THE CONTENT ANALYSIS OF STUDIES ON INDIVIDUAL DIFFERENCES IN EDUCATION IN TURKEY FROM 2000 TO 2020

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Editor
Prof. Dr. Hulya GUR

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Prof. Dr. Hulya GUR

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PREFACE

This book provides a detailed and up-to-date overview of works in education, science and mathematics education. This book is informative for especially educators, reseachers, academics, postgraduate students, preservive teachers, teachers and school leaders own development. It gives suggestions to educators, reseachers, academics, postgraduate students, preservive teachers, teachers, school leaders and policy makers and so on...

The book presents educational articles on various aspects, all of them centred on the area of Area of Education and Pandemia. The book consists of eleven chapters and 173+-page work. Thus, first paper – “Opinions of the High School Students Regarding the Flipped Classroom Practice...”. The next work is “The Content Analysis of Studies on Individual Differences in Education In Turkey From 2000 to 2020”. After that, the paper entitled “Effectiveness of Remote Training with Covid-19 Pandemic Source”, Another study “Investigation Of Awareness of Parents in the Pandemic Process and the Perspectives Related to Science and Education In This Process”, and other namely: “Multiple Intelligence Theory and Effective Learning in Visual Arts Education”, “The Relationship Between the Views of The Preservice Mathematics Teachers on Proof and Their Multiple Intelligence...”, “The Significance of Science Centers in Science Education...”, “The Effect of Positivist And Post-Positivist Paradigms on The Change of Validity Conceptualization”, “A Psychological Perspective on Organizational Loneliness...” and “Studies on Cognitive Load Theory in Turkey: A Literature Survey”.

December, 2020

Prof. Dr. Hulya GUR
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CONTENTS

PREFACE......................................................................................................................I

REFEREES...................................................................................................................... V

Chapter I  M. Ramazanoğlu
OPINIONS OF THE HIGH SCHOOL STUDENTS REGARDING THE FLIPPED CLASSROOM PRACTICE.................................................................1

Chapter II  D. Demirbulak & S. Kambur & A. Ergin
THE CONTENT ANALYSIS OF STUDIES ON INDIVIDUAL DIFFERENCES IN EDUCATION IN TURKEY FROM 2000 TO 2020.................................................................21

Chapter III  Y. Çelen
EFFECTIVENESS OF REMOTE TRAINING WITH COVID-19 PANDEMIC SOURCE.................................................................41

Chapter IV  G. Gürkan
INVESTIGATION OF AWARENESS OF PARENTS IN THE PANDEMIC PROCESS AND THE PERSPECTIVES RELATED TO SCIENCE AND EDUCATION IN THIS PROCESS .................................................55

Chapter V  M. İnceagac
MULTIPLE INTELLIGENCE THEORY AND EFFECTIVE LEARNING IN VISUAL ARTS EDUCATION........71

Chapter VI  M. Doruk
THE RELATIONSHIP BETWEEN THE VIEWS OF THE PRE-SERVICE MATHEMATICS TEACHERS ON PROOF AND THEIR MULTIPLE INTELLIGENCE........79

Chapter VII  G. Gürsoy
THE SIGNIFICANCE OF SCIENCE CENTERS IN SCIENCE EDUCATION.................................................................95

Chapter VIII  S. Çüm & E. K. Demir
THE EFFECT OF POSITIVIST AND POST-POSITIVIST PARADIGMS ON THE CHANGE OF VALIDITY CONCEPTUALIZATION .................................................................119
Chapter IX  A. N. Dicle  
A PSYCHOLOGICAL PERSPECTIVE ON ORGANIZATIONAL LONELINESS…………………129

Chapter X  E. Ozdemir  
EXPECTATIONS AND FACTS FROM PROBLEM SOLVING IN MATHEMATICS: AN APPLICATION EXAMPLE……………………………………………145

