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Differentiated Instruction in the World and Türkiye through Studies

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Abstract. With the emergence of individuals with different characteristics with the developing age and the shaping of needs in these directions, approaches in education and training processes are diversifying. One of these approaches is the differentiated instruction approach based on individual learning differences. In our study; to reveal the change process of differentiated instruction approach from past to present, studies published in English and Turkish languages were examined according to various variables and it was aimed to compare them according to foreign and domestic perspectives. The research data consisted of Turkish and English articles published on differentiated instruction approaches between 2006 and 2023. The data were obtained from reliable sources by searching the Google Scholar database for Turkish articles and the Web of Science database for English studies. Document analysis, one of the qualitative research designs, was preferred as the research design and the data were analyzed by descriptive analysis method. As a result of the research, it was observed that more teacher-oriented and process-planning studies were conducted in English, while more student-oriented process-planning was observed in Turkish studies. Based on these results, it is recommended that researchers conduct studies with groups such as parents and administrators to observe the effects of the process on different data groups.

Keywords. Differentiated instruction, qualitative research, document analysis, web of science, google scholar.

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In line with their developmental characteristics, each individual differs from other people in society just like the colors of a rainbow and stands out with their different aspects. This difference not only supports individuals to be unique beings but also allows for the diversification of views by presenting various perspectives. Because each individual comes from environments where different life opportunities are provided and the points where they can differ from each other diversify within these opportunities. Although some of the diversity can be expressed by classifying them in terms of learning styles, intelligence areas, interests, abilities, and skills (Levy, 2008, p. 161; NMSA Research Committee, 2003), the idea that each individual is special and unique and that the studies should be diversified in this direction is adopted. In societies where this way of thinking is not supported, the desire to squeeze individuals into uniform patterns emerges as a process that leads the individual towards blunting. In the educational process, these situations can be prevented if students with different learning styles in schools have an educational environment in which teachers take into account their differences.

As a result of the research, it has been revealed that the use of different teaching strategies in the educational process is important in both the academic success of students and the development of their sense of self (NMSA Research Committee, 2003, p. 1), while in environments where differences are not taken into consideration, it is observed that children gradually move away from the education and training process. In this context, the most effective learning opportunities are tried to be provided with various approaches that aim to make children a part of the process, to provide active learning opportunities for each student, and to take the individual as the basis. One of these approaches is the differentiated instruction model.

Differentiated teaching studies reveal individuals who are different from each other in terms of their characteristics as an output of the processes in which individual needs and differences are increasing day by day within the framework of age. In order for these differences to be at the right level and beneficial to the individual, the outputs within the education and training processes need to be organized and developed. Based on these needs, the differentiated instruction approach based on individual differences was first introduced to the literature by Tomlinson in 1995 (Avcı et al. 2022). Differentiated instruction, whose theoretical foundations are based on many teaching approaches such as multiple intelligences, brain-based learning, and social constructivism, is an approach that argues that the education and training process should be designed for individual differences such as interest, readiness, and learning styles of individuals instead of a single common idea that is compatible with everyone (Gregory & Chapman, 2007; Tomlinson & Allan, 2000).

A differentiated instruction approach is a learning experience in which various ways are adopted for students to explore the course content, practices, and processes are structured for meaningful learning, reaching their own knowledge and ideas, and students can make unique choices to demonstrate their learning (Tomlinson, 1995). In this way, each student will be able to make sense of and construct their inferences in a unique way within the framework of the opportunities offered to them by the teaching approach. In this process, teachers will act as a guide by differentiating teaching elements according to the student's readiness, interest, or learning profile and thus create a more qualified learning environment.

These instructional elements, which are followed within the educational outcomes, are examined under different headings (Tomlinson, 2000). The first of the elements, the content stage, provides the answer to the question "What will we teach?" in order to reveal the target phenomenon, which is the first stage of the teaching process, and emphasizes that students with different learning levels can have a learning experience with the same curriculum content, but in this process, the content may differ quantitatively or qualitatively (Levy, 2008). The process stage, which is the second step, seeks answers to the questions "How will we transfer the outcome?" or "How will we ensure that the student internalizes the subject?" in the planning stage of the lesson process, which can be diversified according to the comprehension levels of the students, while in the product stage, which is the third step, it answers the question "At what level has the student learned?" in a way that will allow the evaluation of the process and the result together with the suitability of the learned information for the student. In fact, Tomlinson (2000) suggests that in order to differentiate the product and assessment stages in terms of course outcomes, students can be given options to express their learning differently, and assessment documents that correspond to different skill levels and can be deepened can be preferred. The last stage, the learning environments stage, is based on the idea that an effective learning environment should be created in order to optimize students' learning outcomes in the process.

The differentiated instruction approach (TCSII, 2001, p. 140), which allows students to acquire new knowledge and provides various opportunities for them to internalize what they have learned and put it into performance, provides the individual with the opportunity to manage the teaching process in line with their differences as a result of the steps followed. Thus, students will be able to better assimilate the information conveyed by the instructors within their current readiness and different areas of intelligence and will be able to reveal it in a way that can be observed in the process outcomes.

In order to be able to involve all students willingly in the process within the education system and to provide effective teaching environments, it is necessary to recognize the characteristics of students and to search for innovative ways of learning. In this sense, examining the studies conducted around the world will be guided in order to understand and use the differentiated instruction approach and to conduct related studies.

