. It was therefore decided to include a total of 77 studies in the systematic review process.

Step 4: Access the Studies to be Included in the Review: After the literature review process was complete, a summary Excel file was created showing the 77 studies to be included in the systematic review and their characteristics. The studies were entered in the summary table by examining and evaluating the characteristics that a scientific study is supposed to have. In this way, the data were created, organized, and made ready for content analysis.

Step 5: Analysis of the Studies: Content analysis was deemed appropriate to analyze the data of the 77 studies under review. Content analysis is a form of analysis made to find the concepts that will explain the data and the relationship between these concepts. It involves conceptualizing the data, organizing these concepts, discovering the themes explaining the data, and explaining the codes and themes numerically afterward (Yıldırım & Şimşek, 2016). When analyzing the data, studies in the national (Turkish literature) and international literature were analyzed within themselves, revealing the trends with respect to the features specified in the study's sub-problems. Afterward, the general trend in the literature was found by considering the studies as a whole. This analysis revealed not only the general trends in the studies but also the gaps in the literature. The analysis findings were explained with frequencies and percentages as predicted by the content analysis and summarized with tables and graphics. Relevant information is explained under the Findings heading.

Validity and Reliability

In systematic review studies, it is important to reach valid and reliable research results as in all scientific researches. To ensure validity and reliability in the research, it is necessary to state the purpose and the research problems of the research clearly. Details of the data collection method, inclusion and exclusion criteria should be given for the validity of the findings. The number of

researches reached on the determined subject and which of these researches were included in the analysis should be written in detail (Çalık & Sözbilir, 2014; Keser- Aschenberger, 2015; Patton, 2014; Sandelowski & Barroso, 2003). All this information is given in detail in this research report. In addition, data collection and analysis were carried out by two researchers. No difference of opinion was found among the researchers. In this way, consistency is also ensured. This whole process was presented to the expert opinion of a third expert. In this way, the validity and reliability of the research were ensured.

Findings

Findings Relating to the Study's First Sub-Problem

The first sub-problem was "What are the characteristics of the studies conducted in the field of Educational Sciences within the context of PBT?". The findings for this research problem are given under this heading. The studies' national-international status is explained in Table 1, their type in Table 2, their years in Table 3, their method in Table 4, the sample in Table 5, and the sample size in Table 6.

Table 1

Studies' National-International Status

| National (Turkish literature) | | International | | Total | |
|-------------------------------|------|---------------|------|-------|-------|
| f | % | f | % | f | % |
| 26 | 33.8 | 51 | 66.2 | 77 | 100.0 |

Of the 77 studies included in the study, 26 (33.8%) were from the national (Turkish) literature and 51 (66.2%) were from the international literature.

Table 2

Types of Studies

| | National (Turkish literature) | | International | | Total | |
|---------|-------------------------------|------|---------------|------|-------|------|
| | f | % | f | % | f | % |
| Article | 15 | 57.7 | 26 | 51.0 | 41 | 53.2 |
| Thesis | 11 | 42.3 | 25 | 49.0 | 36 | 46.8 |

Of the 77 studies included in the study, 41 (53.2%) were articles and 36 (46.8%) were theses, with 15 of the articles being from the national and 26 from the international literature. As for the theses, 11 were from the national literature and 25 were from the international literature.

Table 3

Distribution of Studies by Year

| | National (Turkish literature) | | International | | Total | |
|------|-------------------------------|-----|---------------|-----|-------|-----|
| | f | % | f | % | f | % |
| 1991 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| 1993 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| 1996 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| 1997 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |

