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Descriptive Content Analysis of Studies on 21st Century Skills

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Abstract

The aim of the study is to bring together national studies on 21st century skills under the headings of “purpose, method, skill types, sampling, data collection tools, results, and recommendations”. Descriptive content analysis is done for 84 national studies on 21st century skills. Within the scope of the research, the data of each study were analyzed with the examination form. Each study was recorded in the form and then the tables were formed. According to the results of the study, the purpose of the studies with the highest frequency was “investigation of the relationship between 21st century skills and various variables”, the method with the highest frequency was “survey”, and the skills that were explained as “P21 skills” had the highest frequencies. While “teacher candidates” and “teachers” were the most preferred sample groups, “scales” were the most used data collection tools. Conclusions of the studies showed that 21st century skills were existing in our lives, education systems, and also textbooks more or less because 21st century skills were the skills that not apart from the life itself. Therefore, it was suggested in the studies that it was the goal of education to raise individuals in line with the demands of 21st century.

Key words: 21st century skills, Descriptive content analysis, Meta-analysis

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INTRODUCTION

Education in the new world order, with the effect of Covid-19, which is declared as a pandemic today; requires individuals who are equipped to meet changing needs. In a world that has become digital with globalization, learning is not limited to classrooms and schools, but can only be achieved by integrating the concept of lifelong learning into their lives with enriched learning environments in all areas of life (National Ministry of Education, 2019). The rapid progress of technological developments requires learners to adopt the concept of lifelong learning by making personal development a focal point (Özgüzel, 2018). Learners of the 21st century must have high-level cognitive skills such as innovation, creative, solution-oriented, highly motivated, strong in communication, technology, and information literacy, problem solving, and critical thinking (Aydeniz, 2017). These skills that learners of this century should have are called 21st century skills (National Research Council, 2012). Rotherham and Willingham (2009) stated that these skills, which allow the solution of many problems such as problem solving and critical thinking, are as old as human history and it is wrong to call them 21st century skills. At this point, just because the skills are not new does not mean they are not important. However, this situation is considered important in terms of the relevant skills are gradually increasing. The fact that these skills are called 21st century

skills shows that they are blended in the information age and reinterpreted according to the age (Çolak, 2019).

The term “21st century skills” refers to a broad range of knowledge, skills, work habits, and character traits that are thought to be critical to success in today's world. Although there are different opinions in the literature about what 21st century skills are, there is a general trend (Dicerbo, 2014; Lai & Viering, 2012). In the 21st Century Learning Framework (The Partnership for 21st Century Skills - P21) prepared for 21st century skills, the P21 framework (partnership for 21st century learning (P21), 2007) includes basic topics; learning and innovation skills consist of three main skill areas known as knowledge, media and technology skills and life and career skills (Yalçın, 2018; Kylonen, 2012; Trilling & Fadel, 2009). Combined skills in these three main skill areas are shown in Figure 1 below (URL-1, 2019).



Figure 1. 21st century skills framework (P21)

According to Figure 1, *Critical thinking* within the main skill of *Learning and Innovation*; is the ability to analyze, synthesize, and evaluate by using inductive and/or deductive methods within the framework of logic, and to make judgments using high-level cognitive skills (Facione, Facione, & Giancarlo, 2000). It is possible for individuals having this skill to express problems clearly (Beyer, 1988) and transfer what they learn to their daily lives (Çalışkan, 2009). *Problem solving* is the realization of all solution steps in order to reach the determined goal or solve the problem (Haladyna, 1997). Individuals with this skill can produce solutions to the problem using existing or innovative methods (Yalçın, 2018). *Communication* skill is to use all verbal, non-verbal or written communication skills effectively, to communicate by keeping communication in maximum interaction and to be a good listener (Trilling & Fadel, 2009). Individuals having this skill can express themselves by using their communication skills effectively. *Collaboration* is the ability to work together within a common goal and to make effective contributions (Partnership for 21st Century Learning, 2015). Individuals having this skill can produce different ideas and develop solutions by working effectively with group members with different characteristics (Yalçın, 2018). *Creativity* is related to the methods developed by the learners to reach the solution of the problems are unique rather than mediocre (Karakuş, 2011). Individuals with this skill are open to innovations, self-confident and courageous to take risks (Özden, 2014).