When the literature that includes the studies shaped within the framework of these basic objectives is examined, it is seen that the studies on differentiated instruction mostly originate from abroad (Abbati, 2012; Chen, 2011; Etienne, 2011; Gilbert, 2012; Learn, 2012; Mathis, 2012; Stevens, 2012; Waller, 2011; White, 2012; Williams, 2012), while the studies conducted in Türkiye have been observed to be insufficient in conveying this approach (Bekler & Kozikoğlu, 2022; Olçay Gül, 2014; Zoraloğlu & Şahin, 2022; Demir, 2013), there is no recent study that provides a comparison of the world and Türkiye that can reveal this insufficiency. In this context, this study will be able to reveal the place of the differentiated instruction approach in the world and Türkiye and in which subject areas it tends to be more in the world and Türkiye by approaching the differentiated instruction approach carried out in the field of science, where course content can be differentiated at more appropriate levels within the framework of individual characteristics, from an international perspective. Thus, it will be possible to describe the current place of this approach in Turkish literature together with the positive and negative aspects that emerged in the process of transferring the approach. At the end of the study, it is thought that the descriptions made at the end of the study can significantly guide the researchers who may carry out studies in this field and provide detailed information about the points that should be given importance.

The aim of this research is to reveal the change process of the differentiated instruction approach from past to present, to reveal its contributions to the education process by examining the studies carried out in the literature on the subject areas in which the differentiated instruction approach, which is adopted as an alternative learning approach in the world and in Türkiye, is mostly used and how it is integrated into the curriculum outcomes of the countries. In line with this purpose, the questions sought to be answered in the study are as follows;

1. What is the distribution of studies on differentiated learning approaches according to languages?
2. What is the distribution of studies on differentiated learning approaches according to years?
3. What are the aims of the studies on differentiated learning approach?

4. Which research designs were used in published studies on differentiated learning?
5. Which study groups were used in the studies on the differentiated learning approach?
6. Which data collection tools were used in published studies on differentiated learning?
7. What are the data analysis methods used in published studies on differentiated learning?
8. What results were obtained in published studies on differentiated learning approaches?
9. What recommendations were given in published studies on differentiated learning?

Method

In this section, the type of research, selection of participants, data collection tools, data collection, process, and data analysis are presented.

Research Model

In this study, document analysis, one of the qualitative research designs, was used in order to synthesize quantitative, qualitative, and mixed-design studies that include the usage areas and forms of differentiated learning approach, which is an alternative learning approach in the education and training process. Document analysis reveals the process of examining and evaluating the materials presented in various data publishing environments (Bowen, 2009). In another definition, document analysis covers the analysis of studies on the phenomena planned to be examined (Yıldırım & Şimşek, 2016). The document analysis method is analyzed by dividing it into certain steps and the studies carried out for each step in this research are shown in Figure 1 (Forster, 1994);

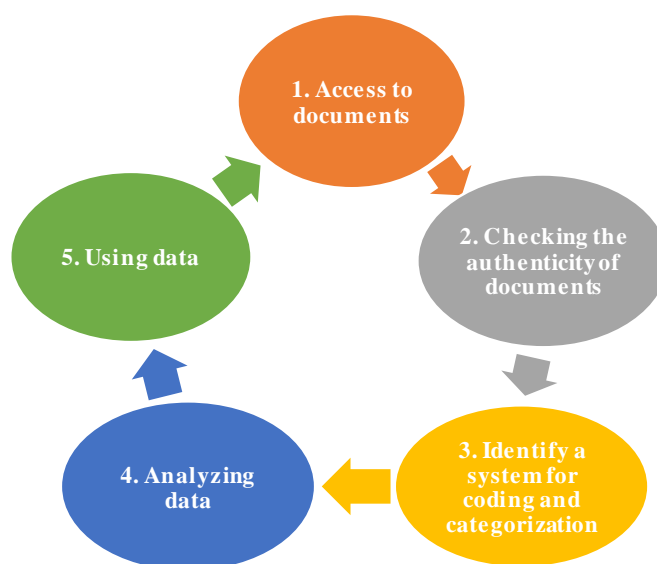


Figure 1. Steps of Document Analysis (Forster, 1994).

In this study, which was conducted by following the analysis steps developed by Forest (1994), in the first step of accessing the documents, Turkish and English articles on differentiated instruction conducted in the field of Science between 2006 and 2023 were searched. Web of Science and Google Scholar databases were searched in accordance with the step of checking the originality of the documents. Web of Science database was preferred to access international studies and Google Scholar database was preferred to access studies published in Turkish. In the third step of adopting a system for coding and categorization, in order to examine the studies included in the scope of the subject as a systematic whole, descriptive analysis methods were used to collect and integrate general information about the languages and years in which the studies were conducted, and after examining the colophon information of the studies with the descriptive analysis method, the fourth step of analyzing the data, which is the fourth step, was carried out by using document analysis method for data such as purpose and data collection group. In line with all the data obtained, the similarities and differences of the studies in terms of many variables such as the languages in which they were published and the years of publication were revealed and analyzed in the step of using the data in a way to reveal the approaches of Türkiye and other countries in the studies on differentiated instruction approach.

Study Group

In order to access Turkish studies, the Google Scholar database was searched with the keyword "differentiated instruction" and 12 studies were found. In order to access the studies in English, Web of Science database was searched and 12 studies were reached. As a result of the searches, a total of 24 articles, both in English and Turkish, on the applications of differentiated learning approaches in education were reached. In order to contribute to the analysis and interpretations in the findings section of the studies, English studies were categorized as Eng1, Eng2, Eng3... and Turkish studies were coded as Tr1, Tr2, Tr3.....

Data Collection Tools

In the study, Web of Science and Google Scholar databases were searched in order to find answers to the questions asked in order to reveal to what extent the usage areas of the differentiated learning approach have developed in the education-teaching process and in which areas the studies are concentrated. During the preliminary screening in the research process, 10 studies were found when the keyword "differentiated teaching" was searched in the Web of Science database in order to access English studies. In order to access more studies related to the concept, 2 more studies were

found when the keyword "differentiated instruction" was searched, which may have translation differences.