Chapter XI  A. Yılmaz Virlan & D. Demirbulak  
STUDIES ON COGNITIVE LOAD THEORY IN TURKEY: A LITERATURE SURVEY……………………………………173

Chapter XII  R. Benlikaya  
NANOSCIENCE EDUCATION……………………………………191
REFEREES

Prof. Dr. Hakan Uşaklı, Sinop Üniversitesi University, Turkey
Prof. Dr. Hülya Gür, Balıkesir University, Turkey
Assoc. Prof. Dr. Derya Orhan Göksün, Adıyaman University, Turkey
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CHAPTER II

THE CONTENT ANALYSIS OF STUDIES ON INDIVIDUAL DIFFERENCES IN EDUCATION IN TURKEY FROM 2000 TO 2020

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1. INTRODUCTION

The wars and the pandemic that happened during the first part of the 20th century had various costly dimensions, one of which was the disruption of the educational process. The first step to recover was to stop the disruption and increase the quantity of education provided. The numerous scientific research findings were used to advance these studies and improve education quality as the second step. The assumption was that information and communication technology (ICT) would enhance the teaching and learning process quality and cease the teacher-oriented classrooms (Paul, 2002; Papert, 1987; Voogt & Pelgrum, 2005; Watson, 2001; Well-Strand, 1991). Therefore, there needed to be a synergy and coherence between education - learning and instructional theory, and science of computing disciplines. In other words, the improvements needed to be grounded in educational theories to identify the circumstances and the reasons for the employment of specific learning and teaching methods and educational technology and designed accordingly. Since education provides pedagogy and virtual didactics while computing science provides the platform for educational technology. Behaviorism, Cognitivism, and Constructivism were the major learning theories that were mostly used for sophisticated choice in learning, teaching, and educational technology in the 20th century. The primary concern in education was the organization and instruction presentation (Quey, C., Cheng, Y., Shibata, 2010). In 1954 Skinner started to experiment with "teaching machines" that made use of programmed learning. The aim was to computerize teaching to structure information,
test learners` knowledge, provide immediate feedback, and enable learners to have more control of their learning.

The teaching machine of the Behavioristic learning theory is described as the early version of computer-based learning. Computer-assisted instruction was used in Cognitive Learning theory to develop learners` creative thinking, problem-solving, and information analysis capabilities. Constructivism is described as "a theory of knowledge rotted in philosophy, psychology, and cybernetics." The main common feature of these learning theories was to fulfill the individual needs of the learners. Since the late 1990s, "21st-century skills" have been the catch-phrase in education to fill the needs and emphasize the uniqueness of learners (Quey et al., 2010). The assumption was that the rapid movement towards automation and an information-saturated world requires education to equip young generations with the necessary skills, abilities, and knowledge to thrive in an ever-changing world. Therefore, all the countries were redesigning their curricula per the 21st-century skills framework.

As the countries had just started implementing their curricula, life in the world changed dramatically as China informed the World Health Organization (WHO) of novel viral pneumonia on the last day of 2019 and the first death on January 11, 2020. Upon the alarming level of the COVID, 19 virus spread and severity (Wickramasinghe et al., 2020; Wong, 2020), WHO assessed it as a pandemic, and all educational institutions were closed just like it was done during the Spanish Flu. There was a sudden and unexpected transition to distance education all over the world. It was time to put these 21st-century skills to use. The studies have shown that none of the parties involved in education were fully equipped to cope with distance education (OECD, 2020). This could be due to the curriculum not being redesigned so that each learners` talents and individualities, as pointed out in the humanistic approach and digital humanism, are supported. It could be said that there was a transition, but the synergy and the coherence between education and digital technologies were not enough in terms of the measurable quality of education. Distance education requires learners to have network self-efficacy and self-directedness. Network self-efficacy is learners` perception of their readiness level to use the technology (Hung et al., 2010). Self-directedness is the realization of learners` responsibility to guide and direct their learning and take a more active role (Hartley & Bendixen, 2001; Hsu & Shiue, 2005). These can only be achieved if and when it is realized that education is made by individuals for the individuals and their differences matter and thus need to be supported (Palmer, 1997). The curricula need to support their differences and uniqueness. Our experience during the Covid has shown that the benchmarks and goals are needed, yet they should be
altered to fulfill learners' humanistic needs stemming from their differences.