Information literacy included in the *Information, Media, and Technology* main skill is the production, use and evaluation of 21st century information on the basis of lifelong learning (Polat, 2005). Individuals who have this skill can learn independently. *Media literacy* is the analysis,

synthesis and evaluation of messages, and the production of new contents and sharing them in the media (Karaman, 2016). Individuals having this skill can make sense of messages and reach the suitable outcome by using the media effectively (Çolak, 2019). *Information and technology literacy* is the use of digital tools to access all forms of information, to reconstruct and evaluate information (Eryılmaz & Uluyol, 2015). Individuals with this skill can use digital tools for their intended purpose.

Being within the scope of the *Life and Career* main skill, *flexibility and adaptability* are being able to approach a problem from different perspectives and adapt to this situation (Özden, 2014). Individuals with this skill are also prone to differentiation (Tomlinson, Brimijoin, & Narvaez, 2008). *Initiative and self-direction*, working independently in line with the gains, means clarifying the success criteria by distinguishing concrete and abstract goals. Individuals with this skill can turn lifelong learning into a process by showing their dependence on learning (Yalçın, 2018). *Social and cross-cultural* skills are the processes of initiating, maintaining, and ending interactions as well as including individuals and intercultural qualities (Zengin, Kırılmazkaya, & Zengin, 2012). People with this skill are accepted by their peers and they can adapt to the environment they live in becomes easier (Deniz, 2003). *Productivity and accountability* are the ability to undertake possible results in line with the determined gains and to create products as a result of ethical work (Eryılmaz & Uluyol, 2015). Individuals with this skill have the ability to work efficiently by managing time well in a work and to take responsibility for possible results. (Yalçın, 2018). *Leadership and responsibility* is the ability to adapt to innovations, to direct possible changes, to work efficiently in line with the determined gains and to guide them to use their potential to reach the target and to take responsibility (URL-2, 2020). Individuals with this skill feel responsible towards the group they lead and display an ethical behavior.

As seen in Figure 1, these skills are directly related to assessment and evaluation, courses and curricula, professional training and learning environments. Having 21st century skills is directly related to the 21st century learners' education they receive. At this point, the results of studies about 21st century skills are important for 21st century learners, teachers, and individuals in terms of shaping, organizing, or structuring education. Researchers and practitioners have been paying increasing attention to 21st century skills. For example, the current Hong Kong school curriculum emphasizes the importance of students' creativity development, and as a result, teachers are encouraged to develop or adopt innovative teaching methods to foster students' creativity in the classroom (Chan & Yuen, 2014). However, no model exists at this time for teaching the core 21st century skills in schools (Qian & Clark, 2016). On the other hand, Bybee (2009) suggested to use 5E model for 21st century skills development and stated that it is possible to draw some research-based inferences from the parallels between 21st century skills such as problem solving, self-motivation, communication, and system thinking and learning outcomes in science such as scientific reasoning, interest, and argumentation. School science programs that include activity-based teaching models have the potential to improve 21st century skills. Providing model curriculum materials that exemplify the objectives, changing teachers' perceptions of teaching explicitly to develop skills and abilities, and fostering fidelity to teaching models designed to help students are among the main challenges associated with this claim (Bybee, 2009).

In educational settings, it may be useful to distinguish 21st century skills and to create some activities for the development of the specific skill. But in practice, it is difficult because 21st century skills are closely linked to each other. Real education is seeing connections between ideas, concepts, and disciplines in ways that help students understand relationships and how ideas relate to people and new situations. Therefore, while dealing with one 21st century skill, others engage in different skills. According to Germaine, Richards, Koeller and Schubert-Irastorza (2016), as the 21st century progresses, good teachers will seek ways to thoughtfully embrace the 4Cs and encourage more critical thinking, better communication, collaboration, and creativity in their professional lives as well as the quality of their students' learning experiences.