Data Analysis

In line with the criteria determined in this study, systematic information was collected by conducting a descriptive analysis of the existing studies in the literature on the differentiated instruction approach between 2006 and 2023. The findings obtained in line with the information collected were interpreted by the researcher, all the data obtained were analyzed with the help of Microsoft Excel program and presented to the reader in tables and graphs.

In order to ensure validity and reliability in the study data and findings, Web of Science and Google Scholar databases used as data collection tools were scanned more than once to avoid publication bias and impartiality was adopted. Since the research process included articles published between 2006 and 12.01.2023, all current studies were followed. In addition, in order to get general information about the differentiated instruction approach, which is the subject of the study, and to get opinions about the way to be followed in the study, three field education experts were consulted and their suggestions were taken into consideration.

Results

The findings of the data obtained in order to answer the questions describing the current place of the differentiated instruction approach in the literature are included in this section.

Distribution of the Analyzed Articles According to Years

When the distribution of the studies included in the scope of the research is examined according to the languages in which they were published, it is seen that the studies were published equally in English and Turkish languages, while the distribution of the studies on the approach according to the years of publication is given in Figure 2.

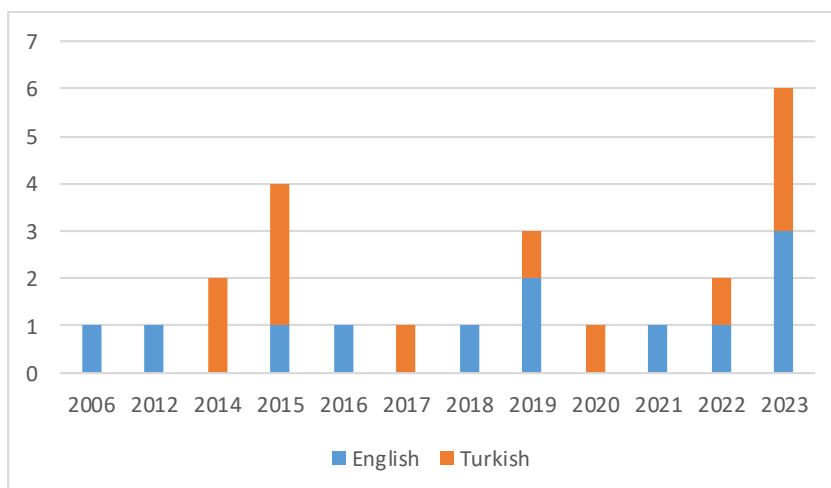


Figure 2. Distribution of the Studies Included in the Scope of the Research According to Years.

From the distribution of the studies included in the scope of the research according to the years of publication, it can be said that the studies conducted in English have a longer history than the Turkish studies. In addition to these data, it is observed that English studies increased in 2019 (2 articles) and 2023 (3 articles), while Turkish studies were mostly conducted in 2014 (2 articles) and 2015 (3 articles).

Distribution of the Analyzed Articles According to Their Purposes

Table 1 shows the objectives adopted for the studies included in the scope of the research, which enable the studies to proceed in line with certain objectives.

Table 1.

Objectives of the Studies Included in the Research

Aims of the Studies	Codes of Work
Academic success	Tr1, Tr2, Tr10, Tr12
Impact on students' attitudes towards the course	Tr8, Tr9
Effects on students' science literacy levels	Eng1
The effect of differentiated learning approach practices on the level of learning NOS concepts	Eng10
The effect on students' motivation to learn science	Tr8, Tr10
Impact on the development of students' scientific process skills	Eng11, Tr10
Identification of misconceptions	Tr1

The effect of the DL approach on question switching strategies	Eng2
Entrepreneurship skills	Tr2
To investigate the knowledge, attitudes and practices of lecturers on differentiated instruction	Eng3
Impact on the perspective on learning approaches	Tr3
The effect on science teachers' practices shaped by the approach	Eng6
Uncovering and developing missing knowledge of subject concepts	Tr11
Impact on the retention of learning	Tr3
The effect of the DL approach on peer relations of students in inclusive science classrooms	Eng8
Teachers' perspectives on the applications designed with the DL approach	Eng4, Eng7, Tr6
Pre-service physics teachers' experiences and limitations of differentiated learning environments	Eng12
Impact on classroom climate	Eng2, Tr4
To reveal the approach perceptions and usage patterns of laboratory exercises based on differentiated learning approach	Eng9
The effect on teachers' ideas of competence regarding the DL approach	Eng4, Eng5, Tr6
The effect on pre-service teachers' conceptual perceptions and evaluations	Tr7

When Table 1, which includes the preferred purposes of the studies included in the scope of the research, is examined, it is seen that the English studies were generally conducted with the purpose of revealing teachers' perspectives and levels of use of differentiated instruction (2 articles), while the Turkish studies were generally conducted with the purpose of revealing the effect of the approach on academic achievement (5 articles). It is seen that English studies have very few similar aims with Turkish studies.

Distribution According to Research Methods Used in the Analyzed Articles

The research methods used in the studies are presented in Figure 3.

