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Examination of scales developed/adapted on distance education

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Abstract

Distance education is an educational practice concept that has been in the literature since the 1700s, when the idea of education being accessible was adopted. It has come to life in applications in different forms, from the years when education was seen as a mere transfer of knowledge, to the years when technological developments accelerated, and transnational classes could be formed. Due to the mandatory pandemic conditions experienced in 2020 and whose effects were observed at the global level, discussions, and studies on distance education in the field of educational sciences gained momentum and became one of the important concepts. This situation has also guided the scale development studies on distance education, and it is aimed to measure the concept of distance education by associating it with many factors such as attitude, satisfaction, and perception. However, in the literature review, no content analysis was found regarding the scales developed/adapted for distance education. The aim of this study; The aim of this study is to examine the distance education scales developed in Turkish and adapted to Turkish for higher education students. In this context, scale development and adaptation studies related to the concept of distance education in Turkish with higher education students in the study group were scanned through Google Scholar, TOAD and ResearchGate databases, and the scales developed/adapted were examined in terms of sub-dimensions, distribution by years, scale types, number of items and scale types analyzed. The research is a qualitative study in which document analysis method is used. In the research, 22 scale development/adaptation studies were examined by scanning model method. According to the results, it was seen that the scale development/adaptation studies were carried out mostly in 2021 (6), the development studies (17) were dominant, the number of items in the scales was in the range of 21-30 items (8), and it was developed in a 5-point Likert type (20). It has been shown that / is adapted.

1. Introduction

To realize the desired behavior, change process in individuals, which is the main goal of education, it is tried to proceed in quite different ways in line with the conditions of time and opportunities. With the increasing need for education in every field in the 21st century, face-to-face education is insufficient. In addition to face-to-face education, alternative approaches, such as distance and technology-assisted online teaching, have been put into practice in the teaching process. To facilitate access to education and enable more individuals to receive education, education has become widespread in the online environment with

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the development of distance and, of course, technology. With the widespread use of distance education, the number of studies conducted to increase the effectiveness of education has also increased.

Education has a crucial role in shaping an individual's lifestyle and its effects can be observed in different processes. As the learner can transform the educational gains into behavior in a short time, they can also transform what they have learned directly or indirectly into behavior in the distant future. Education should always be accessible and sustainable as it is an indispensable power element in the progress of societies as well as providing the individual's personal development and increasing life well-being. Distance education applications were carried out using communication resources to increase individuals' access to education and their sustainability. Sustainability of education is valuable in terms of maintaining the vitality of all factors in the learning environment of the individual (Hamutoğlu et al., 2022). Exceeding the limits of communication ways with technological effects has also removed the borders in the realization of education. Distance education, which started with books and letters, has evolved into online education with the discovery of the internet and the widespread use of computers. The final point of distance education is called the third generation and interactive online environments are accepted as a social process (Taşpınar & Tuncer, 2007). This educational transformation, experienced in the light of developments in information and communication technologies, has carried the individual beyond the geography in which he lives in the online environment and opens to a different world.

Distance education applications have been an effective solution key to meeting the demand for education. Distance education (Özbay, 2015), whose emergence as a concept dated back to the 1700s and started with letter teaching applications, had come to life in applications in different ways, from the years when education was seen as pure knowledge transfer between four walls to the years when technological developments accelerated, and transnational classes could be created. Given the development of distance education applications in Turkey; the idea of a traveling library in John Dewey's report between 1923 and 1960, the discussion of non-formal education in the councils, and the Instructional Film Center established in 1951 indirectly brought the education to the agenda not to have a homogeneous environment.) was opened and the works gained a concrete identity (İşman, 2022). With the developments experienced, it was not until the 1990s that distance education (Özer, 1989), which started to be implemented at the higher education level with the Open Education Faculty established at Anadolu University in 1980, appealed to a wide student population. With the developments in information and processing technologies in the 2000s, distance education applications have become prominent applications in education (Bozkurt, 2017).

Since there are problems in the delivery of education to every individual, it can be said that years of work on distance education, which was put into practice as a formula, laid the groundwork for the transition to distance education during COVID-19 in 2020. The acceleration of research and studies on distance education applications in the world has increased to a remarkable level due to the mandatory pandemic conditions experienced in 2020 and the effects of which are observed at the global level. To control the epidemic, the countries of the world have taken emergency measures on issues related to social life, such as health, transportation, and education. They have switched to distance education applications depending on their infrastructure, the measures they can take and the degree of service they can offer to continue education (Sözen, 2020).