If we look at what has been done in the literature on a subject that has been so popular in recent years, it is seen that most of the studies are done to reveal the relationship of 21st century skills between different skills and different variables (Akman, 2019; Aydın, 2019; Elekoğlu & Demirdağ, 2020; Erdoğan & Cevat, 2020; Gökbulut, 2020; Kardeş, 2020; Kıyasoğlu & Ay, 2020; Korucu & Ünüvar, 2020). Altınpulluk and Yıldırım (2021) conducted a descriptive analysis of the studies about 21st century skills carried out in between 2010-2019 years searched in the Web of Science Social Sciences Citation Index (SSCI). In addition, it was observed that other descriptive content analysis, meta synthesis and meta-evaluation studies, which are synthesizing the studies on 21st century skills, were not conducted at national level (Eskici & Özsevgeç, 2019; McGrath & Fischetti, 2019) and not included the studies done in 2020. At this point, it is considered valuable to examine and present national studies on 21st century skills through descriptive content analysis. In this context, in this study, the purpose, method, sample, data collection tools, results and suggestions of the studies at national level about 21st century skills were gathered and discussed from variable points. The study can provide a general knowledge by reading this article instead of reading 84 studies one by one. In addition, thanks to this study, researchers can realize the gap in the literature and draw a road map for themselves. In this respect, the study will not only guide researchers, but also present studies on 21st century skills in our country in a descriptive framework, and will contribute to increasing the quality of their studies. In this context, the aim of the study is to bring together national studies on 21st century skills under the headings of “Purpose, Method, Skills, Sampling, Data Collection Tools, Results, and Recommendations”. For this purpose, the study was directed in the light of the following questions:

- For what purposes were the studies on 21st century skills carried out?
- Which methods have been used in studies on 21st century skills?
- Which of the 21st century skills have been discussed?
- Which sample groups were used in studies on 21st century skills?
- Which data collection tools were used to collect data in studies on 21st century skills?
- What kinds of results have been obtained from studies on 21st century skills?
- What suggestions have been made in studies on 21st century skills?

METHODOLOGY

The Method of the Research

In the broadest sense, content analysis is divided into three categories: Meta-analysis, meta-synthesis and descriptive content analysis (Çalık & Sözbilir, 2014). Meta-analysis is a quantitative application that includes statistical processes for combining, synthesizing, and interpreting the experimental findings of separate studies conducted on the same subject at different times and locations (Wolf, 1986). Meta-synthesis studies include qualitative research in a specific field, as well as a comparison of similarities and differences. Descriptive content analysis is the examination and organization of qualitative and quantitative studies on a specific subject, as well as the identification of broad trends in the field (Çalık, Ünal, Coştu & Karataş, 2008; Selçuk, Palancı, Kandemir & DüNDAR, 2014).

In this study, it is aimed to describe how the trends of 21st century skills studies conducted at national level between 2010 and 2020, and to compare the results within the specified frameworks, and to interpret them in a more comprehensible manner as a whole (Çalık & Sözbilir, 2014; Ültay, Akyurt & Ültay, 2021; Ültay, Dönmez Usta & Durmuş, 2017), so descriptive content analysis is preferred.

Data Collection and Data Analysis

This research was conducted to examine the studies on 21st century skills that were conducted at national level between 2010 and 2020. In order to reach the sample of the study, databases of ERIC, Education Source, Science Citation Index, ULAKBİM, Education Source, Science Direct, Google Scholar, Giresun University Library and National Thesis Center were used and national studies were determined. Databases had been scanned with the keyword of “21st century skills”, “P21 skills”, and “4C skills”. In studies accessed from databases, the condition of being an article, a thesis, a book section, or a conference paper was sought. Studies that are not accessible or that have difficulty in reaching the full text are not included in the sample. After these stages, research was carried out on a total of 84 national studies, including 58 articles, 15 master's thesis, 2 doctoral dissertation, 6 conference papers, 2 book sections and a report. This research is limited to the studies conducted between in 2010-2020 on national 21st century skills and can be accessed from relevant databases.

In order to analyze the studies more easily, each study examined was coded as S1, S2, ..., S84 and these codes were used in the study. Within the scope of the research, the data of each study were analyzed with the "Examination Form" developed by the researchers. While the examination form was being developed, it was finalized within the scope of the necessary feedback by taking the opinions of the field experts. Since the aim of the study is to describe what about the studies on 21st century skills are and to interpret the existing situation, the final version of the related themes was created as indicated in Table 1. In addition, an example of the analysis of the studies in the examination form is presented in Table 1 below.

Table 1. Study examination form

Study Code	Year	Author	Purpose	Method
S2	2013	Gülen	Investigation of the relationship between 21 st century skills and various variables	Survey
Skills	Sample	Data Collection Tools	Conclusions	Recommendations
Learning and innovation, Information, media, and technology	Middle school students	Scale	There is/is not a significant relationship between the students' level of having 21 st century skills and various variables studied (IT skills, science beliefs, TIMMS achievement, etc.)	It is possible to determine how 21 st century skills are expressed in self-efficacy educational science programs.

