Sakarya University Journal of Education

e-ISSN : 2146-7455
Publisher : Sakarya University

Vol. 15, No. 1, 82-95, 2025
DOI: https://doi.org/10.19126/suje.1544081

Research Article

21st Century Skills Research Trends in Türkiye: Investigating Graduate Theses in Curriculum and Instruction

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Abstract: The internationalization of higher education institutions is a positive development, offering significant opportunities for growth and advancement. It is imperative that students are equipped with 21st-century skills. This paper presents the latest research trends on 21st-century skills in higher education, focusing on graduate theses in curriculum and instruction programs in Türkiye. This research examines the context in which these graduate programs study 21st-century skills from 2014 to 2024, along with the results of these studies. This study employs a qualitative content analysis method using MAXQDA. The analysis reveals an increasing academic focus on 21st-century skills, marked by a peak in dissertation completions in 2022, reflecting a response to evolving technological and societal needs. The emphasis on quantitative and mixed methods, alongside diverse research tools, illustrates the complexity of this research area and underscores a commitment to empirical study. These findings highlight the critical need for ongoing investigation, particularly at the doctoral level and within foundation universities, to further enrich understanding in this evolving educational field. The study suggests fostering diverse research approaches, particularly qualitative and interdisciplinary methods, to enrich insights into 21st-century skills. Expanding doctoral-level research and increasing contributions from foundation universities are recommended to broaden perspectives and strengthen theoretical frameworks. Additionally, the development of specialized data collection tools is encouraged to enhance accuracy and support detailed analysis in this complex field. These recommendations highlight pathways to deepen academic understanding and support the continued evolution of 21st-century skills research.

Keywords: 21st-Century Skills, Curriculum and Instruction, Research Trends

Received: 05.09.2024
Accepted: 01.11.2024
Available 17.04.2025

1. Introduction

The rapid advancement of technology has profoundly impacted various aspects of our lives, making it essential to develop new educational competencies tailored to the demands of the 21st century. Contemporary education now prioritizes some skills termed "21st-century skills," which include learning and innovation skills such as creativity, critical thinking, collaboration, and communication. Additionally, these skills encompass information, media, and technology literacy, as well as essential life and career skills like productivity, accountability, leadership, responsibility, flexibility, adaptability, social and cross-cultural competence, and self-direction (Ananiadou & Claro, 2009).

The concept of 21st-century skills is defined as "the knowledge, media, and technological capabilities, along with life and career skills, that individuals need to adapt to an increasingly technological and interconnected global landscape and thrive in a competitive job market" (P21, 2019, p.1). Today's students live in a fast-paced, culturally diverse, and media-saturated society, which calls for a shift in educational strategies. However, many schools still operate under outdated, industrial-age models of education (Shaw, 2004).

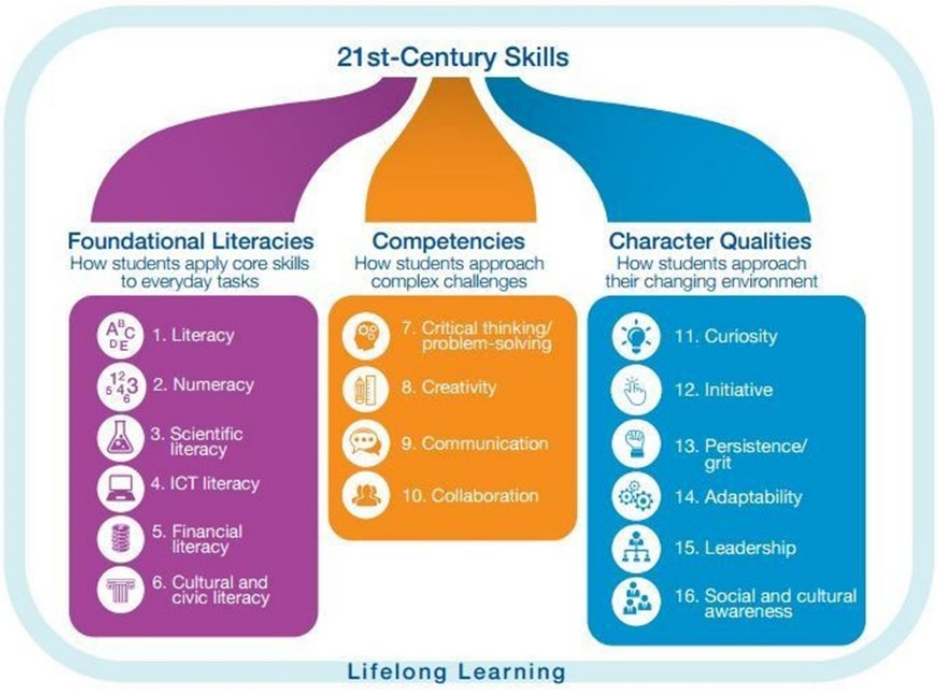
To compete in a global economy, students now require more than just basic academic knowledge. In addition to mastering traditional subjects, they must become well-rounded individuals capable of thinking creatively, accessing and utilizing new sources of information, and applying this knowledge effectively. In particular, students need the following 21st-century skills to enhance their employability, marketability, and civic engagement:

Cite as(APA 7): Akinlar, A. (2025). 21st century skills research trends in Türkiye: Investigating graduate theses in curriculum and instruction. *Sakarya University Journal of Education. 15*(1), 82-95. https://doi.org/10.19126/suje.1544081

- The ability to analyze and critically evaluate the continuous stream of information they encounter daily
- Solving complex, interdisciplinary, open-ended problems encountered across various professional environments
- Entrepreneurial thinking and creativity
- Communicating and collaborating with diverse groups across cultural, geographic, and linguistic boundaries
- Leveraging knowledge and information to generate innovative services, processes, and products
- Effectively managing personal finances, health, and civic responsibilities, and making informed decisions

In 2015, the World Economic Forum published a report titled "New Vision for Education: Unlocking the Potential of Technology," which addressed the pressing issue of the 21st-century skills gap and proposed ways to bridge this gap through technology. Soffer (2016) also highlighted 16 key competencies necessary for modern education. These competencies include six foundational literacies such as literacy, numeracy, and scientific knowledge, alongside ten skills categorized as competencies and character qualities. Students are expected to solve complex problems through collaboration, communication, critical thinking, and problem-solving skills. Furthermore, those who approach their evolving environments with character traits such as curiosity, adaptability, and social and cultural awareness are more likely to succeed academically and beyond (See Exhibit 1).

Exhibit 1: Students require 16 skills for the 21st century



Note: ICT stands for information and communications technology.

Note: Adapted from *Ten 21st-century skills every student needs*, by J. Soffer, 2016, March 10, *World Economic Forum*

Curriculum and instruction are intrinsically linked, with curriculum serving as a blueprint for learning and instruction as the process by which that learning is achieved. The curriculum outlines the essential knowledge and skills students need to acquire, while instruction delivers these learning objectives. As Ornstein and Hunkins (2009, p. 17) explain, “Curriculum development involves the planning, implementation, and evaluation of the curriculum.” Various factors, including physical, social, economic, and cultural contexts, play a critical role in shaping the curriculum. As student populations become increasingly diverse and international, the need to adapt curricula to meet their varied needs grows.

In today's educational landscape, universities must design 21st-century curricula that integrate critical thinking, creativity, information literacy, and ICT competencies across core academic subjects and interdisciplinary themes. Furthermore, they must adopt modern instructional strategies that combine evidence-based teaching methods, innovative learning technologies, and real-world applications.

Effective curriculum and instruction that integrate 21st-century skills prioritize the following key elements (Literacy, 2009):

- Providing opportunities for students to apply 21st-century skills across different disciplines, encouraging a competency-based approach to education.
- Incorporating assistive technologies, inquiry-based learning, problem-solving strategies, and higher-order thinking skills into new instructional practices.
- Utilizing community resources and extending learning opportunities beyond the traditional classroom setting.
- Teaching 21st-century skills both as standalone components within core subjects and as part of broader, interdisciplinary themes.

1.1. Curriculum design in higher education

In recent years, many countries have modernized their education systems, replacing outdated teaching methods with approaches that meet the demands of 21st-century education. Teacher education programs play a critical role in preparing educators for these shifts (Bedir, 2019). A study by Tekerek et al. (2018) explored how 21st-century skills were integrated into elementary mathematics and science teacher training programs revised by the Council of Higher Education (CoHE) in 2018. Through document analysis, the researchers reviewed CoHE-provided course materials and found that elementary mathematics programs emphasize critical thinking and problem-solving, while science programs focus more on creative thinking and practical application of advancements. Similarly, İlhan and Kalaycı (2018) assessed core curricula in undergraduate programs and their effectiveness. Their qualitative case study, which surveyed 37 academics from three Turkish foundation universities, revealed that the core curriculum supported students' academic, professional, and personal development. The content was found to be relevant, student-friendly, transferable, and multidisciplinary, though research and discovery-based learning approaches were underused.