In line with the developments in the world, the necessary skills for an individual to be active in life have also changed. In this transition period, the skills that a student should have also changed. While physical skills were at the forefront in hunter-gatherer societies, cognitive skills gained more importance with the production of machines. These cognitive skills, which should be possessed by individuals who adapt to the changing world, are gained through education. These are 21st-century skills, such as critical and creative thinking, collaboration, and communication skills (P21, 2015), analysis and interpretation skills brought by education 4.0 (Gürsev, 2022), keeping up with technology and digital fluency skills (Tatlı & Karoğlu, 2020).

The idea that education cannot be separated from technology in a rapidly changing world has given birth to the technopedagogical approach. Technopedagogy refers to synthezing information on technology use with pedagogical knowledge (Doğan & Doğan, 2022). Given that one of the goals of education is to provide students with life skills, it is an important issue how to integrate technological skills, which are the skills of the 21st-century and the future, into education. Aydemir et al. (2020) stated that the technopedagogical approach has become widespread to increase efficiency in education, as it is convenient to increase students' academic success and life skills. It should be emphasized that integrating technology into the learning process improves the ability to use technology (Asad, Aftab, Sherwani, Churi, Moreno-Guerrero, & Pourshahian, 2021). The benefits of technopedagogical teaching are used in online education and in flipped education processes (Pozo-Sánchez, López-Belmonte, Fuentes-Cabrera & López-Núñez, 2021).

Distance education, at the center of the mutual interaction between education, technology, and science, is making a name for itself more and more every day with its benefits, conveniences and successful results (Kırık, 2016). The use of interactive materials, such as animation, video, and simulation in lessons (Kör et al., 2013) and the convenience it provides in accessing resources (Özyürek et al., 2016), can be given as examples of successful results of distance education. Therefore, it can be said that distance education contributes to academic success with its features, such as providing a variety of stimuli and saving time.

Since education is a dynamic and innovative process, it is inevitable that there will be updates (Yavuz, 2018). This update has shown itself with the transition from traditional education, which requires the cooperation of face-to-face and physical environment, to distance education, where people with a difference of kilometers and hours can come together in virtual environments. Distance education is the embodiment of the updated education world with its synchronous or asynchronous delivery (Bağrıacık Yılmaz & Karataş, 2020), its ability to create a multicultural environment by bringing together people from different environments (Karademir, 2021) and its rich perspective. According to Tatlı and Karoğlu (2020), change and transformation also update the skills that learners should have, and learners are expected to be innovative, productive, and creative with their differing learning needs and the way they use information. At this point, individuals are lifelong learners. Distance education applications are also the biggest helpers for individuals in their lifelong learning path. Because the individual who is in working life can have the chance to receive education in the subjects, he wants to have education, in the place that is suitable for him according to the time he will determine. To Karaca et al. (2021), distance education emerges as an alternative practice chosen to ensure the continuity of education and training activities, as well as to increase the quality of education because of technological developments. The rich learning environments it offers, the individualization of education according to interests and abilities (Karaca et al., 2021), and the opportunity to reach education from home for students who have difficulty in reaching school due to their disability (Çivril et al., 2018) are other benefits of distance education that can be emphasized.

With the advent of the 21st century, developments in communication technologies and the dominance of student-centered education have supported the emergence of innovations in the application of distance education. The practice of distance education, which offers lifelong learning to the individual, is constantly updated, and brought into line with the times. The closest example of this is the continuation of distance education with some online platforms because of the COVID-19 in 2020. The use and continuous updating of distance education applications, contents, and materials, which can be preferred in every field and level, shows that distance education is the future (Kışla, 2016). An interactive environment in education is provided by student participation, and the student's activeness throughout the process is an important factor that increases the success of teaching. Student activity in distance education applications is possible with technological opportunities (Ahshan, 2021). Enabling classroom communication in simultaneous distance education applications increases the effectiveness of education (Aykış, 2021). Beyond the freedom of time, place and speed, providing a multicultural environment and enriching the learning communities culturally is another benefit that can be mentioned. This benefit offers learners the opportunity to meet with various instructors and a culturally rich learning environment (Dron, 2021). Easy access to different instructors has

given a new meaning to the aims of education and brought a new breath to the expectations of individuals from education. Distance education has become a preferred practice with these opportunities (Parlak, 2007).