| | | | | | | |
|------|---|------|---|------|---|------|
| 2000 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| 2001 | 1 | 3.8 | 3 | 5.0 | 4 | 5.2 |
| 2002 | 2 | 7.7 | 0 | 0.0 | 2 | 2.6 |
| 2003 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| 2004 | 0 | 0.0 | 2 | 3.9 | 2 | 2.6 |
| 2007 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| 2008 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| 2009 | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| 2010 | 0 | 0.0 | 2 | 3.9 | 2 | 2.6 |
| 2011 | 2 | 7.7 | 4 | 7.8 | 6 | 7.8 |
| 2012 | 1 | 3.8 | 4 | 7.8 | 5 | 6.5 |
| 2013 | 1 | 3.8 | 5 | 9.8 | 6 | 7.8 |
| 2014 | 2 | 7.7 | 5 | 9.8 | 7 | 9.1 |
| 2015 | 2 | 7.7 | 0 | 0.0 | 2 | 2.6 |
| 2016 | 2 | 7.7 | 6 | 11.8 | 8 | 10.4 |
| 2017 | 4 | 15.4 | 2 | 3.9 | 6 | 7.8 |
| 2018 | 7 | 26.9 | 2 | 3.9 | 9 | 11.7 |
| 2019 | 3 | 11.5 | 4 | 7.8 | 7 | 9.1 |
| 2020 | 0 | 0.0 | 2 | 3.9 | 2 | 2.6 |

The first study conducted in the field of educational sciences in the context of PBT is a study from international literature made in 1991. No study on the subject was found in the national literature before 2001. Similarly, no studies on this subject were found in the national literature between 2003 and 2010. Considering the overall trend, the trend toward educational sciences research in the context of PBT has increased since 2011 in both the national and international literature. The year in which the most studies were published is 2018.

Table 4

The Methods of Studies

| | National (Turkish literature) | | International | | Total | |
|----------------------|-------------------------------|------|---------------|------|-------|------|
| | f | % | f | % | f | % |
| Quantitative Studies | | | | | | |
| • Survey | 24 | 92.3 | 41 | 80.4 | 65 | 84.4 |
| • Experimental | 0 | 0.0 | 4 | 7.8 | 4 | 5.2 |
| Qualitative studies | | | | | | |
| • Case | 2 | 7.7 | 2 | 3.9 | 4 | 5.2 |
| Mixed Studies | 0 | 0.0 | 3 | 5.9 | 3 | 3.9 |

Of the 77 studies included in the study, 12 (46.1%) of the 26 studies belonging to the national literature were survey studies. Furthermore, the method used in 12 (46.1%) studies was not specified in their reports. Only two (7.7%) studies are case studies. In international studies, as in national studies, survey studies were conducted the most (80.4%). Next, there are experimental studies not found in the national literature (7.8%). Three international studies were prepared using a mixed method (5.9%). Just as in the national literature, case studies are found the least in the international literature (3.9%). In general, survey studies were conducted the most (84.4%). Other research methods are too few to include in the review.

Table 5*Studies' Samples*

| | National (Turkish literature) | | International | | Total | |
|---------------------------|-------------------------------|------|---------------|------|-------|------|
| | f | % | f | % | f | % |
| Teacher | 10 | 38.5 | 18 | 35.3 | 28 | 36.4 |
| University students | 8 | 30.8 | 21 | 41.2 | 29 | 37.7 |
| Preservice Teacher | 6 | 23.1 | 4 | 7.8 | 10 | 13.0 |
| Secondary School Students | 2 | 7.7 | 7 | 13.7 | 9 | 11.7 |
| High School Students | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |

Of the 77 studies included in the study, 10 (38.5%) of 26 studies belonging to the national literature were studies conducted with teachers. University students were seen to be the sample in eight (30.8%) of these studies, while preservice teachers were the sample in six (23.1%) studies. Secondary school students were the sample in just two (7.7%) studies. When the international literature was examined, unlike the national literature, university students were chosen as the sample in most studies (41.2%). Teachers were seen to form the second most frequent sample in PBT studies (35.3%). While secondary school students formed the sample for seven (13.7%) of these studies, preservice teachers were the sample in four (7.8%) studies. In general, it is seen that the PBT studies conducted in the field of education were mostly conducted on university students (37.7%). This is followed in second place by studies on teachers (36.4%). In only one (1.3%) study, high school students were chosen as the sample.