Reliability and Validity

The studies used in the research were examined in different times and places and the data obtained as a result of the examinations were recorded with the examination form. In order to ensure the reliability between two valuers, the Cohen's Kappa (Cohen's Kappa Coefficient) value between the two readers was calculated with the SPSS v.22 package program. Calculated Cohen's Kappa (κ) .857 was found and according to the classifications of Landis and Koch (1977), it was seen that almost perfect agreement was achieved. In this way, the reader reliability of the study was tried to be achieved. Apart from the reliability coefficient, two science education experts were included in the all phases of the study for ensuring the study's validity. These experts were checked the studies' suitability for 21st century skills topic and then controlled all the tables.

FINDINGS

In this section, the findings of the descriptive content analysis of the studies about 21st century skills are summarized and shown in tables. The first research question was tried to be answered by Table 2 showing the purposes of the studies.

Table 2. The purposes of the studies

Purposes	Study Code	f
Investigation of the relationship between 21 st century skills and various variables	S2, S5-6, S9, S13-15, S19, S21, S26, S29, S32, S40, S46, S50, S52, S54, S59-61, S63-65, S68-71, S73-76, S84	32
Determining the level of having 21 st century skills or using these skills	S2, S7-8, S11-12, S16, S24, S26, S32, S37, S40, S43, S45, S47, S50, S52, S54-55, S57, S60, S68-69, S73, S76-77	25
Investigation of the inclusion and applicability of 21 st century skills in course contents or textbooks	S1, S20, S23, S33-34, S36, S39, S42, S45, S48, S51, S53, S56, S78	14
Researching how 21 st century skills are defined	S3-4, S16-18, S22, S27-28, S35, S41, S49, S66, S83	13
Examining the development of 21 st century skills with experimental research	S25, S30-31, S38, S62, S67, S82	7
A valid and reliable scale development study for 21 st century skills	S10, S44, S58, S72, S80-81	6

According to Table 2, the purposes of the studies about 21st century skills are varied from “Investigation of the relationship between 21st century skills and various variables” with the highest frequency to “A valid and reliable scale development study for 21st century skills” with the lowest frequency. The second highest frequency belongs to the purpose of “Determining the level of having 21st century skills or using these skills”. Table 3 shows the distribution of methods of the studies about 21st century skills.

Table 3. The methods of the studies

Methods	Study Code	f
Survey	S2, S12-14, S19, S24, S26, S28, S37, S47, S50, S56, S60, S63, S68, S84	16
Correlational survey method	S13, S19, S21, S29, S43, S46, S52, S59, S61, S63, S65, S69, S71, S75, S77	16
Descriptive survey method	S4, S8, S18, S25, S32-33, S54, S57, S70, S73-74	11
Case study	S3, S9, S11, S16-17, S30, S41, S55, S62, S83	10
Document analysis / Content analysis	S20, S33-34, S36, S39, S42, S48, S51, S53, S78	10
Method not specified (studies conducted for giving information)	S1, S5-6, S15, S22, S27, S35, S49, S66	9
Scale development study	S10, S44, S58, S72, S80-81	6
Causal-comparative method	S13, S19, S60, S70, S76	5
Quasi-experimental method	S31, S38, S82	3
Weak experimental method	S40	1
Descriptive mixed design (survey + phenomenology)	S79	1

As seen Table 3, the most used methods are “survey, correlational survey, and descriptive survey” methods. It can be said that the quantitative researches are predominantly preferred. Table 4 shows which 21st century skills are discussed in the studies.

Table 4. The 21st century skills discussed in the studies

Skill Type	Study Code	f
Learning and innovation	S3-4, S9-11, S16-18, S20-25, S27-30, S32-33, S35-42, S44-45, S47, S49, S51, S53, S55-57, S62-63, S66-72, S74, S77-81, S83-84	54
Information, media and technology skills	S1, S3-6, S8-11, S14, S16, S18, S20-25, S28-29, S32-35, S38-42, S44-45, S47, S49, S51, S53, S56, S63, S66-70, S72, S74, S77-81, S83-84	51
Life and career skills	S3-5, S9-11, S16, S18, S20-21, S23-25, S27-29, S32-33, S35, S37-42, S44-45, S47, S49, S51, S53, S56, S63, S66-68, S70-72, S74, S77-79, S81, S83-84	46
Teacher skills (Administrative skills, technopedagogical skills, affirmative skills, flexible teaching skills and generative skills)	S13, S19, S26, S43, S50, S52, S64, S73, S75	9
Learner skills (Cognitive skills, autonomous skills, collaboration and flexibility, and innovativeness skills)	S13, S19, S59-61, S73	6
Key subjects and 21 st century themes	S22, S27, S35, S66, S71	5
Active learning, problem solving, learning to learn, collaboration and communication skills	S2, S12, S31, S54, S65	5
Cognitive, affective and sociocultural	S7, S46, S48, S82	4
Knowledge, skill, character, meta-learning	S15, S58, S76	3