For distance learning, in addition to the conveniences, such as the use of technology, the variety of stimuli, and the opportunity to access unlimited information in a short time, as well as creating an inequality of opportunity for the students who cannot reach them (Bozkurt, 2020), there can be problems. For example, the inadequacy of the experience of the instructors in using technology and educational applications (Telli & Altun, 2020), the students may feel alone. It creates disadvantages in subjects, such as feeling and socializing (Bozkurt, 2020), not being able to benefit from the lessons that require practice, connection problems, not being able to access the necessary materials for every student (Avcı, 2020), neck pain and stiffness due to excessive computer use, and fatigue in the eyes (Tuncer, 2007). Given these factors, it is seen that there are issues that need to be investigated and improved in terms of eliminating or minimizing the disadvantages as well as the benefits. This situation reveals the necessity of conducting extensive research to improve and develop distance education applications. Studies on concepts, such as perception, attitude, motivation, satisfaction, and competence towards distance education in terms of students and teachers, can be conducted with methods, such as observation and interview, as well as with scales that provide standardized and consistent information. Scientific data obtained from the scales are used to guide society. From this point of view, scales are preferred in obtaining scientific data. It is essential to be error-free in obtaining scientific data. Thus, it is very important to develop measurement tools used in scientific studies and measure the feature used to measure it without other concepts. Scale as a scientific tool; it forms the basis of scientific activities with the support it offers in understanding concepts, situations, and people.

The scale, which is one of the tools used by the measurement process to present the findings of scientific studies in a valid and reliable way, is used to provide valid and reliable data, although it provides an indirect measurement in social sciences. The word scale is used in Turkish in several senses, such as "unit," "measurement tool" and "measurement level" (Erkuş, 2019). The scale is the name given to the structured tool that serves to show the measurement process with numbers and symbols (Turgut & Baykul, 2019), and it serves the purpose of being able to evaluate, reach a decision or make sense of the measured concept.

This study aims to draw attention to that the same concept is measured with different measurement tools. This is also the case in studies conducted with different concepts in the literature. For example, in the literature, there are different scales that measure learning styles (Aşkar & Akkoyunlu, 1993; Cesur & Fer, 2009; Ekici, 2002; Gökdağ, 2004; Gülbahar & Alper, 2014) and lifelong learning tendency (Aykış, 2021; Diker Çoşkun, 2009; Gür Erdoğan & Arsal, 2016; Şahin et al., 2010). Likewise, it is seen that many different scales have been developed or adapted in studies on distance education. In this study, it is desired to draw attention to that the measurement tool used may lead to different interpretations of the findings.

Given that collecting data from the field for improvement and development studies are the basis of research, it can be deduced that the development of scales, which is one of the data collection tools, is a basic need for the literature. Espacially the need for measurement and evaluation processes increases in order to understand the change in human life and to produce problem-solving policies during the periods of events that have a global impact (Bingöl et al., 2022). Due to this need, researchers resort to ways, such as looking at the relationship and change of a concept they are trying to measure with different concepts, diversifying the sample group, and using different types of measurement to address the reality of social life. This reality reveals the necessity of developing more than one scale for a concept. This study was conducted to consider the necessity of presenting the developed/adapted scales to the literature by analyzing as well as the scale development/adaptation studies.

2. Purpose

It is striking that the distance education method has been preferred since the 1700s, but because of the developments and the global epidemic, it is a subject that researchers have begun to work on more. In this

study, we aimed to examine the scales developed/adapted for distance education. To our knowledge, there is no content analysis study on the scales related to distance education in Turkey in the literature. For this purpose, answers to the following questions were sought:

Scales developed/adapted for distance education,

1. What are their names and sub-dimensions?
2. How is the distribution according to years?
3. What is the scale type (development/adaptation) distribution?
4. What is the distribution of the number of items?
5. What is the scale type distribution?

3. Methodology

3.1. Research Model/Design

Qualitative research uses the preferred methods of observation, interview, and document review to deepen the research in social sciences and reveal the context. This research was conducted using the content analysis method in the screening model. Survey studies aim to collect data to determine certain characteristics of a group. Content analysis technique, which is frequently used in social sciences, includes a text and interview, is used to summarize, and categorize systematically (Büyüköztürk et al., 2020). This research was designed through document review method, Google Academic, TOAD and ResearchGate databases were used, and online access was provided to related publications using Turcademy. The document analysis method is an effort to systematically obtain data by carefully examining various written documents that are the source of this research. The findings that emerged because of this effort are examined and evaluated and made meaningful (Ekiz, 2020; Kıral, 2020).

3.2. Data Collecting Tools

According to Özkan (2021), the document analysis method is also used as a data collection tool. Data collection tools are used to collect data. The data in this study were collected using the internet. Databases that provide access to academic scales used in this study were used as a tool. TOAD and Google Scholar websites were used as data collection tools, as it is a way of providing access to the scales aimed to be achieved in the present study.

3.3. Sampling or Study Group

The universe of this study consisted of TOAD (Turkey Assessment Tools Index) and “distance education” scales in the Google Scholar database. In the literature review, the keywords "distance education," "university distance education scale," "higher education distance education scale," "distance education" and "distance education scale" were scanned. Some of the scales reached were not included in the present study because they did not serve the purpose of the researcher. This research was limited to the scales whose study group consisted of higher education students. According to Kafes and Yıldırım (2021), distance education, where the teacher and the learner are in different places and where education is offered to students through printed or electronic communication methods, has entered a period of important experience with the pandemic conditions. Distance education at the higher education level has a meaning beyond creating an alternative.