Table 6*Sample Size*

| | National (Turkish literature) | | International | | Total | |
|---------------|-------------------------------|------|---------------|------|-------|------|
| | f | % | f | % | f | % |
| 0-999 | 15 | 57.7 | 45 | 88.2 | 60 | 77.9 |
| 1,000 - 1,999 | 3 | 11.5 | 0 | 0.0 | 3 | 3.9 |
| 2,000-2,999 | 3 | 11.5 | 2 | 3.9 | 5 | 6.5 |
| 3,000-3,999 | 4 | 15.4 | 0 | 0.0 | 4 | 5.2 |
| 4,000-4,999 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 5,000-5,999 | 0 | 0.0 | 4 | 7.8 | 4 | 5.2 |

Of the 77 studies included in the study, 15 (57.7%) of 26 studies belonging to the national literature were conducted with 0-999 participants. In three (11.5%) studies, the sample size is between 1,000 and 1,999, and in three (11.5%) studies, the sample size is between 2,000 and 2,999. There are four (15.4%) national studies with samples in the range of 3,000-3,999 people. Most of the studies in the international literature are in the range of 0-999 people (88.2%). Unlike the national literature, there are four (7.8%) studies in the international literature in the range of 5,000-5,999 people. When the studies are considered overall, it is seen that the general trend was for studies to use sample groups in the range of 0-999 people (77.9%).

Findings Relating to the Study's Second Sub-Problem

The second sub-problem was "What subjects have been studied in the field of educational sciences in the context of PBT?". These findings take the form of subjects (Table 7), conclusions (Table 8), and recommendations (Table 9).

Table 7

Subjects of the Studies

| | National (Turkish literature) | | International | | Total | |
|--|-------------------------------------|------|---------------|------|-------|------|
| | f | % | f | % | f | % |
| Explaining student behavior | | | | | | |
| • Entrepreneurship | 3 | 11.5 | 4 | 7.8 | 7 | 9.1 |
| • Environmentally friendly behavior | 2 | 7.7 | 5 | 9.8 | 7 | 9.1 |
| • Acquiring healthy habits | 2 | 7.7 | 3 | 5.9 | 5 | 6.5 |
| • Cheating | 1 | 3.8 | 0 | 0.0 | 1 | 1.3 |
| • Purpose of participating in student-centered teaching | 1 | 3.8 | 8 | 15.7 | 9 | 11.7 |
| • Acquiring habits that are harmful to one's health | 0 | 0.0 | 4 | 7.8 | 4 | 5.2 |
| • Purposes of participating in field trips | 0 | 0.0 | 2 | 3.9 | 2 | 2.6 |
| • Academic bullying | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| • Career planning | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| • Learning objectives of scholarship students | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| Explaining teacher behavior | | | | | | |
| • Sustainable behavior | 2 | 7.7 | 0 | 0.0 | 2 | 2.6 |
| • Quitting the profession | 0 | 0.0 | 2 | 3.9 | 2 | 2.6 |
| • Preparing a teaching plan | | | | | | |
| <i>Technology-based</i> | 0 | 0.0 | 13 | 25.5 | 13 | 16.9 |
| <i>For the inclusion of mainstreaming students</i> | 0 | 0.0 | 7 | 13.7 | 7 | 9.1 |
| <i>For inquiry-based science teaching</i> | 5 | 19.2 | 4 | 7.8 | 9 | 11.7 |
| <i>For laboratory use in science lessons</i> | 4 | 15.4 | 2 | 3.9 | 6 | 7.8 |
| <i>To gain environmentally friendly behavior</i> | 3 | 11.5 | 5 | 9.8 | 8 | 10.4 |
| <i>For preschool science teaching</i> | 1 | 3.8 | 0 | 0.0 | 1 | 1.3 |
| <i>Based on teaching the nature of science</i> | 1 | 3.8 | 0 | 0.0 | 1 | 1.3 |
| <i>Based on out-of-school learning environments</i> | 1 | 3.8 | 0 | 0.0 | 1 | 1.3 |
| <i>For the subject of evolution in biology lessons</i> | 1 | 3.8 | 0 | 0.0 | 1 | 1.3 |
| Identifying cultural differences | | | | | | |
| • Teachers from different cultures design applied teaching | 1 | 3.8 | 0 | 0.0 | 1 | 1.3 |
| • Adaptation of students from different cultures to school | 0 | 0.0 | 4 | 7.8 | 4 | 5.2 |
| Comparing the abilities of theories to explain behavior | | | | | | |
| • PBT vs. Social Learning Theory | 0 | 0.0 | 3 | 5.9 | 3 | 3.9 |
| • PBT vs. Technology Acceptance Model | 0 | 0.0 | 3 | 5.9 | 3 | 3.9 |
| • PBT vs. Trying Theory | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |
| • PBT vs. Theory of Reason Action | 0 | 0.0 | 1 | 2.0 | 1 | 1.3 |