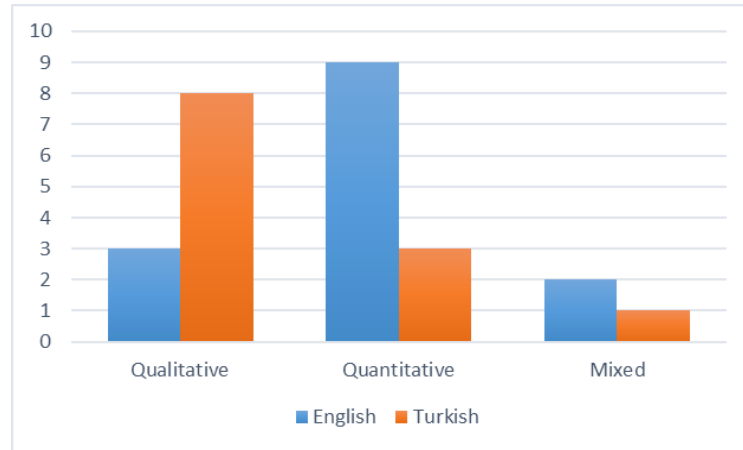


Figure 3. Distribution According to Research Methods Used in the Studies.

In Figure 3, the research methods used in English and Turkish studies are analyzed separately. While qualitative research methods were mostly preferred in English studies (9 articles), quantitative research methods were mostly preferred in Turkish studies (8 articles). It is observed that mixed research methods, which allow qualitative and quantitative research methods to be examined as a whole, are used more in English studies (2 articles) than in Turkish studies (1 article).

Distribution According to the Research Designs Used in the Analyzed Articles

The distribution of the research methods used in the articles in terms of designs is also given in Figure 4.

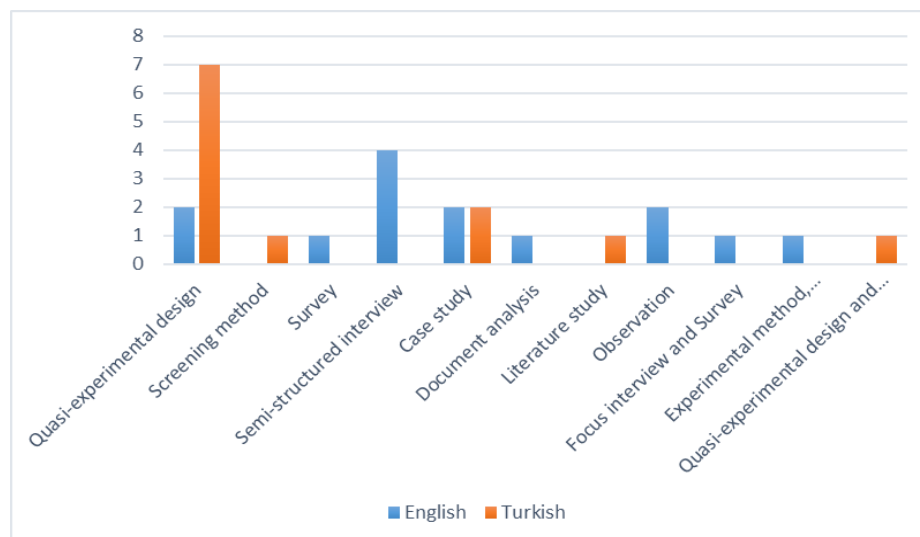


Figure 4. Distribution According to the Research Designs Used in the Studies.

When Figure 4, which shows the preferred research designs in the studies, is examined, it is seen that while semi-structured interviews are generally used in English studies (4 articles), quasi-experimental designs (2 articles) and observation (2 articles) are also preferred. In Turkish studies, quasi-experimental designs were mostly used similar to English studies (7 articles), while case study (2 articles) was also one of the preferred research designs. In addition to these, it is observed that research methods such as survey method, literature review and mixed methods, quasi-experimental design and case study are not preferred in English studies, while research designs such as questionnaires, semi-structured interviews and document analysis are not preferred in Turkish studies. Another finding was that other research designs were used in English and Turkish studies in common but with low frequency.

Distribution of Reviewed Articles According to Study Groups

The distribution of the study groups used in the studies is presented in Figure 5.

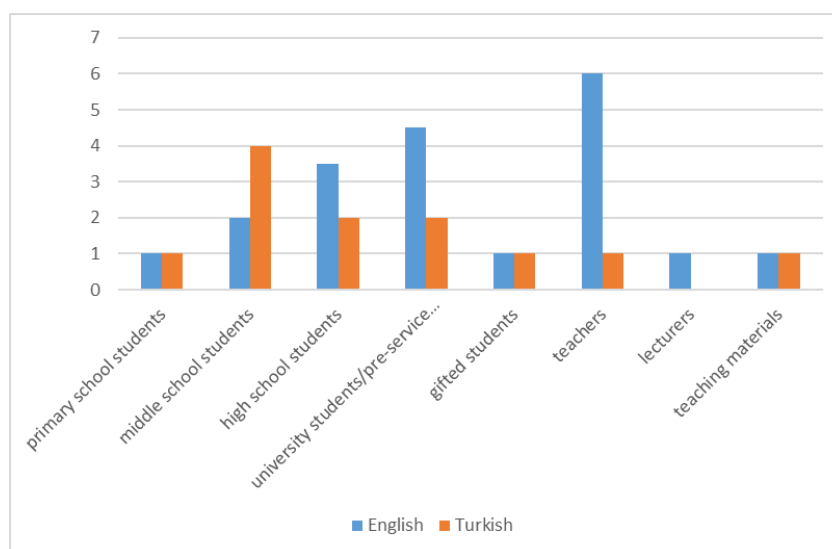


Figure 5. Study Groups of Turkish and English Studies.

When Figure 5 is analyzed, it is observed that the English studies included in the scope of the research were generally conducted with teachers (5 articles), followed by middle school (2 articles) and high school (2 articles) students. Turkish studies, on the other hand, were generally conducted with groups of middle school students (5 articles), followed by groups of high school students (2 articles) and university students/pre-service teachers (2 articles). Another finding is that the study groups preferred in Turkish studies consist of younger student groups than the study groups preferred in English studies.