Since higher education is an education level that is not limited by age group and therefore will be demanded by individuals with different conditions (such as an individual who must take care of his baby or an individual who goes to work but wants to continue his education), there is a high need for conducting education and training activities with distance education. It can be said that it is gradual.

3.4. Data Analysis

No statistical program was used in the data analysis of this study, and the data were analyzed by the researchers. In line with the sub-objectives determined within the scope of this research, the characteristics

of the examined documents aimed to be used in this research were tabulated using the content analysis method. In this study, some features (sub-dimensions, year of development/adaptation, scale type, the number of items and scale type) of scales developed/adapted for higher education students on distance education were determined and compared.

3.5. Validity and Reliability

Since the data obtained in the document review method are objective, free from the intervention of the researcher and do not contain comments (Kıral, 2020), it can be concluded that a different procedure is not required for validity and reliability. In document review, many types of documents can be the sample of the present study. Since the scales in the status of scientific publications with proven validity and reliability were analyzed in this study, there is no question of mixing subjective opinions with the findings. The fact that the subjective opinion is not mixed with the findings is proof of the validity and reliability of the research. It is thought that presenting the data in documents with validity and reliability supports the validity and reliability of the findings of the study. Another feature of the document review method that supports the validity and reliability of the research is the accuracy of the collected data (Özkan, 2021). To ensure the validity and reliability of the research and prevent any mistakes in the data, the findings and tabulation stage were checked separately and together by the researchers.

3.6. Findings and Discussions

1. What are the names and sub-dimensions of the scales?
Scales were developed/adapted for distance education. Their names and sub-dimensions were examined and presented below in tables.

Table.1. Name and sub-dimensions of scales developed/adapted for distance education

Scale Names	Sub-Dimensions
Attitude Scale Towards Distance Education	Advantages of distance education for the participant, technical dimension of distance education, Desire for distance education, Teaching effectiveness of distance education, Problems encountered in distance education
Community Sense Scale in an Online Distance Education Environment	Affective, Actionable
Student Satisfaction Scale in Internet-based Distance Education	Student-student interaction, Student-teacher interaction, Course structure, Institutional support, Flexibility
University Students' Distance Education Satisfaction Scale	Interaction, Availability
Attitude Scale Towards Distance Education	
Attitude Scale towards Distance Education Offered during the COVID-19 Epidemic Period	Satisfaction with the opportunities offered by the university in distance education, Attitude toward faculty members in distance education, Attitude towards online exams, Communication and access in distance education, Comparison of distance education and face-to-face education
Online Learning Attitude Scale	General Acceptance, Self-awareness, Usefulness (Time-Labor Cost), Implementation Effectiveness (Active participation)
Opinions of Distance Education Students on Distance Education	Personal Suitability, Effectiveness, Instructional, Aptitude
Distance Education Students' Satisfaction Perception Questionnaire	Personal suitability, Effectiveness, Learning, Program evaluation, Technology, Material, Evaluation, Support services
Distance Education Service Quality (UE-SERVQUAL) Scale	E-learning environment, Trust, Accessibility, Responsiveness
Evaluation Scale of the Distance Education Process	Accessibility, Usability, Attitude, Technological possibilities, Self-efficacy
General Attitude Scale towards e-learning	E-learning aptitude, E-learning escape
Student Barriers Scale in Online Learning	Administrator/teacher issues, social interactions, Academic skills, technical skills, Student motivation, Time and support for studies, Internet access and prices, technical problems
Readiness Self-Assessment Scale for e-Learning	Importance of success, Online relationships, technical skills, Technology access, Motivation, Online skills

Attitude Scale Regarding the Use of Distance Education Environments during the Pandemic Process	Competence and motivation, Usability, Effectiveness, Satisfaction
Readiness Scale for Online Learning	Computer/Internet self-efficacy, Self-directed learning, Student control, Motivation for learning, Online communication self-efficacy
Distance Education Perception Scale in COVID-19 Pandemic and Pandemic Process	Thoughts on Coronavirus, Behavior of school management against Corona epidemic, Effect of Corona epidemic on studying, thought about UZEP after distance education experience, how to use distance education, Problems in distance education
Developing a Distance Education Self-Efficacy Belief Scale: A Validity and Reliability Study	Distance education application skills, Field knowledge in distance education applications, Interaction in distance education
Examining University Students' Attitudes towards Using Web-conferencing Systems in Distance Learning Courses	User expectations, User preferences, User attitudes, User problems
Developing an Attitude Scale toward Distance Learning	Usability, Communication, Distance learning preference, Face-to-face learning preference
Measuring the e-learning Autonomy of Distance Education Students	
Distance Education Perception Scale for Medical Students	Student perception, Equipment facility, Time management, Facility and support

When Table 1 is examined, it is seen that 22 scales for distance education have been developed or adapted. It is seen that the scales with the highest number of sub-dimensions (8) are Distance Education Students' Satisfaction Perception Scale and Student Barriers in Online Learning Scale. The scales with the least number of sub-dimensions (1) are the Attitudes towards Distance Education Scale and the e-learning Autonomy of Distance Scale with one dimension. Although the names of the sub-dimensions have some common points, they vary depending on the concept associated with distance education.