Korkmaz and Kalayci (2021) examined how societal, cultural, political, economic, technological, and industrial changes have reshaped the knowledge and competencies required in the workplace, necessitating changes in higher education. This has led to the growing importance of problem- and project-based learning (PBL), which centers curricula around real-world challenges. Their study traced PBL's evolution from a teaching strategy to an educational philosophy and proposed a conceptual model for implementing PBL at the institutional level. Using a narrative approach, they synthesized various theories and constructs to offer a new perspective on PBL. The authors argued that integrating PBL into higher education curricula could help bridge the gap between theory and practice, enabling universities to better fulfill their educational and societal roles.

In a related study, Vural and Turan (2019) used quantitative research to identify the competencies businesses prioritize during recruitment. Their findings emphasized the need to align academic programs with industry expectations to improve graduate employability. Critical thinking (CT), a key 21st-century skill, has been widely researched, particularly in higher education and language learning contexts (Petek, 2018). Petek conducted a ten-week action research study on implementing CT in English as a Foreign Language (EFL) classroom. Through qualitative and quantitative analyses of critical thinking exercises, questionnaires, and interviews, the study demonstrated that CT positively influenced learners' perceptions of both thinking and language skills, suggesting that integrating CT in language instruction can enhance cognitive and linguistic abilities.

The shift toward a constructivist approach in education has been supported by advances in brain research, which emphasize the development of students' critical thinking, problem-solving, research, and evaluation skills to address contemporary challenges (Güneş, 2012). This approach aims to improve students' social interactions, collaboration, conflict resolution, and lifelong learning capabilities. As a result, many educational programs worldwide now prioritize cognitive and language development over traditional behavioral approaches.

In Türkiye, the Ministry of National Education has embraced a constructivist approach in primary and middle school curricula since 2004. Universities are also transitioning to student-centered education in line with the Bologna Process (Council of Higher Education, n.d.). The Bologna Declaration, signed in 1999 by 29 European countries, seeks to create a European Higher Education Area with comparable and transparent higher education qualifications, aligning with 21st-century skill development. The three-cycle degree system (undergraduate, graduate, and doctoral) promoted by the Bologna Process supports diversified and interdisciplinary education, enhancing students' critical thinking and problem-solving abilities. Additionally, student mobility within the Bologna Process fosters adaptability and intercultural competence, which are key 21st-century skills.

Teacher education programs play a pivotal role in equipping future educators to integrate 21st-century skills into curricula and instruction (Cosanay & Karalı, 2021). Despite a growing body of content analysis research in curriculum and instruction (Gömleksiz et al., 2019; Kozikoglu & Senemoglu, 2015; Ozdemir & Arı, 2008), which has primarily focused on master's theses and dissertations, further investigation is needed to explore how 21st-century skills are incorporated into graduate theses and doctoral dissertations in Türkiye, particularly in the field of curriculum and instruction.

1.2. The purpose of the study

The purpose of the current study is to analyze curriculum and instruction graduate theses featuring 21st-century skills for the period between 2014-2024. The following research questions were examined by the criteria determined within the scope of the research:

- Which terms are in the foreground in the theses investigated?
- What are the characteristics of 21st-century skills research in Curriculum and Instruction contexts? (type of theses, year, and place of publication)
- Which methods were commonly used in 21st-century skills research in Curriculum and Instruction contexts?
- What data collection tools were employed?
- Which data analysis methods were used?
- Which sampling features and what sampling size were commonly preferred?
- What are the purposes of the studies?
- What are the results of the studies?

1.3. Importance of the study

This study holds significance for researchers and policymakers by providing insights into how 21st-century skills are addressed in graduate studies related to curriculum and instruction. It highlights a gap in literature, specifically the limited focus on integrating these skills into curriculum development programs. The findings offer direction for future research on these essential topics, encouraging scholars to explore the underrepresented area of 21st-century skills in higher education curricula.