Individuals differ psychologically, physically, and behaviorally and understanding the characteristics and reasons for these differences is studied by psychology. Educational psychology looks into the differences in learners in terms of intelligence, cognitive and affective development motivational level, self-regulation, self-concept, and their role in the learning process. These concepts form the description of education and learning today. Education is described as the individuals' activity of gaining knowledge, skills, habits, and attitudes. In other words, education is the process of bringing about the desired change in the behavior of an individual through his or her own lives in a planned and programmed way (Ertürk, 1972, p. 12; cited in Günay, 2015).

On the other hand, learning is described as the change in knowledge, attitude, and behavior resulting from an individual's own life (Saban, 2005). "Learning and individual" seem to be the primary keyword; however, the quality and extent of schooling or learning experiences that accommodate the individual needs can be quite tricky in this overpopulated world. It seems not easy to create a learning environment where learners' learning experiences are designed based on their characteristics. Especially with educational systems where a centralized curriculum is implemented, and transitions are based on standardized assessment. When that is the case, students are classified based on their intelligence and personal characteristics. The students are usually labeled as "hardworking, smart" or "lazy, slow-learner." The problem with such labels is that individual differences are masked by averaging or broad-classifications. However, individual differences are more-or-less, enduring psychological characteristics that distinguish individuals from each other and describe each person's individuality (Baumeister & Vohs, 2007).

The causes of individual differences are broadly described as heretical, environment, race and nationality, gender, age, motivation, behavior, attitudes (Cook, 2008; Cohen & Dörnyei, 2002). Among these causes, teachers can only control or impact motivation, behavior, and attitudes, in other words, on their executive functions (Dörnyei, 2001; Horwitz, 2001; Ehrman & Leaver, 2003; Anderson, 2005; Benson, 2007) since every individual has feelings of love, anger, fear and pleasure, and pain. An individual's stress management, empathy, awareness of others, and feelings are related to the concept of emotional intelligence. The executive functions, on the other hand, control and manage the implementation of targeted behavior; multiple cognitive processes such as focusing, planning, strategy development, emotion control, sustaining attention, cognitive flexibility, procrastination, time management, empathy, and decision making (Mesulam 2002; Stuss & Alexander, 2008;
cited in Ahçı, 2016), actively keeping the information in memory for processing and continuously update it with the new information obtained (Baddeley, 2000; Ahçı, 2016), and self-regulation (Barkley, 2011). The other two individual differences, which are naturally cognitive but open to external influences, are learning style and learning strategy. These two factors are often cited together in the literature. One of the reasons for this situation is that the students' strategies to overcome the problems they face during their learning processes must be in harmony with the learning styles (Cohen & Dörnyei, 2002; Dörnyei & Skehan, 2003; Oxford, 2001). Individual differences often explain differences in learning and performance among learners because the differences affect the learners' learning processes.

*Education* is the leading cause of individual differences and the main accommodator of the individualized curricula rather than one size fits all. Education can be as successful as it can be sensitive to differences between individuals. Focusing on similarities in education is economical, comfortable, yet focusing on differences is difficult and expensive. However, the richness of human nature diversity needs to be identified and accommodated (Kuzgun & Deryakulu, 2004, p.1, cited in Aktepe, 2005). The primary means to do so research since it addresses three broad questions: 1) developing an adequate descriptive taxonomy of how people differ; 2) applying differences in one situation to predict differences in other situations; and 3) testing theoretical explanations of the structure and dynamics of individual differences (Revelle, 2011). The answers to these broad questions will enable all parties involved in education to shift focus to the individual's nature and needs since the quality of education cannot be understood without examining what happens in the classroom.