2. What is the distribution of scales developed/adapted for distance education by years?
The distribution of scales developed/adapted for distance education by years is presented below in Figure 1.

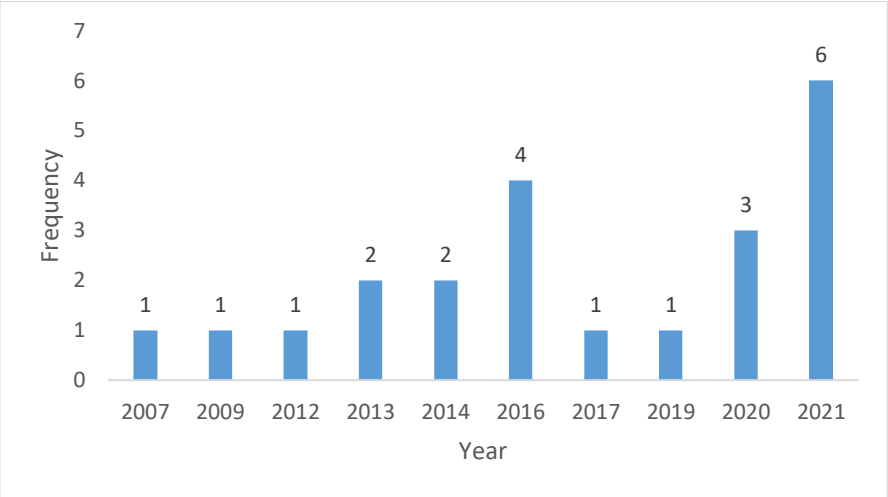

Fig. 1. Scale development/adaptation study by years

Looking at Figure 1, it is seen that the scales developed/adapted for distance education are between 2007 and 2021. While six scales were developed in 2021, four scales in 2016 and three scales in 2020 were developed or adapted.

3. What is the scale type (development/adaptation) distribution of the scales developed/adapted for distance education?
The development/adaptation status of the scales developed/adapted for distance education is presented in Figure 2.

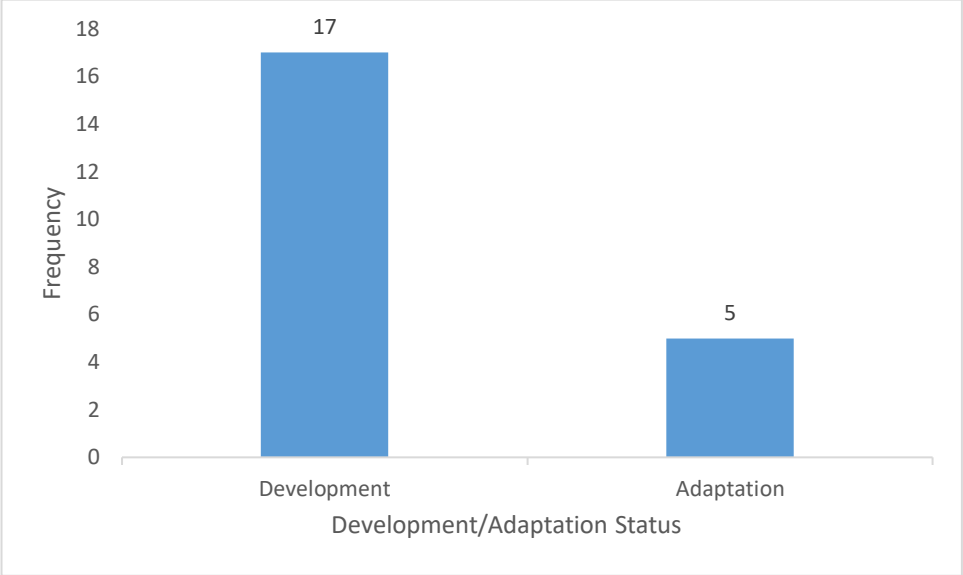

Fig.2. Distribution of scale type

When Figure 2 is examined, it is seen that 17 scales related to distance education are development and five scales are adaptations.