2. Method

2.1. Research model

This study analyzed master's and PhD theses on 21st-century skills in higher education, produced between 2014 and 2024, within the field of Curriculum and Instruction in Türkiye. The research employed a qualitative content analysis approach (Powers & Knapp, 2006) to examine the selected theses. According to Mayring (2014), qualitative content analysis systematically examines textual material by focusing on its origin and impact. This method allows for unobtrusive, systematic coding and categorization of large amounts of textual data to identify trends, patterns, and relationships between terms and concepts. The selected theses were analyzed to reveal specific features and methodological trends in studies related to 21st-century skills within curriculum and instruction.

The aim of the content analysis was to interpret the data in its context, examining the theses in terms of their sources and impact (Mayring, 2014). The data were categorized and organized using MAXQDA software. Before the actual analysis, the researchers conducted a comprehensive review of the data to establish a general understanding of the content. Following this initial review, the researchers held a debriefing session to discuss the overall direction of the findings.

After the debriefing, each researcher independently coded the data. They then compared their coding to identify any overlaps or discrepancies, ensuring accuracy and consistency, thus establishing intercoder reliability (Thomas & Harden, 2008). To further enhance the validity of the analysis, an external expert reviewed the codes. Based on the expert's feedback, the researchers combined a few codes, reaching consensus for both intra- and inter-reliability (Mayring, 2014).

2.2. Study group – Universe/Sample

Purposive criterion sampling (Patton, 1990) was employed in this study. This sampling method selects cases that meet specific criteria. For this research, the criteria included theses listed on the Council of Higher Education (CoHE) National Theses Center website under "curriculum and instruction" and related to "21st-century skills." The keywords used in the search, both in Turkish and English, were "Eğitim programları ve öğretim" and "21. yüzyıl becerileri."

2.3. Data collection tools

The data for this study consisted of graduate theses obtained from the CoHE National Theses Center in Türkiye. The inclusion criteria were aligned with the study's research questions. Theses categorized under "curriculum and instruction" and focused on 21st-century skills were analyzed.

2.4. Data collection process

Data collection involved searching the CoHE National Theses Center using the keywords "21st-century skills" and "curriculum and instruction," along with their Turkish equivalents ("Eğitim programları ve öğretim" and "21. yüzyıl becerileri"). Both English and Turkish results were considered for the study. Since the CoHE online theses database has been operational since 2014, the analysis included theses submitted between 2014 and 2024.

2.5. Data analysis

The data were analyzed using qualitative content analysis, facilitated by MAXQDA software.

3. Limitations

The study is limited by the accessibility of postgraduate theses available in the CoHE National Theses Center. The findings are based solely on theses that specifically address 21st-century skills within curriculum and instruction programs.

4. Results

The study examined data from 28 master's theses and eight doctoral dissertations within curriculum and instruction programs. Of these, the majority (22) were conducted in institutes of educational sciences, six in institutes of social sciences, and eight in institutes of education. The variation in institutional affiliation is due to the fact that not all universities in Türkiye have institutes of educational sciences. In some cases, these programs are affiliated with social sciences institutes, while others are housed within institutes of education.

The research methods utilized in the theses fell into three main categories: quantitative, qualitative, and mixed methods. The quantitative approach was the most common, employed in 20 theses, followed by 12 that used mixed methods, and five that relied on qualitative research. Regarding sampling methods, non-probability sampling was the most frequently employed, found in 16 theses. Nine theses used probability sampling, while seven did not specify their sampling technique.

Figure 1

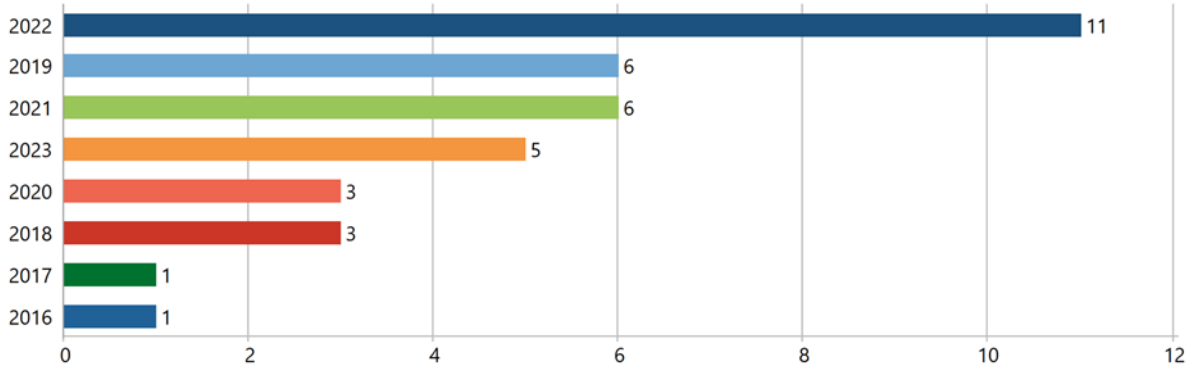
Word Cloud of the Theses

The analysis aimed to compile the most frequently used terms across the theses, leading to the creation of a word cloud using MAXQDA, as depicted in Figure 1. A word cloud offers a visual representation of word frequency, highlighting the most prominent terms in the data.