To the best of the researchers, two studies reported data from the largest population. The first one was carried out by Schneider & Preckel (2017). They reviewed 38 meta-analysis studies that correlated 105 variables of achievement from 2 million students. The significant findings were a close relationship between achievement, social interaction in courses, and the stimulation of meaningful learning by clearly presenting information, relating it to the students and using conceptually demanding learning tasks. The study also reported that teachers with high-achieving students invest time and effort in designing their courses' microstructure, establishing clear learning goals, and employing feedback practices. It was also pointed out that high achieving students were characterized by high self-efficacy, high prior achievement and intelligence, conscientiousness, and the goal-directed use of learning strategies. The researchers also pointed out that there were limited controlled experiments and a lack of meta-analyses on recent educational innovations. The second study was carried out by Sackett, Lievens, Iddekinge, & Kuncel (2017). It reviewed
100 years of research on individual differences and their measurement. The study focused on three significant individual differences domains: (a) knowledge, skill, and ability, including both the cognitive and physical domains; (b) personality, including integrity, emotional intelligence, stable motivational attributes (e.g., achievement motivation, core self-evaluations), and creativity; and (c) vocational interests. The domain's evolution across the years and relationships between individual differences and variables such as job performance, job satisfaction, and career development were looked into. The researchers pointed out that trends in the literature include a growing focus on substantive issues rather than on the measurement of individual differences, a differentiation between constructs and measurement methods, and the use of innovative ways of assessing individual differences, such as simulations, other-reports, and implicit measures and hence needed to be further studied. In a study that aimed to develop and validate the inventory of child development and validation of the inventory of child individual differences via comparison of two Slavic countries, it was seen that culture-gender-age interaction had an impact on different patterns of personality development in boys and girls (Slobodskaya & Zupančič, 2010). Yeung (2018) reviewed the studies carried out in Hong Kong and found out that students' different psychological traits such as a natural liking for communicative learning activities, low confidence and anxiety, attitude, self-assessment, and gender were considered. It was also stated that these results shed light upon the quantitative (rate of learning) and qualitative (way of learning) individual differences and the dynamics of individual differences in different contexts.

This study is significant because it depicts the studies' inclination on individual differences in education in Turkey. Besides, the scarcity of content analysis studies about this field increases the relevance of this study. For example, it is seen that there was only a study that studied nation-wide individual differences in education via content analysis. The current study was conducted to contribute to this related literature. This study aims to carry out a content analysis of the studies on individual differences in education to determine the tendencies in this respect within this framework. The sub-research questions are as follows:

1) How did the studies' topics about individual differences in education in Turkey fluctuate over the 20 years?

2) How did the research and data collection methods in individual differences in education in Turkey fluctuate over the twenty years?

3) How did the data analysis methods in individual differences in education in Turkey fluctuate over the twenty years?
2. METHOD

2.1. Research Design

In this study, the content analysis method, one of the qualitative research methods, was used to analyze individual education differences. Qualitative research includes interviews, observation, personal experiences, life stories, historical documents, and visual texts (Swanson et al., 1999). Content analysis is a scientific approach that allows an objective and systematic examination of verbal, written, and other materials (Tavşancıl & Aslan, 2001; Büyüköztürk et al., 2018). Accordingly, content analysis refers to the systematic and impartial digitization of research data obtained with written or verbal expressions (Young and Schmid, 1968). At the core of this approach lies the categorization of what is written and spoken and counting how often they are (Hepkul, 2002); Thus, the existing data are summarized, standardized, and compared (Smith, 1991).

The primary purpose of content analysis is to reach the concepts and relationships that explain the collected data. The collected data should first be conceptualized and then arranged logically according to the emerging concepts, and the themes explaining the data should be identified (Yıldırım & Şimşek, 2006).