4. What is the distribution of the number of items?
The item number distribution of the scales developed/adapted for distance education is presented in Figure 3.

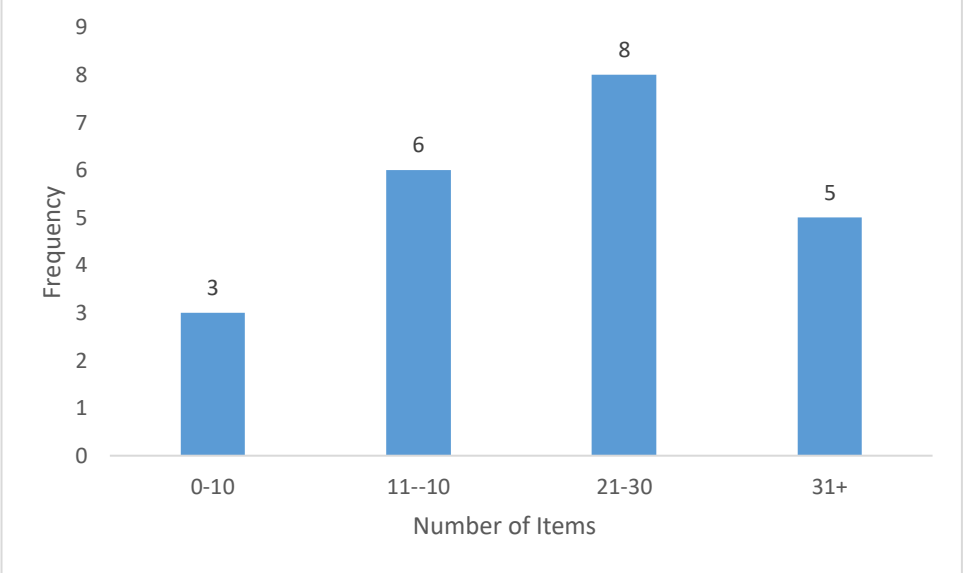

Fig.3. Item number distribution of the scales
When Figure 3 is examined, it is seen that the number of scales with 0-10 items has the lowest frequency among the developed scales (3); it is seen that the scale frequency (8), which has 21-30 questions, is the highest.

5. What is the scale type distribution?
The scale type distributions of the scales developed/adapted for distance education are presented in Figure 4.

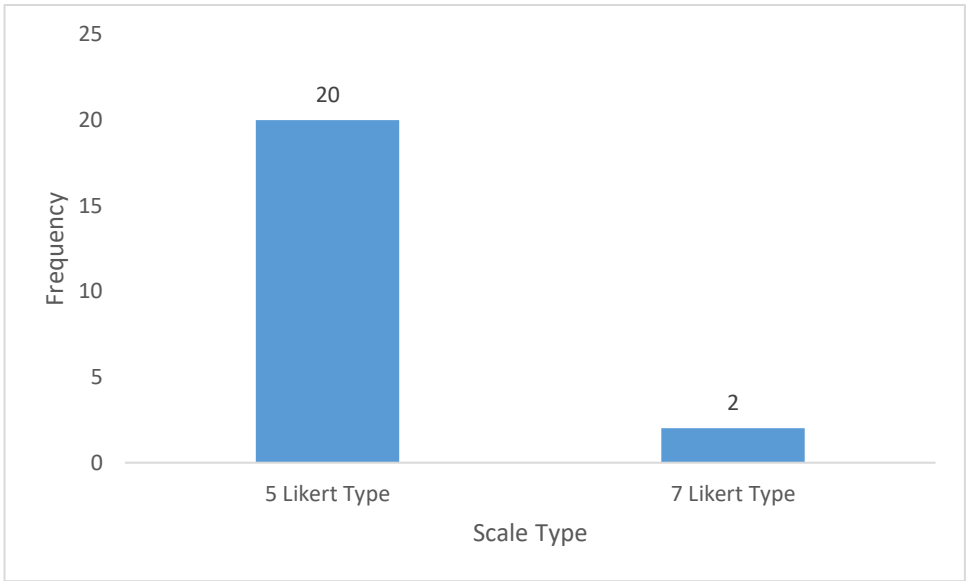

Fig.4. Species distribution of scales

Looking at Figure 4, the 20 scales developed/adapted for distance education are in a 5-point Likert structure; it is seen that two scales are in a 7-point Likert structure.

4. Conclusion and Suggestions

Twenty-two scales developed/adapted in Turkish in the field of distance education were accessed through Google Scholar and TOAD databases and sub-dimensions, distribution by years, scale types (development-adaptation), number of items and scale types (5-point Likert-7-point scale), content analysis method. This study is limited to the development of the scales in Turkish and their adaptation to Turkish, the study group being higher education students, and the scales available to the researcher.