As shown in Figure 1, the word "eğitim" (education) appears most frequently. Other commonly mentioned terms include "becerileri" (skills), "yüzyıl" (century), "bilgi" (information), "öğretmen" (teacher), “öğrenme” (learning).

Table 1

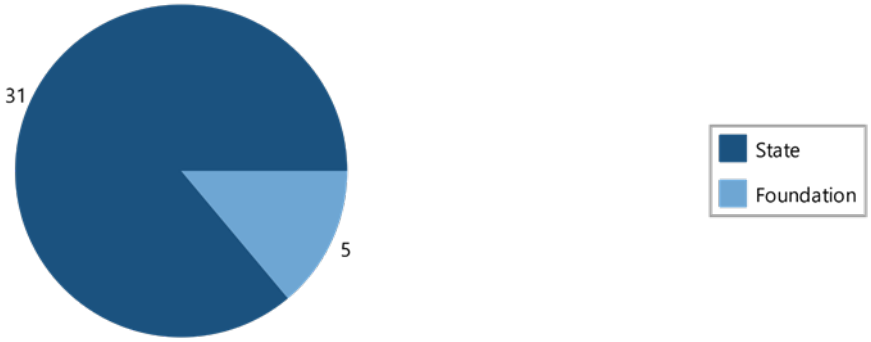
Distribution of Theses According to Year of Publication



As it is seen in Table 1, the research scope includes 36 theses in total. The distribution of the theses indicates that the theses that address 21st century skills were generally greater in number in 2022 (11 theses), 2019 (six theses), 2021 (six theses), and 2023 (five theses). The years with the least number of theses that engaged in the investigation of 21st century skills were 2017 (one thesis) and 2016 (one thesis).

Table 2

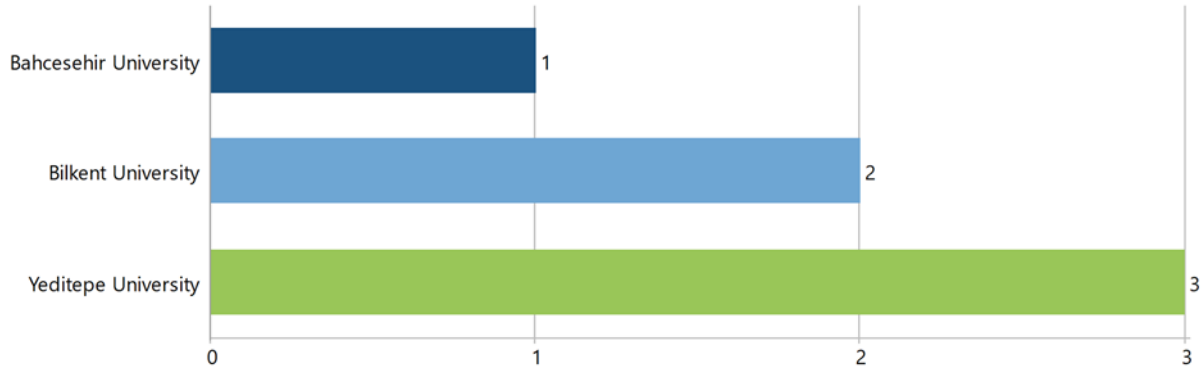
Distribution of Theses According to Type of University



As seen in Table 2, 31 theses were completed at a state university, while 5 were from a foundation university. The total number of theses was drawn from 36 universities.

Table 3

Distribution of Theses According to the Foundation Universities



The foundation universities include Bahçeşehir University with one thesis, Bilkent University with two theses, and Yeditepe University with three theses.