2.2. Sample

A purposive sampling method was used in sample selection. The purposive sampling method is a non-probability sampling method, and the researcher determines the sample according to the criteria determined by itself (Cohen, Manion & Morrison, 2000: 103). In this study, criterion sampling was chosen among purposive sampling methods. The researchers can create the criterion or criteria mentioned here, or a list of criteria can prepare beforehand (Yıldırım & Şimşek, 2006: 73).

2.3. Data Collection Process

Considering that sample selection is essential in ensuring validity and reliability, the documents were selected correctly and impartially, and they were provided with the needs of the subject area of the research. Wherever possible, the works of authors from different fields of expertise and cultures were examined. To determine the documents to be used in the study, the researcher determined the number of screening and selection criteria. After the criteria were determined, the researcher examined individual differences, learning, education, and content analysis resources. Theses and articles published in academic journals were used as documents. The articles were accessed using Istanbul Technical University Ratip Berker Library and Mustafa İnan Library database (http://www.itu.edu.tr), ProQuest database, and Social Sciences Citation
Dissertations and theses were written in Turkey's Higher Education Board / National Thesis Centre (https://tez.yok.gov.tr). The studies encountered were purposively chosen and saved on a Google Drive file so that researchers had proper access to the studies chosen. Within the study's scope, three doctoral dissertations, ten master theses, and 18 articles total of 31 pieces of research were gained from the databases. Each study was listed on a Microsoft Excel page and coded under the identified variables. For the study's validity and reliability, the researchers paid utmost importance to have consensus about finding variables, categories, and coding data correctly. After completing the data, the researchers examined the data to ensure that the data was coded appropriately. Also, two experts in the field of individual differences checked the codes, categories, and variables.

2.4 Data Analysis

As part of the data analysis, 11 variables were identified; (1) Publication type, (2) Language, (3) Publication years, (4) Research design, (5) Number of sources of data, (6) Data collection tools, (7) Sample, (8) Sample size, (9) Analysis type, (10) Area of study, and (11) Research findings. Each variable had some categories, and they can be seen in Table 1.

Table 1. Research variables and categories

<table>
<thead>
<tr>
<th>Themes</th>
<th>Categories</th>
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</thead>
<tbody>
<tr>
<td>Publication Type</td>
<td>• Master Thesis</td>
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<td>• Doctoral Dissertation</td>
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<td></td>
<td>• Article</td>
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<td>Language</td>
<td>• Turkish</td>
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<td>• English</td>
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<td>Research Design</td>
<td>• Quantitative Design</td>
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<td>• Qualitative Design</td>
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<td>• Mixed-Method Design</td>
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<td></td>
<td>• Quasi-Experimental</td>
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<td>Data Collection Tools</td>
<td>• Survey</td>
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<td></td>
<td>• Survey &amp; Academic achievement scores</td>
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<tr>
<td></td>
<td>• Semi-structured interview</td>
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<td></td>
<td>• Review</td>
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<tr>
<td>Number of Sources of Data</td>
<td>One Sources of Data</td>
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<td></td>
<td>• Two Sources of Data</td>
</tr>
<tr>
<td></td>
<td>• Three or More Sources of Data</td>
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</tbody>
</table>
Sample
- Student
- Teacher-Preservice Teacher
- EFL Learners

Sample Size
- 0-30
- 31-50
- 51-100
- 101-250
- 251-500

Analysis Type
- Descriptive
- Predictive
- Qualitative

Area of Study
- Individual Differences in EFL
- Individual Differences in Higher Education
- Modeling the influence of individual differences
- Individual differences from the preschool period to high school
- Individual differences in the learning process
- Individual differences reviews

Findings
- The negative relationship between individual differences and achievement and attitude in the learning process
- The positive relationship between achievement and attitude in individual differences in the learning process
- The positive effect of individual differences in teaching.
- The negative attitudes about individual differences in classrooms
- Teachers' anxiety to overlook individual differences in teaching.
- The importance of individual differences in curriculum evaluation and teaching process
- The determinative and positive effect of individual differences in EFL

As can be seen in Table 1, the subcategories of each variable were listed. The studies were examined, and the data were coded into the columns. After the coding and categorization were completed, the data were analyzed with Excel 2016 version, and clustered columns were used in the findings section to visualize the data.
3. FINDINGS

The findings of this study are presented under each of the sub-research questions.