When the sub-dimension frequency values of 22 scales included in this study are examined, it is seen that only two scales have one dimension, and the other 20 scales have two or more dimensions. From this point of view, it can be said that the distance education scales examined are mostly multidimensional. It can be thought that this multidimensionality is because the concept of distance education covers many concepts, such as learning environment, student, teacher, technical dimension. When the sub-dimensions of distance education scales are examined, it is seen that there are sub-dimensions that aim to measure different characteristics, such as thoughts about the problems and expectations encountered in the process, although they are generally aimed to measure emotions and skills about distance education and related issues.

Considering the concepts associated with the scales with distance education, eight attitude scales, two satisfaction scales, two perception scales, one opinion scale, one service quality scale, one evaluation scale, one barriers scale, one self-assessment scale, one readiness, one e-learning autonomy, it is seen that a total of 22 scales, including one sense of community scale, one satisfaction scale and one self-efficacy belief scale, measure 13 different qualities. When the examined scales are evaluated regarding the measured qualities related to distance education, it is seen that most of the scales are aimed to develop an attitude scale, and the measurements of other qualities are two or less. Supporting the finding in this study that the most attitude scales towards distance education were developed, Hair, Jr. et al. (2019) stated that attitude measurement is the most prominent subject in social sciences and related fields. Attitude measures the feelings, thoughts and values attributed by individuals to an event, object, person, belief, or view, measuring

attitudes is a valuable data source in many sectors that require understanding the individual, such as marketing, education, and communication sector.

Being able to measure the characteristics of people first requires recognizing the features to be measured. These features can be classified as cognitive, affective, and psychomotor (Erkuş, 2019). Based on this classification, it can be said that the scales within the scope of this research mainly result from the attitude measurement aiming to measure the affective domain. Given that the attitude scale determined in this study is the most developed scale related to distance education, it is stated by Erkuş (2019) that the concepts measured by affective characteristics are emotional, such as liking, anxiety, hatred, and include the characteristics of the individual, such as personality, interest, and attitude. As a result, it can be concluded that it is suitable for measuring the effective field.

When we looked at the development years of the scales, it was seen that the studies were relatively few until 2012, but the studies gained momentum after 2012 and there was a large increase in the studies conducted by 2020. With the onset of the COVID-10 in 2020, the interruption of face-to-face education brought the necessity of distance education. The biggest savior of education, which should continue in the uncertainty brought by the pandemic, has been distance education. Distance education, which ensures the continuity and accessibility of education, is a method in which the distance increases physically, but in a way, the boundaries disappear. The increase in scale development/adaptation studies in 2020 and beyond can be explained by the effects of the COVID-19, as well as by technological developments and the aim of catching up with the pace of education in the world countries. According to Parlak (2007), students have become able to benefit from the opportunities of distance education regardless of time, place, and distance with the increase in access to technology and opportunities. Gök (2011) stated that accessing and transferring information has accelerated since technology has eliminated the concept of distance, which has played a role in eliminating inequality. Therefore, it is possible to say that technological developments have a direct effect on education. In order to avoid problems related to the digital divide in education, it is important to focus on research on distance education (Sezgin & Fırat, 2020).

The concept of education is shaped according to the conditions of the time. According to Google Trends 2020 data, the first most searched concept in Turkey is “EBA” and the 5th concept is “Zoom;” The 2nd concept searched under the how the title was “how to set up a Zoom program,” and the 4th concept was “how does distance education work” (Google Trends, accessed 26.04.2022). This situation gives an idea of how much the concept of distance education came to the fore in 2020.

The fact that five of the examined scales are adaptation studies and 17 are development studies shows a tendency to develop a distance education scale. It can be said that each country's education policy, distance education infrastructure, the transition process to distance education, its speed and form are different, which causes development studies to be emphasized. At the same time, it can be considered that the expert opinion and adaptation studies conducted to adapt the scale adaptation studies to the culture and language of the adapted country require as much effort as the scale development process. It is thought that developing the scale in the mother tongue will provide an advantage in terms of collecting accurate data to prevent the semantic shifts that may occur in language differences. Erkuş (2019) said that adaptation is the process of making a valid and reliable scale developed for a certain language and culture suitable for different cultures. These processes and processes may vary depending on the purpose of the scale and the assumption of invariance of the measured feature. This process is deeper than a translation and structural equivalence alone. According to Orçan (2018), the translation step is a very important step in scale adaptation studies. The fact that the meaning of the item does not match the new translated language may cause errors, as well as changing the structure of the scale, which may cause problems regarding validity and reliability. Thus, article translation processes should be carried out meticulously. Studies in the literature show that when we accept that the connection between language and thought, and the relationship between culture and the conditions of the time, is an undeniable reality in adaptation studies, and it can be said that adaptation processes require a long and comprehensive study.