Distribution According to Data Collection Tools Used in the Analyzed Articles

The quantitative and qualitative data collection tools used in the step of reaching the data by analyzing the articles preferred in the research are given in Tables 2 and 3.

Table 2.

Quantitative Data Collection Tools Used in the Studies Included in the Research

<i>Research model</i>	<i>Data Collection Tools</i>	<i>Codes of Work</i>
	Academic Achievement Test (AAT)	Tr1, Tr3, Tr10
	Multiple Intelligence Inventory	Tr1
	Chemistry Achievement Test (KBT)	Tr12
	Electricity in Our Lives Achievement Test	Tr2
	Science Laboratory Entrepreneurship Scale	Tr2
<i>Quantitative Model</i>	Learning Approach Inventory	Tr3
	Genetics and Ecology Survey	Eng7
	Learning Styles Scale	Tr2
	Personal Information Form	Tr6
	Teachers' Implementation of Differentiated Instruction and Level of Competence Scale	Tr6
	Fowler Test of Scientific Process Skills (Fsps)	Eng11
	Raven Advanced Progressive Matrices Test	Tr12
	Laboratory Online Survey	Eng9
	FGD (Focus Group Discussion)	Eng3

When Table 2 is examined, it is seen that the quantitative data collection tools preferred in the studies included in the scope of the research are not concentrated within the framework of a single tool in English studies, but tools such as Fowler Scientific Process Skills Test (1 article), Laboratory Online Questionnaire (1 article), FGD (Focus Group Discussion) (1 article) and Genetics and Ecology Questionnaire (1 article) were used in equal proportions. In Turkish studies, Academic Achievement Test (3 articles) was the most used data collection tool, while instruments such as Multiple Intelligences Inventory (1 article) and Learning Styles Scale (1 article) were also preferred.

Table 3.

Qualitative Data Collection Tools Used in the Studies

<i>Research model</i>	<i>Data Collection Tools</i>	<i>Codes of Work</i>
<i>Qualitative Model</i>	Videos	Eng2
	Classroom Activities	Eng5, Eng6, Eng6
	Motivation Scale for Learning Science	Tr8
	Semi-structured Interviews	Eng1, Eng3, Eng4, Eng5, Eng6, Eng9, Eng12, Tr7
	Student Agendas	Tr11
	Science Attitude Scale (SAS)	Tr8, Tr9
	Motivation Scale for Learning Science	Tr10
	Scientific Process Skills Scale	Tr10
	L	Eng1, Eng5
	Student Diaries	Eng5, Eng6, Eng8, Eng10
	Teaching Materials	Eng5, Eng6, Eng8, Eng10
	Classroom Climate Observation Form" (Sigf)	Tr4
	Observation Form	Eng1, Eng4
	Metaphor Form	Tr7
	Literature Review	Tr5

When Table 3 is examined, the qualitative data collection tools preferred in the studies included in the scope of the research are Semi-structured Interviews (7 articles), Instructional Materials (4 articles) and Classroom Activities (3 articles) in English studies, while Science Attitude Scale (SAS) (2 articles) is the most used data collection tool in Turkish studies. In addition to these tools, it is seen that tools such as Motivation Scale for Learning Science (1 article), Metaphor Form (1 article), Literature Review (1 article) are equally used in Turkish studies.

Distribution According to the Types of Data Analysis Used in the Analyzed Articles

The data analysis types preferred in the process of analyzing the data obtained in the studies are examined in Figure 6.

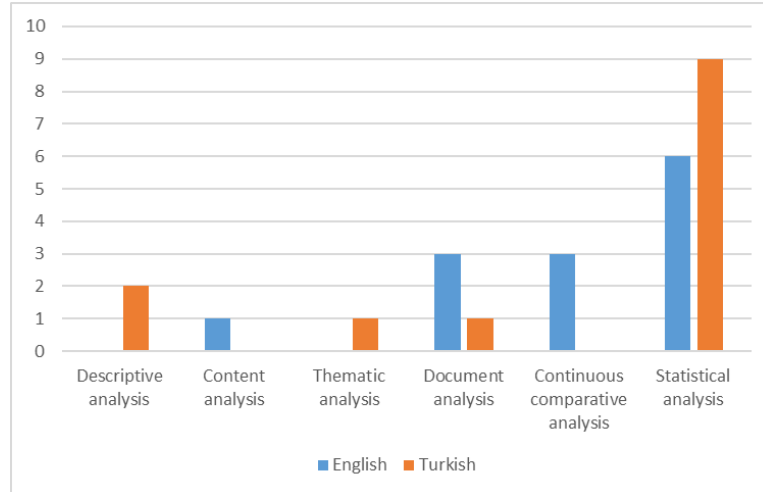


Figure 6. Data Analysis Methods Used in the Studies Included in the Research.

When Figure 6, which reveals the preferred data analysis types in order to interpret the findings, is examined, it is seen that qualitative analysis designs were preferred in English studies, while quantitative analysis designs were preferred in Turkish studies. From these qualitative and quantitative analysis methods, it was concluded that the studies published in both languages showed similarities in analysis methods, with statistical analysis methods (6 articles) mostly preferred in English studies and statistical analysis methods (9 articles) mostly included in Turkish studies. In addition to these, document analysis (3 articles) and constant comparative analysis (3 articles) methods were also preferred in English studies, while descriptive analysis method (2 articles) as well as statistical analysis the method was preferred in Turkish studies.

Distribution of Reviewed Articles According to Results

The results obtained from all the data were analyzed with the word clouds in Figures 7 and 8, which were created with the most common concepts in English and Turkish studies, and in addition to this, they were classified under different categories in Tables 4, 5 and 6.



Figure 7. English Studies.



Figure 8. Turkish Studies.