According to Table 4, the skills that were explained as P21 skills (learning and innovation, information, media and technology skills, life and career skills) have the highest frequencies. Apart from P21 skills, teacher and learner skills are discussed in some studies. Knowledge, skill, character, and meta-learning skills has the lowest frequency. Table 5 shows the sample groups which were used in the studies.

Table 5. The sample groups of the studies

Sample Groups	Study Code	f
Teacher candidates	S3, S10-11, S13, S16, S19, S21, S24-25, S28-30, S32, S37, S45, S47, S55, S57, S59, S62-63, S67-68, S70, S79-80	26
Teachers	S8, S13, S23, S26, S40-41, S43-44, S50, S52, S61, S64, S71, S73, S75, S83	16
Middle school students	S2, S7, S12, S31, S38, S46, S54, S65	8
High school students	S9, S60, S74, S81-82	5
Undergraduate students	S58, S69, S76, S84	4
Education Faculty instructors	S4, S56	2
Preschool students	S72	1
Business managers	S77	1

When Table 5 is examined, it is seen that for 21st century skills studies, “teacher candidates” were mostly preferred as sample groups. The second highest frequency belongs to the “teachers” groups.

Preschool students and business managers have the lowest frequency as sample groups. Table 6 shows data collection tools of the studies.

Table 6. Data collection tools of the studies

Data Collection Tools	Study Code	f
Scale	S2, S4, S7-8, S10, S12-13, S19, S21, S23-26, S28-32, S37-38, S40, S43-47, S50, S52, S54, S56-61, S63-65, S67-77, S79-82, S84	54
Document analysis	S3, S16, S18, S20, S33, S36, S39, S42, S48, S51, S53, S78	12
Interview	S3, S7, S9, S23, S41, S45, S55, S62, S67-68, S79, S83	12
Literature review	S14, S17, S22, S34-35	5
Open-ended questions	S4, S11	2
Student product (Animation, presentation)	S11, S30	2
Achievement test	S46	1
Observation	S55	1
Field notes	S55	1
Mind maps	S62	1
Diary	S62	1

As seen in Table 6, “scale” have the highest frequency and it means scales were mostly used in the studies as data collection tools. “Achievement test”, “observation”, “field notes”, “mind maps”, and “diary” have the lowest frequency. Table 7 shows the conclusions of the studies.

Table 7. Conclusions of the studies

Conclusions	Study Code	f
It was observed that the participants had adequate / inadequate knowledge about 21 st century skills.	S4, S7, S12-13, S24, S26, S32, S37, S40-41, S43, S45, S47, S50, S52, S54, S60-61, S64, S68-69, S73, S76-77, S83-84	26
There is/is not a significant relationship between the students' level of having 21 st century skills and various variables studied (IT skills, science self-efficacy beliefs, TIMMS science achievement, etc.)	S2, S6, S8, S21, S29, S46-47, S59-60, S63, S65, S68, S70-71, S73-76, S84	19
It has been observed / thought that the application has a positive / neutral effect on the development of all / some of the 21 st century skills.	S9, S11, S14, S25, S30-31, S38, S55, S62, S67, S82	11
It was concluded that the curriculum / textbook examined reflected / did not reflect some of the 21 st century skills.	S20, S23, S33, S36, S39, S42, S48, S51, S53, S56, S78-79	12
Teacher and learner skills are determined according to 21 st century skills.	S3, S16-19, S22, S34, S37	8
Gaining a contemporary perspective and being successful depends on developing 21 st century skills.	S1, S6, S27, S34, S41, S53	6
Teachers / schools / parents should contribute more for students to acquire 21 st century skills.	S5, S15, S27, S28, S49	5
It has been observed that the measurement tool developed to measure 21 st century skills has sufficient psychometric properties.	S10, S44, S58, S72, S80-81	6
Measurement tools that can be used to measure 21 st century skills have been introduced / prepared.	S35, S57	2

It is understood that the targets that are planned to be brought to the new generations are developed in line with market demands rather than an educational philosophy. S66 1

Conclusions on certain topics are given according to Table 7. The most repetitive effect is that the participants have adequate or inadequate knowledge of the skills of the 21st century. The least frequent effect is that the priorities identified for the new generations are determined not according to the philosophies of education, but according to the wishes of the corporations. Table 8 shows the recommendations of the studies.