Given the species distribution of the scales, it is seen that the 5-point Likert type is predominantly preferred. This method, developed by Likert (1932) to measure attitudes, is known as "scaling with rating sums." In this method, individuals are presented with a series of attitude statements, and individuals generally respond to these statements in five categories “strongly agree,” “agree,” “undecided,” “disagree” and “strongly disagree.” Likert-type scales can be of 3, 5 and 7, and the increase or decrease of this rating number changes the measurement precision. In developing a Likert-type scale, which is an attitude scale development method, care should be taken to keep the distance between the response categories as equally spaced as possible (Erkuş, 2019). It can be said that 20 of the 22 scales included in the study are 5-point Likert type, which is preferred to approach the ideal frequency type. According to Arul and Misra (1977), the Likert type measurement, which is preferred because it is easy to apply and evaluate, is generally preferred to the Thurstone technique. Given that the examined scales measure predominantly in the affective dimension (such as attitude, satisfaction, and perception) paved the way for the scales to be prepared as a Likert-type rating scale.

Item type is preferred depending on the measured structure and can be classified as types requiring selection, classification, grading and scoring (Erkuş, 2019). The optimum amount of the number of items in the scales and the number of scale sub-dimensions is a controversial issue. The reason for this is the belief that many items and many sub-dimensions will provide us with a better result and the thought that the reduced form of the items will make a healthier measurement than the other in the field. Given that the number of items in a scale will be directly proportional to the number of sub-dimensions of the scale, the sub-dimension, and the number of items in parallel can be left open-ended in relation to the subject area (Matell & Jacoby, 1971). The increase in content validity is in parallel with the number of items, but an optimum value was not specified for the number of items.

It has been seen that many studies have been conducted on the items in the Likert scale or the grading frequency (e.g., 3, 5 and 7). However, it cannot be said that there is no item number or grading frequency in the literature on which the researchers agreed for validity and reliability (Croasmun & Ostrom, 2011). Although increasing the number of items is a functional method to ensure many aspects, such as content validity, fatigue and irritability, emotional states may cause them to stop completing the scale or to give a sloppy response. In other words, it can be said that increasing the number of items measuring the construct will decrease the measurement reliability of other constructs (Böckenholt & Lehmann, 2015). Among the scales examined in this study, it was observed that the maximum number of items on the scale ranged from 21-30 items (8). Regarding the number of items, it can be said that it varies according to the structure of the measured feature and the type of scale item (which requires grading, classification, and selection). Lozano et al. (2008) discussed that most of the studies trying to discover the optimum number of alternatives take the reliability of the scale as a criterion. Such studies examine whether a different number of alternatives affects reliability and, if so, which number maximizes it. The clearest conclusion from such studies is that the minimum number of categories is four to ensure an appropriate level of reliability.

When we accept that societies change rapidly and deeply and one of the titles of this change is education, we understand the seriousness of the steps to be taken on behalf of educational practices. When we start to question the uncertainty of the future and what they expect from us, we face that the education system should raise individuals who have the power to change and transform. According to Öztemel (2018), the soundness of the social transformation to be experienced is possible with the progress in the field of industry and technology and studies should be conducted systematically in health and education that will guide society. Bozkurt et al. (2021) emphasized that the transformation tool of the information age is knowledge, and that knowledge redefines the balance of power between countries. It is inevitable for the education system to be a part of this digital transformation.

As a result, to benefit from the transformative power of education, the needs of the current period should be considered and the needs of the future. There is no doubt that distance education applications will be the education tool of the future. According to the report of the United Nations (2022), the world population is

expected to reach 9.7 billion in 2050. Based on this data, it can be said that the need for resources such as space, materials and teachers for education will increase. It can be thought that distance education will be a remedy for eliminating the limitations in accessing resources and increasing accessibility. According to Kavak (2011), investing in human beings in order to maintain the welfare of life and planning to eliminate the disruptions in the education system are valuable in order to prevent the problems that may arise in the future. Therefore, it is important that the scales to be developed or adapted are valid, reliable, functional, and field-oriented to improve distance education practices and obtain need-based data. This study can contribute to the field regarding the lack of examples in the literature and provides a roadmap for researchers who will develop/adapt scales and use scales in their studies. In this context, it can be suggested to researchers who will develop scales for distance education:

• When the literature review and the scales examined were examined, it was seen that the application level of the developed/adapted scales was predominantly for higher education. There is a need for scale development/adaptation studies for different education levels in further studies to be conducted.

• When the distribution of the number of items in the developed/adapted scale studies was examined, it was seen that there was no consensus on the ideal number of items for the measurement process. Thus, further studies on this subject are needed.

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