The results obtained from the studies were categorized under certain words and these words are presented as word clouds in Figures 7 and 8. When Figure 7, which was created in line with the results obtained from the English studies, is examined, it is observed that the results focused on are classified as science literacy, interest, enjoyment, attitude, process control, and dynamic process, while when Figure 8, which was created in line with the results obtained from the Turkish studies, is examined, it is observed that the Turkish studies are mostly classified under the titles of academic achievement, entrepreneurship skills, attitude, misconceptions, and incentives. In order to examine the results in more detail, the results revealing the effect of the approach on students by classifying them under different categories are analyzed in Table 4.

Table 4.

Results Revealing the Impact of the Approach on Students in the Studies Included in the Research

<i>Category</i>	<i>Code</i>	<i>Studies</i>
<i>In terms of the student</i>	Increased academic success	Tr1, Tr2, Tr10, Tr11 Tr12
	Contribution to science literacy level	Eng1
	Elimination of misconceptions	Tr1
	Their enjoyment	Eng8
	Increases entrepreneurial skills	Tr2
	Developing a positive attitude toward the lesson	Eng9, Eng11, Tr8, Tr9
	Increasing interest in science, technology, and the environment	Eng1
	Question switching strategy	Eng2
	Increasing deep learning scores	Tr3
	Increased motivation toward the course	Eng9, Tr8, Tr10 Tr4
	Encouragement to attend class	
	Developing scientific process skills	Eng11, Tr10
	No difference in attitudes toward the course	Tr6

When Table 4, which describes the results of the studies included in the scope of the research, is examined, it is seen that the studies published in English mostly focused on students' attitudes towards science courses (2 articles), while results such as contribution to students' science process skills (1 article) and increase in motivation levels (1 article) were also reached. In the studies published in Turkish, the main outcome of the approach was a positive increase in students' academic achievement (5 articles), while similar to the English studies, an increase in students' motivation levels (2 articles) was also found. Another category, the results revealing the impact of the approach on teachers and pre-service teachers, is analyzed in Table 5.

Table 5.

Results Revealing the Effects of the Approach on Teachers and Pre-Service Teachers in the Studies Included in the Research

<i>Category</i>	<i>Code</i>	<i>Studies</i>
<i>In terms of Teachers/Prospective Teachers</i>	Preference in your classes	Eng6
	Making the lesson effective	Eng5
	Developing a positive attitude	Eng3
	Failure to fully implement the approach	Eng3
	Observe student differences more clearly	Eng4
	Control learning processes	Eng4, Eng6
	Giving responsibility to the student	Eng6
	Preparing a quality lesson plan	Tr7
	Making the learning process dynamic	Eng5, Eng12

When Table 5, which presents the results of the studies included in the scope of the research on the effects of the approach on teachers and pre-service teachers, is examined, it is concluded that the English studies contributed to the development of the idea that the approach helped teachers to control the learning process (2 articles) and to make the process dynamic (2 articles), while in Turkish studies, only one output was reached and the idea that the approach helped teachers to prepare qualified lesson

plans (1 article) was more prominent. The results regarding the impact of the approach on the curriculum in the studies are examined in Table 6.

Table 6.

Results Revealing the Impact of the Approach on the Curriculum in the Studies Included in the Research

<i>Category</i>	<i>Code</i>	<i>Studies</i>
<i>In terms of the program</i>	More effective than the current curriculum	Tr2
	Increased quality of cognitive-epistemic representation of the nature of science	Eng10

When Table 6, which presents the results of the studies included in the scope of the research on the effect of the curriculum on the curriculum, is examined, one study in English and one study in Turkish were found to reveal the results of the curriculum. In the English study, it was emphasized that students could better assimilate science and cognitive representations with the differentiated teaching approach integrated into the curriculum (1 article), while in the Turkish study, it was concluded that the differentiated teaching approach techniques were more efficient than the current curriculum approach (1 article).

Distribution of the Suggestions in the Analyzed Articles

In line with the results obtained, suggestions were made in some studies by identifying the shortcomings of the approach, and these suggestions are analyzed in Tables 7, 8, 9, and 10.

Table 7.

Suggestions Presented in terms of Students in the Studies Included in the Scope of the Research

<i>Category</i>	<i>Code</i>	<i>Studies</i>
<i>In terms of the student</i>	Conducting studies to reveal the level of science literacy and adoption of scientific process skills	Eng1
	To take into account the individual differences between gifted and talented students such as interest, motivation, and ability	Tr9
	Increasing academic achievement by creating homogeneous or heterogeneous groups	Tr1

When the suggestions presented in the studies are analyzed numerically, it is seen that suggestions were included in 8 studies published in English and 11 studies in Turkish. When Table 7, which examines the suggestions presented in terms of students, is analyzed, it is seen that Turkish studies mostly suggested that an increase in academic achievement can be observed by forming homogeneous or heterogeneous groups among students (1 article) and that the differences of gifted and talented students should be respected under appropriate conditions (1 article), while English studies suggested that appropriate studies should be carried out to improve students' science literacy and scientific process skills (1 article). In addition, the suggestions presented to teachers and pre-service teachers are analyzed in Table 8.

Table 8.