Tablo 8. Recommendations of the studies

Recommendations	Study Code	f
To keep up with the modern era, to ensure this, 21 st century skills must be mastered or the appropriate teaching atmosphere must be organized.	S1, S3-9, S11, S13-16, S18, S22-24, S27-29, S32-33, S36, S38-41, S45-46, S49-50, S52-55, S57, S60, S62, S68-70, S75, S78-80, S83-84	47
The relationship of 21st century skills with different variables can be revealed.	S3, S7, S19, S21, S25-26, S30-31, S34, S47, S59, S63-64, S67, S73, S76	16
It is possible to determine how 21st century skills are expressed in educational programs	2, S17, S20, S23, S27-28, S32, S34, S36-37, S39, S43, S51, S74	14
To assess 21st century skills, various measurement instruments have been suggested.	S10, S35, S42, S44, S58, S72, S81	7
Pre-service and in-service training should be given to teachers and teacher candidates in order to teach 21st century skills.	S8, S29, S56-57, S65, S71, S75	7
Studies should be conducted to address the different levels/degrees of skills of the 21st century.	S2, S12, S48, S81-82, S84	6

As shown in Table 8, the highest frequency is “to keep up with the modern era, to ensure that the skills of the 21st century must be mastered or that the appropriate teaching atmosphere must be organized”. “Studies should be conducted to address the different levels/degrees of skills of the 21st century” have the lowest frequency.

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

In this research, descriptive content analysis has been carried out to bring together 84 national studies on 21st century skills published in between 2010-2020. These national studies are examined some key themes such as purposes, methods, skill types, data collection tools, conclusions, and recommendations. According to the results of this research, the purposes of the studies are highly concentrated on the investigation of the relationship between 21st century skills and various variables. The reason why the goals are concentrated around this goal may be that 21st century skills studies can be said as new for Turkey. From a more broad view, 21st century skills are not new for any country, these skills have been existed in programs, objectives, and textbooks for a long time. Critical thinking and problem solving, for example, have always been important parts of human progress, from the invention of basic tools to agricultural advancements, vaccine development, and land and sea exploration (Rotherham & Willingham, 2009). In fact, not for critical thinking but for creativity, in Turkish National Educational Ministry, to grow up creative people had been existed in the

educational goals (National Ministry of Education, 1973). 21st century skills are not new but gaining importance is new (Silva, 2009).

Going back to the purposes of the studies, it is seen that some studies are tried to define what 21st century skills mean. There are a lot of classification styles for 21st century skills in the literature. But most of the classifications include critical thinking, creativity/innovation, problem solving, collaboration, and communication (Ekici, Abide, Canbolat & Öztürk, 2017) (S17). The task of educators should be to prepare today's students for a global and participatory world based on life, learning, study and advanced technology by gaining these skills (Lemke, 2010).

When the methods of the studies are considered, it is seen that survey and some survey types are mostly preferred. This is not surprising, because a similar case is seen in some content analysis studies (i.e Ültay & Uludüz, 2018; Ültay, Durnacı & Ültay, 2019). Survey method studies are highly used in quantitative designs. It is not a valid point of view to say that a qualitative study is better than a quantitative one, and vice versa. But it can be said that a qualitative study requires more effort, time, and energy. Therefore, researchers may prefer using quantitative designs for their searches. Apart from that, formerly, it is said that 21st century skills are not new but gaining importance is new. This case can be clearly seen in the methods of the studies that some studies try to give information about 21st century skills. In the studies, as a data collection tool, scales are mostly used. It is compatible with doing a quantitative research. Aside from that, document analysis and interviews are used for data collection.