When the topics of the studies included in the review are analyzed, it is seen that the topics are gathered under the themes of "Explaining student behaviors," "Explaining teacher behaviors," "Identifying cultural differences," and "Comparing the abilities of theories to explain behavior." Of these themes, it is seen that the studies collected under the theme of "Comparing the abilities of theories to explain behavior" are the first studies conducted in the field of educational sciences in the context of PBT. All of these studies are found in the international literature. The ability of PBT to explain behavior was mostly compared with Social Learning Theory and the Technology Acceptance Model (5.9%). After the ability of the relevant theory to explain behavior in the field of education was revealed, studies were initiated to explain student and teacher behaviors and to identify cultural differences. In the national literature, it is seen that student behaviors are mostly identified as entrepreneurship (11.5%), environmentally friendly, and healthy behaviors (7.7%). The subject covered the most by studies in the international literature is students' purposes of participating in student-centered teaching (15.7%). The subject studied the most under teacher behavior is the use of PBT to explain teaching plan preparation behavior. It was seen that teacher behavior studies in the national literature focus on science education. Inquiry-based science teaching (19.2%) and laboratory use in science lessons (15.4%) were the subjects selected the most for studies. In the international literature, it is seen that PBT is mostly applied to technology integration (25.5%) and special needs education (13.7%).

Table 8*Studies' Conclusions*

| | National (Turkish literature) | | International | | Total | |
|---|-------------------------------|------|---------------|------|-------|------|
| | f | % | f | % | f | % |
| Reveals the main variable in the occurrence of behavior | 18 | 69.2 | 26 | 51.0 | 44 | 57.1 |
| Is an adequate model for explaining behavior and purposes | 18 | 69.2 | 21 | 41.2 | 39 | 50.6 |
| Measures behaviors that affect teaching processes | 17 | 65.4 | 27 | 53 | 44 | 57.1 |
| Provides important evidence to improve teacher training processes | 12 | 46.1 | 12 | 23.5 | 24 | 31.2 |
| Creates valid and reliable scales | 5 | 19.2 | 15 | 29.4 | 20 | 26.0 |
| Identifies cultural differences in the formation of behaviors | 1 | 3.8 | 4 | 7.8 | 5 | 6.5 |
| Reveals the deficiencies in transferring behaviors to daily life | 2 | 7.7 | 10 | 19.6 | 12 | 15.6 |
| PBT is better able to explain behavior than other theories | 0 | 0.0 | 4 | 7.8 | 4 | 5.2 |