Suggestions for Teachers and Pre-Service Teachers in the Studies Included in the Scope of the Research

<i>Category</i>	<i>Code</i>	<i>Studies</i>
<i>In terms of Teachers/Prospective Teachers</i>	Improving the individual competencies of teachers who have difficulty in communicating effectively with their students	Tr4
	Teachers can be informed about the approach through various seminars	Tr5
	Teachers can be enabled to exchange information with each other	Tr10
	The deficiencies in the incomplete knowledge of prospective teachers can be identified	Tr11
	Plan the education and training process by taking into account the individual differences of students	Eng2, Eng7, Tr5
	Teachers should follow the technological developments and develop themselves according to the requirements of the age	Eng5, Eng6, Tr6
	There should be a tendency towards technological developments in undergraduate programs where teacher candidates are trained	Tr3

When Table 8, which analyzes the suggestions presented in the studies in terms of teachers and pre-service teachers, is examined, it is seen that 4 suggestions are presented in English studies and 7 suggestions are presented in Turkish studies. While the suggestions presented in English were that

teachers should take into account the individual differences of students (2 articles) and improve themselves by following technological developments (2 articles), the Turkish studies also included the suggestions presented in the English studies, and in addition to these, suggestions such as teachers or pre-service teachers should be informed about the approach (1 article), missing information should be identified (1 article), and they should plan an education-teaching process in a way to interact with each other (1 article). In the studies based on the approach, suggestions in terms of the program are also examined in Table 9.

Table 9.

Suggestions Presented in terms of Curriculum in the Studies Included in the Scope of the Research

<i>Category</i>	<i>Code</i>	<i>Studies</i>
<i>In terms of the program</i>	Individual differences in teaching practices should be given more space in the curriculum	Tr3
	The use of various approaches within differentiated instructional practices should be encouraged	Tr2
	Modern education approaches should be based on modern education approaches instead of traditional education	Eng3
	Differentiated science teaching modules can be developed for the individual development of gifted students	Eng8, Tr7
	Courses on the approach should be diversified and the number of courses should be increased	Eng9
	It can be done by developing new designs at different grade levels and subject levels	Tr8

When Table 9, which examines the suggestions in terms of the program presented in the studies, is examined, it is observed that there are 3 suggestions in English studies and 4 suggestions in Turkish studies. In English studies, suggestions such as basing the approach on contemporary educational philosophy in order for it to be effective (1 article) and encouraging studies such as courses and seminars (1 article) were made, while in Turkish studies, suggestions such as individual differences should be given more space in the curriculum (1 article), the approach should be internalized in every aspect and its different dimensions should be encouraged to be used (1 article) and diversifications should be made on the basis of class and subject (1 article) were made. In addition to these, it was

suggested that teaching could be made more effective by developing various modules by taking into account the developmental characteristics of gifted students in Turkish and English studies. Among the suggestions made in the studies to make the approach more effective, those related to learning environments are analyzed in Table 10.

Table 10.

Suggestions Presented in terms of Learning Environments in the Studies Included in the Scope of the Research

<i>Category</i>	<i>Code</i>	<i>Studies</i>
<i>Learning environments</i>	School conditions should be improved for differentiated teaching practices to become widespread	Eng3, Tr6
	Class sizes should be reduced	Eng3, Tr6
	Material aid should be provided to schools	Eng3, Tr6

When Table 10, which analyzes the suggestions in terms of learning environments presented in the studies, it is seen that 3 suggestions were made in English studies and 4 suggestions were made in Turkish studies. It is seen that the suggestions have common features on the basis of languages and are mostly presented as improving school conditions (2 articles), reducing class sizes (2 articles), and improving materials in schools (2 articles).

Discussion and Conclusion

In this study, the articles in this field were examined in order to reveal the perspective of the differentiated instruction approach in the world and Türkiye between 2006-2023 and how this alternative learning approach was integrated into the education process. Within the framework of this purpose, the place of differentiated instruction approach in the world and in Türkiye is described based on qualifications, and the perspective on the approach is tried to be revealed with its positive and negative aspects. The findings were categorized and analyzed under nine headings: languages of the studies, years, purposes, research methods and designs used, study groups, data collection tools, analysis methods, conclusions reached, and recommendations.

When the Turkish and English studies selected in line with the targeted objectives were examined, it was seen that a total of 24 studies based on differentiated instruction approach were found in the preferred databases and 12 of these studies were published in Turkish and 12 in English.

In the research conducted by Karadağ et al. (2008), it was found that Türkiye started to adopt the constructivist approach in the first level of primary education in 2005-2006 and although the studies published on differentiated instruction, which entered our lives as output of this approach, are numerically equal, when examined on the basis of the years they were conducted, the oldest English study was published in 2006, while the oldest Turkish study was published in 2014, which leads us to conclude that the interest in differentiated instruction in the world started to develop before Türkiye. In addition, the increase in the number of studies published in English mostly in 2019 and 2023, and the increase in the number of Turkish studies mostly in 2014, 2015, and 2023 reveals that the recent interest in approach phenomena has been increasing. In this context, when the distributions according to years are analyzed comparatively, it supports the idea that Türkiye is conducting studies that can close the gap with recent studies, although it is one step ahead in terms of the adoption of the phenomena with the studies published in the world on the approach starting earlier than Türkiye.

In order for the studies to be capable of describing a problem situation, they are carried out under certain objectives and this is one of the main points where they differ from each other. The diversity of the objectives taken as a basis in the studies most accurately reveals the general tendency of the approach in the conditions in which they are published. In this context, it is seen that a total of 14 objectives were adopted in English studies and mostly aimed at revealing teachers' attitudes towards differentiated instruction and their level of implementation, while in Turkish studies, a total of 19 objectives were adopted and mostly focused on the effect on student's academic achievement, attitudes and motivation towards the course, similar to the studies conducted by Baumgartner, Lipowski, and Rush (2003) and Gilbert (2011). In addition to these aims, the studies focusing on providing opportunities for students to develop scientific process skills and aiming to reveal the differences in teachers' perspectives on the approach were addressed from common aspects in both Turkish and English studies. Thus, it is observed that the studies carried out in both languages in order to obtain similar outputs are in an effort to develop the approach for the future rather than characterizing the current state of the approach.