The studies included in the content analysis show that “learning ad motivation,” “information, media and technology,” and “life and career” skills are mostly discussed. These 21st century skills are defined as P21 skills (Partnership for 21st century learning, 2007). While some studies call the 21st century skills with different names or use the different classification styles for 21st century skills, the common point is that most of them include some or all of P21 skills in themselves. For example, some studies use “teacher skills” and “learner skills” concepts but teacher and learner skills are still formed by P21 skills. Teacher and learner skills are evaluation of P21 skills from the perspectives of the teacher and the learner. While explaining teacher and learner skills, it is seen that Trilling and Fadel (2009) used P21 skills and do not present headings that are clearly different from each other, but that they put forward skill titles that explain and interact with each other.

When the sample groups of the studies are taken into account, it is seen that in most of the studies teacher candidates and teachers are preferred. The reason for preferring teacher candidates and teachers as a sample may arise from them is easily accessible. In Turkey, academic searches are mostly done by faculty members such as research assistants, instructors, professors, and students of master of education or doctorate programs. For these researchers, teachers and teacher candidates are more accessible than the students in middle and high schools. In fact, this situation can be evaluated from a better perspective. The formation of scientific foundations in students depends on the teaching techniques used by teachers and of course teachers' candidates who are the teachers of future (Ünal & Akman, 2006).

All in all, the majority of the purposes of the studies is the investigation of the relationships between 21st century skills and some variables. The other purpose is the determination of the levels of 21st century skills (see Table 2). When we see the methods of studies, it is seen that survey and some types of surveys are used (see Table 3). It is compatible with the purposes of the studies. The best way to reveal the levels of some characteristics is to use surveys. In addition, as we mentioned before teacher and teacher candidates who are the implementers or new skills or teaching methods/strategies are preferred (see Table 5). Therefore, it can be said that sample groups are also suitable with the purposes and methods. Apart from this, teacher and teacher candidates are the people who create a 21st classroom and they have to focus not to teach one more topic, but to teach in authentic contexts (Larson & Miller, 2011). In 21st century classrooms, students should have communicate and

collaborate online and offline environments. In order to do this, students communicate via social media networks such as Facebook, Instagram, Twitter, email, etc. According to Leu, Kinzer, Coiro and Cammack (2004), the accessibility to Internet does not decrease the importance of the teachers, just the roles of the teachers are changed. Teachers should be expert in all new technological techniques that can be used in the classrooms.

According to the conclusions of the studies, it was found that, in most of the studies, whether the sample had 21st century skills at a sufficient level. Bozkurt and Çakır (2016) (S12) found that students has 21st century learning skills as active learning, problem solving, learning to learn, and collaboration and communication skills. Similarly, Önür ve Kozikoğlu (2019) (S54) concluded that the students' active learning skills were found to be at moderate level whereas it was concluded that learning to learn, problem solving, cooperation and communication skills are at high level. Different from that, the majority of studies found that 21st century skills affect information technology skills (Gülen, 2013; Eryılmaz & Uluyol, 2015) (S2 and S6). Lifelong learning also includes digital skills. In this sense, our teachers, who will educate our generation, should learn these skills, and apply them throughout their lives in order to keep up with our fast-paced age of information development and dissemination (Keskin & Yazar, 2015) (S8). Conclusions of the studies show that 21st century skills are existing in our lives, education systems, and also textbooks more or less because 21st century skills are the skills that not apart from the life itself. The age we are in is a period in which we can easily access information and there is a lot of information. During this period, most skills of 21st century skills are needed to access information (Karaşah Çakıcı & Yakışan, 2020) (S82). According to Colwill and Gallagher (2007), one of the main goals of education is to raise individuals in line with the demands of the 21st century. As a matter of fact, this is clearly seen in the recommendations (Zeybek , 2019; Özyurt, 2020) (S60, S80).

Finally, this descriptive content analysis including of 2010-2020 years give information about national 21st century skills studies on what trend topics are studied about 21st century skills., what methods, samples and data collection tools are used. Additionally, which 21st century skills are discussed in these studies may give information to the researchers thinking about to study about 21st century skills. What conclusions are found can be seen easily and therefore, researchers have a quick idea about the positive and negative aspects of 21st century skills. What recommendations are suggested are also important for the researchers to draw a road map to do a study on 21st century skills. It is believed that the results of the research will provide an overview of the field of research and will therefore be particularly useful in terms of the recognition of the deficiencies.

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Note: The references used in the descriptive content analysis are shown with (*)