When the studies' conclusions are examined, it is mostly seen that PBT can reveal the main variable in the emergence of behavior and that it can measure those behaviors that affect teaching processes (57.1%). Furthermore, one of the points most commonly stressed in the studies' conclusions is that regardless of the identified behavior, PBT is an adequate model to explain both the behavior and the purposes for that behavior (50.6%). This is followed in 24 studies (31.2%) by the conclusion that it provides significant evidence for the improvement of teacher training processes. In international literature, in particular, it is thought that the ability of PBT studies to form valid and reliable scales to measure the behavior they are based on is an important conclusion (29.4%). When an overall comparison is made of the national and international literature, the conclusion we see most in the national literature is that PBT reveals the main variable in the emergence of behavior and is an

adequate model for explaining this behavior (69.2%) whereas international studies mainly conclude that it can measure behaviors that affect teaching processes (53.0%).

Table 9*Studies' Recommendations*

| | National (Turkish literature) | | International | | Total | |
|--|-------------------------------------|------|---------------|------|-------|------|
| | f | % | f | % | f | % |
| Recommendations for the use of PBT in educational processes | | | | | | |
| • Studies should be increased | 19 | 73.1 | 14 | 27.4 | 33 | 42.9 |
| • New trends in education should be identified | 8 | 30.8 | 10 | 19.6 | 18 | 23.4 |
| • Cross-cultural research should be increased | 1 | 3.8 | 4 | 7.8 | 5 | 6.5 |
| Recommendations for the use of PBT in instructional design | | | | | | |
| • Real behavior-based teaching | 10 | 38.5 | 12 | 23.5 | 22 | 28.6 |
| • PBT-based teacher training | 1 | 3.8 | 8 | 15.7 | 9 | 11.7 |
| • Should be compared with other theories to find the variables in teaching processes | 0 | 0.0 | 6 | 11.8 | 6 | 7.8 |
| • Determining sub-dimensions for student-centered teaching | 0 | 0.0 | 5 | 9.8 | 5 | 6.5 |

Following analysis, the recommendations of the studies made in the context of PBT in the field of educational sciences are explained under the themes "recommendations for the use of PBT in educational processes" and "recommendations for the use of PBT in instructional design." In recommendations for the use of PBT in educational processes, in both the national and international literature, emphasis is placed on increasing research in this field most of all (42.9%). This proportion is 73.1% in the national literature and 27.4% in the international literature. This is followed by suggestions to use this theory in explaining new trends in education (23.4%). Studies in the international literature, in particular, suggest that PBT should be used to explain cultural differences and multiculturalism in education (7.8%). This recommendation was found only in one national study (3.8%). The most common suggestion for the use of relevant theory in instructional design concerns the use of PBT to design instruction based on real behavior. This emphasis is seen in 10 (38.5%) national studies and 12 (23.5%) international studies. Again, in the international literature, it is stated that the programs and teacher training to be prepared based on the sub-dimensions of PBT that explain the purpose of behavior will be very important. (15.7%). This comment was made in only one national study (3.8%). Again, unlike in the national literature, there were six (11.8%) studies in the international literature suggesting that PBT should be compared with other theories on behavior to find the variables that affect teaching processes, and five (9.8%) suggesting that this theory be used to explain the factors necessary to create a student-centered learning environment.

Discussion and Conclusion

This study aimed to reveal the general tendencies in studies of PBT in the field of educational sciences and thus to present the kind of in-depth information that is at the heart of qualitative research. It can be seen that most of the studies in this context included in this study were found in the international literature. When the national literature is examined, it is one of the first examples in the national literature to investigate the behavioral aims of saving energy at home by PBT. The research by Erten in 2003 emphasizes further research on PBT and educational sciences. The study by Tekkaya