Planned research becomes meaningful when the process of creating the research design, collecting and interpreting information, and reaching the results complement each other (Yıldırım, 1999), and in this direction, certain research designs that allow the studies to proceed in a certain systematic manner are preferred. In this direction, when we examine the research designs preferred in the studies, it is seen that qualitative methods, which are the designs that can best reveal the effect of the approach by Civitillo et al. (2016), stand out in English studies. 14 In the English studies where

the research design was preferred, semi-structured interviews from qualitative methods were used as the majority. In Turkish studies, it is seen that quantitative methods, which are supported by Deunk et al. (2018) and aim to reveal statistical data, come to the fore. In the 12 Turkish studies, the research process was carried out using a quasi-experimental design, which is mostly quantitative methods. In addition to these designs, while it is observed that the quasi-experimental design from quantitative designs and the case study method from qualitative designs are preferred in English and Turkish studies, it is also concluded that some of the studies carried out are carried out within the scope of joint planning.

The method of obtaining qualified data in the process is to select the study groups that will provide the most accurate access to the target outcomes. When we look at the study groups in the published studies, it is observed that the English studies are mostly conducted with teachers who are the transmitters of the differentiated instruction approach, while the study groups preferred in Turkish studies consist of secondary school students, which is the main focus of the approach. In the research conducted by Karadağ et al. (2016), it is emphasized that the studies revealing the differentiated instruction approach are mostly at the 5th-grade level. Thus, it is concluded that the perspective on the differentiated instruction approach in the world is the idea that the approach can be shaped by teachers, whereas in Türkiye, the way the approach is adopted is the idea that students themselves will play an active role. In addition, the fact that the studies conducted with lecturers are only seen in studies published in English reveals the missing point in the Turkish literature. Another conclusion is that gifted students and the instructional materials used in the lessons are common in both English and Turkish studies, while differentiation features are observed to overlap in the studies published in both languages.

In the process of obtaining the most accurate data in line with the objectives of the studies, the preferred data collection tools are as important as the data collection group, and a total of 23 data collection tools were used in the English studies and 22 data collection tools were used in the Turkish studies. Although semi-structured interviews from qualitative models are a common data collection tool for studies published in both languages, classroom activities, student diaries, and observation forms are the most preferred tools in English studies. In Turkish studies, on the other hand, quantitative models were preferred and tools such as academic achievement tests and student agendas were used. The data obtained were analyzed using a total of 26 quantitative and qualitative analysis types, 13 in English and 13 in Turkish, within all the plans. In Turkish studies, the statistical analysis method is preferred more to the quantitative step, while in English studies, analysis methods such as

comparative analysis and document analysis are preferred. In addition to these, it is also concluded that document analysis and statistical analysis methods are also used in common in studies published in both languages and that they are similar to each other at this point. In the study conducted by Özkal (2020), it was emphasized that the content analysis analyses used in the study provided significant guidance in reaching the outcomes related to the differentiated instruction approach.

As a result of analyzing the imprint and content information of all the studies, it is observed that the studies were completed with different purposes and systematic processes in both languages and some results were reached. In the English studies, which mostly focus on teachers' perspectives and attitudes towards the approach, positive results such as the fact that teachers, who are the implementers of the process, can reach the outcomes of the differentiated instruction approach at the desired levels and make their lessons more qualified within the framework of these directions are mentioned. Kapusnick and Hauslein (2001, p. 159) emphasized that the approach should guide teachers. In terms of students, Anderson (2007, p. 52), it is concluded that the approach has an effect on increasing students' motivation towards the course and allows them to grow up as individuals who develop science literacy and scientific process skills, while in Turkish studies, which mostly aim to reveal the level of students' access to the outcomes of the approach, which is the main point of the approach, students can develop academic achievements at the desired level within the education-teaching process carried out on the basis of the differentiated instruction approach, It is concluded that their motivation towards the lesson increased, they were able to realize the misconceptions they had, and they were able to take a broad perspective in line with scientific and technological outputs. In addition, in Turkish studies, it is concluded that there may be some problems such as inadequate school facilities at the level of achieving the approach outcomes from the teacher's point of view, while in English studies, negative results such as the problems encountered are due to the teachers' competencies are also reached. In a similar and common way, both Turkish and English studies suggest that a more qualified education process will be carried out as a result of the integration of the approach outcomes into the existing program contents.

In light of all the findings obtained, in order to internalize the differentiated instruction approach in the best way, common suggestions were made in both languages, such as the need for teachers to plan education and training processes by taking into account the individual differences of students and to be open to renewing themselves in accordance with the developments of the age, and in terms of environments, learning environments should be organized so that individual differences can be realized in more authentic environments. In addition to these, in English studies, it was emphasized

that an individual-oriented education should be provided on the basis of the contemporary understanding of education, while in Turkish studies, it was emphasized that students should be provided with environments where they can express themselves by participating more in the education-training process.

When all the English and Turkish studies included in the scope of the research are analyzed, it is concluded that while English studies focus more on the contribution to the development of students' affective characteristics such as attitude, motivation, and interest, Turkish studies focus on cognitive characteristics such as academic achievement by taking into account the characteristics of students such as whether the approach helps them learn factual terms or not, and the view that the real difference in students may emerge in affective aspects is ignored. Thus, as stated in the study by Lawrence-Brown (2004), the differentiated instruction approach will be able to maximize achievement levels and abilities by updating curricula in line with student needs.

Recommendations

- The effectiveness of the approach can be questioned by selecting different samples including other groups such as parents and school administrators who play a role in the education and training process.
- Learning environments can be organized in accordance with the outcomes of a differentiated teaching approach.

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It has been reported by the authors that there is no conflict of interest.

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Ethical Standards

We have carried out the research within the framework of the Helsinki Declaration.

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