3.1 How did the topics of the studies carried out about individual differences in education in Turkey fluctuate over the 20 years?

The final analysis framework consisted of the following research topic categories and subcategories:

1. **Prior knowledge** - readiness level of participants' to the learning processes and outcomes.

2. **Home background** - emotional support and stability, genetic and nurture components of intelligence, and the available educational and material resources.

3. **Motivation** - beliefs, attitudes, and behavioral change.


5. **Metacognition** – planning, visualization, perception (and awareness), and self-evaluation.

6. **Instruction** – instructional approaches, characteristics of the tasks and difficulty level, availability of resources and their quality

7. **Learning climate** - Interactive learning environment and learning community

8. **Educational system** - curriculum content and its perceived relevance to the pupil, ethos of the institution

According to the findings, master theses, doctoral dissertations, and articles were included in the study's scope. Of the 31 studies, 18(58, 2%) of them were an article, 10(32, 2%) of them were master theses, and 3(9,6%) of the doctoral dissertations.

Of the 31 studies, 23 (74 %) were Turkish, while 14 (26 %) were written in English.

The most frequently studied areas are individual differences in EFL and Individual differences in the learning process (n=8). Individual differences in higher education followed these studies (n= 6).

3.2 How did the research and data collection methods in individual differences in education in Turkey fluctuate over the twenty years?
In 31 studies that were investigated within the study's scope, there were four main research design models: Quantitative, qualitative, mixed research, and quasi-experimental design.

The most frequently used research designs were quantitative and qualitative research designs, with 13 studies for both. The mixed research design was used in three studies, and quasi-experimental research design was used in two studies.

The most frequently used data collection tool was the survey-academic achievement, which was used in 11 studies. The following data collection tool follows review research. Semi-structured interview and survey studies are listed with the latest seven studies.

The most frequently used sample type was students who continue their education at all levels (from preschool to university). In 18 of the studies, students were used as the sample. Then, EFL learners constituted seven samples of the studies. Lastly, teacher-preservice teachers were encountered in six studies.

The most frequently encountered sample size was 0-30. 11 of the studies were carried out with a sample size ranging between 0-30. There were six studies carried out with a sample size of 51-100 and 101-250. Four of the studies were carried out with 31-50 and 250-500 participants.

3.3 How did the data analysis methods in individual differences in education in Turkey fluctuate over the twenty years?

It is seen that the most studied analysis type was descriptive (n=15). Qualitative analysis (n=14) follows it. According to the investigated studies, only two predictive studies were conducted.

The research findings showed a positive relationship between individual differences and student achievement and attitudes (n = 10). A qualitative study conducted with students concluded that students have negative attitudes towards individual differences.

4. DISCUSSION, CONCLUSION, AND IMPLICATIONS

Individual differences such as age, culture, race, gender, attitude, motivation, self-regulation, personality traits, learning styles, learning pace, emotional intelligence, cognitive characteristics, and so on are determinants of learning. This study aimed to carry out a content analysis of the studies on individual differences in education and determine its tendencies. As a result of the examinations, research questions were identified based on 11 different variables: publication type, publication language, publication years, research design, number of data sources, data collection tools, sample, sample size, analysis type, area of study, and research findings. The findings were obtained by making a data analysis of
these variables. According to the findings of the study of the 31 studies, 18 of them were an article, 10 of them were master theses, and three of them doctoral dissertations. According to the findings, it is seen that doctoral studies on individual differences in education are limited. More studies of doctoral studies are necessary for us to see the quality of learning and student differences. According to the study's findings, of the 31 studies, 23 were Turkish, while 14 were written in English. According to the findings of the study, in 31 studies conducted on individual differences, it was found that there were five publications in 2019. The increase in the studies on individual differences in recent years is remarkable in understanding the subject's importance. According to the findings of the study, the most frequently used research designs were quantitative and qualitative. In the current research, the number of qualitative and quantitative researches showed an equal distribution in individual differences in education-13 studies for both. However, Ilgaz (2018)” A Systematic Review of Online Learning Researches in the Context of Individual Differences” concluded that quantitative studies were examined more.