et al. (2011) is explaining the recycling behaviors for a sustainable campus is one of the first examples in the national literature. Yüzüak's doctoral thesis in 2017 is a very comprehensive research and an important example of integrating environmental education and PBT. Despite all these important examples, there are fewer studies on this subject in the national literature. Considering the types of studies, it is seen that the rates of articles and theses are similar. Most of these studies are survey studies and are generally conducted with very large samples. This situation can be attributed to the effect of large-scale scientific studies such as theses based on surveys. When the distribution of the studies by years is examined, it is seen that the first study conducted in the field of educational sciences in the context of the PBT is a study from the international literature in 1991. This is the year that PBT was introduced by Ajzen. This shows that this theory was tested for its ability to explain behavior in educational sciences from the moment it was introduced. When the topics and publication times of the studies are examined, it is seen that the first studies on this subject compare the behavior explanation abilities of PBT with other behavioral explanation theories. According to the conclusions of the studies made on this subject, it is stated that PBT has greater explanatory power than other theories and that the Attitude Towards Behavior, Subjective Norm, and Perceived Behavior Control factors provide a larger description in explaining the purposes of behavior (Gillespie, 1991). This situation supports the findings of this study. It is seen in the findings that a trend toward other topics in the field of education began after this theory's explanatory power was revealed. The first national (Turkish literature) study is Erten's 2001 study on environmental education. Considering the overall, it is obvious from the study's findings that the trend towards educational sciences research in the context of PBT has increased since 2011 in both the national (Turkish literature) and international literature. Since the power of the PBT has been proven to explain behavior in the field of educational sciences, it is thought that studies have increased since 2011. Another conclusion is that the studies focused mainly on university students and teachers and were conducted with large sample groups.

When the subjects of the studies are examined, it is seen that they are generally based on explaining behaviors and purposes in the context of PBT. In addition to student and teacher behavior, the important role of PBT in detecting cultural differences in research topics is explained. For example, in his study in 2002, Erten explained the behaviors of German and Turkish teachers in implementing the applied teaching method in environmental education in the context of PBT. One of the most important conclusions of the study is how influential the expectations of the person, institution, or organization that Turkish teachers consider important are in revealing this behavior, more so than with German teachers. Another conclusion is that German teachers can apply practice-based lessons in environmental education lessons more successfully. All this goes to show PBT's ability to reveal cultural differences. Other studies on the subject compare the ability of different theories to explain behavior, such as the research on teachers' intentions to use and their actual use of microcomputer science laboratory interface materials (Smith, 1993). All of these studies are found in the international literature. When looking at the studies on teacher and student behavior, it is seen that the research topics vary and that the studies do not focus on a single subject or behavior. The subject studied the most under teacher behavior is the use of PBT to explain teaching plan preparation behavior. Marino-Driscoll's (1997), Malecki's (2003), Zint's (1996), Kudlacek's (2001) and MacFarlane and Woolfson's (2013) researches are examples for this topic. It was seen that teacher behavior studies in the Turkish literature focus on science education, such as Karademir and Erten's (2013), Kılıç and Aydın's (2017), Yüzüak's (2017). In the international literature, PBT is mostly applied to the integration of technology into teaching processes and to special needs education.

When the studies' conclusions are examined, in the Turkish literature, it is concluded that PBT reveals the main factors in the emergence of behavior and is an adequate model in explaining this behavior, while in international studies the main conclusion reached is that PBT can measure behaviors that affect teaching processes. In recommendations for the use of PBT in educational processes, in both the Turkish and international literature, emphasis is placed on increasing research in this field most of all. The most common suggestion for the use of relevant theory in instructional design concerns the use of PBT to design instruction based on real behavior. More so than the

diversity of research topics, the studies' conclusions and recommendations explain the opinion that PBT contributes not only to teaching processes but also to educational sciences research.

Recommendations

- Considering the contribution of PBT to education processes and educational studies in the literature, it could be recommended that research on this topic in the field of educational sciences be increased.
- PBT is a theory that explains in all aspects why a behavior does or does not occur. For this reason, it will have a great effect on the education-teaching processes of teaching plans to be prepared based on these sub-dimensions.
- The results of the study show that there are more studies in the international literature are than in the national literature. It will be important to increase national research on this subject.
- It could also be recommended that PBT be applied to different fields in education, new orientations, and other behaviors thought to affect teaching processes.

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