According to the findings of the research, it is seen that one data source is used, with 13 studies at most in the data source theme used. However, it may be more beneficial to study individual differences with more resources to investigate student differences. According to the study's findings, the most frequently used data collection tool was the survey-academic achievement used in 11 studies. According to the study's findings, the most frequently used sample type was students who continue their education at all levels (from preschool to university). In 18 of the studies, students were used as the sample. Studying individual differences at all levels of education may be related to the capacity to affect learning directly. Therefore, it is crucial to continue and increase studies on the subject.

According to the findings of the study, it can be seen that the most frequently encountered sample size was 0-30. Since the studies were examined, it was revealed that the sample size was no more than 500 participants; it could be said that studies with a higher group of participants are needed. According to the findings of the study, It is seen that the most studied analysis type is descriptive (n=15). According to the study's findings, the most frequently studied areas are EFL and the learning process, with a total number of eight studies. Student differences directly affect learning and student achievement both in the learning process and in foreign language teaching. According to the study's findings, the research findings showed a positive relationship between individual differences and student achievement and attitudes. Individual differences positively affect student achievement and attitude.
5. LIMITATIONS AND RECOMMENDATIONS

The studies examined in this research, doctoral theses, master theses, and the main subject of education and individual differences are limited to the sources and data reviews. In this sense, more comprehensive and detailed content analysis can be made for individual differences. In this sense, broader and more detailed content analysis could be made regarding individual differences. In the studies reviewed, the suggestions variable was not included in the current study since it was not available in every study and was not generalizable. It was revealed that the effects of individual differences in students' attitudes and achievements in the learning process have a positive meaning. This finding is important data for us to see the importance of the subject. Therefore, quantitative, qualitative, and mixed studies and quasi-experimental studies could be done in this field. The findings examined from the research results show that individuals have significant individual differences in learning characteristics. Traditional methods do not provide equal benefits for all individuals. Individual differences, quantity and quality problems in learning, the structure of teaching materials, the impossibility of having a mental knowledge level, and similar reasons require education according to the individual and his/her needs.

While designing the curriculum, it is necessary to arrange it according to the students' interests and needs, considering individual differences in each of the objectives, content, learning-teaching processes, and assessment elements. Embedded systems, coding education, and robotic applications should be included in the curricula, especially during the pandemic when distance education is discussed. Providing coding training at all educational levels can support the increase in individual training and individual productivity. Individualized and computer-aided software applications and curriculum designs should be made. In this context, it is necessary to develop digital literacy that will support individuals' self-regulation skills. It is a need to meet students' computer and tablet needs and strengthen internet connections in both school and family life. In-service or distance learning teleconferences should be organized to improve teachers' and students' knowledge, technology, and digital literacy.
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34


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<table>
<thead>
<tr>
<th>Master Theses Doctoral Dissertations and Articles Examined within the Content Analysis</th>
<th>Publication Date</th>
</tr>
</thead>
</table>


Gürkana, Burcu; Doğanay, Ahmet. (2019). Primary School Teachers and Teacher Candidates' Perceptions of Efficiency in Designing and Implementing Teaching Based on Individual Differences Çukurova University. Faculty of Education Journal; Adana Vol. 48, Iss. 1, (Apr 2019): 131-175. DOI:10.14812/cufej.395128 2019