Table 4

Distribution of Theses According to State Universities

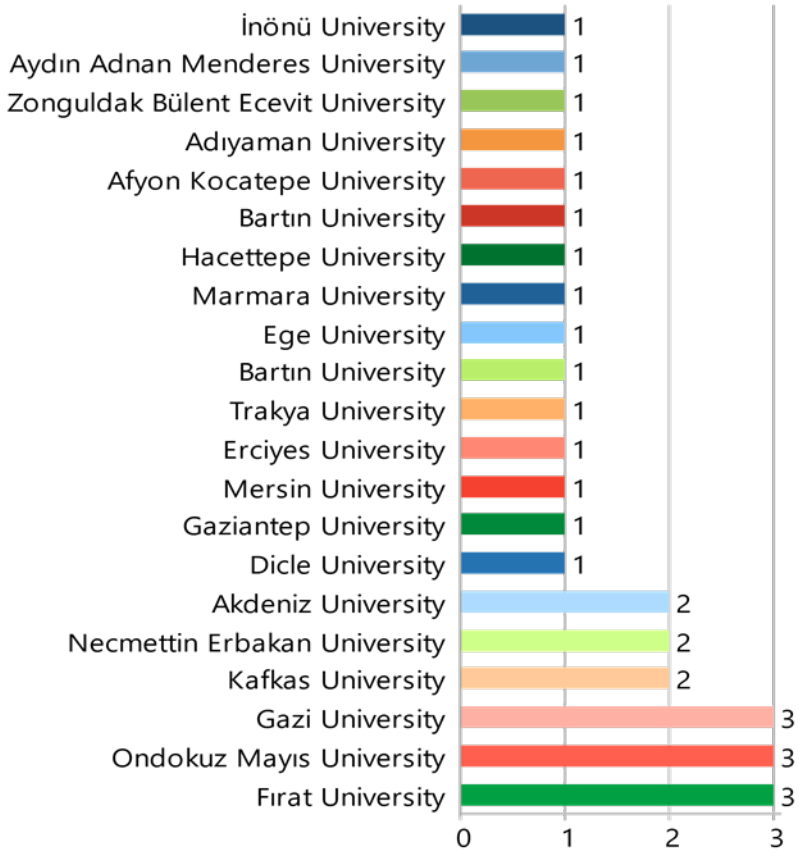


Table 4 shows that the most theses were completed in the field of curriculum and instruction at Gazi University (3), Ondokuz Mayıs University (3), and Firat University (3). In addition, Akdeniz University (2), Necmettin Erbakan University (2), and Kafkas University (2) are among the universities where 2 theses were completed in relation to 21st century skills in curriculum and instruction programs. In addition, universities with theses include Inonu, Aydın Adnan Menderes, Zonguldak Bulent Ecevit, Adıyaman, Afyon Kocatepe, Bartın, Hacettepe, Marmara, Ege, Bartın, Trakya, Erciyes, Mersin, Gaziantep, and Dicle. In this context, the distribution of postgraduate theses concerning 21st century skills in curriculum and instruction was conducted in 21 state universities in total within the scope of research.

Table 5

The Distribution of Data Collection Tools According to Qualitative Research

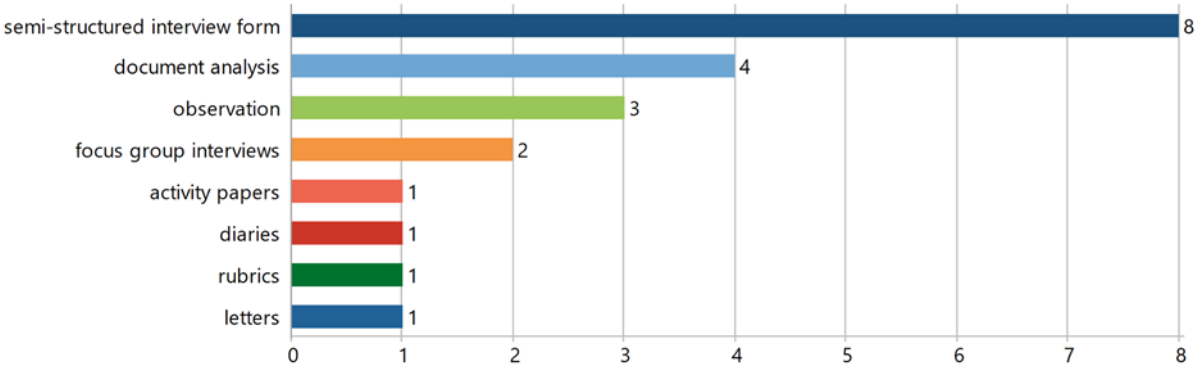
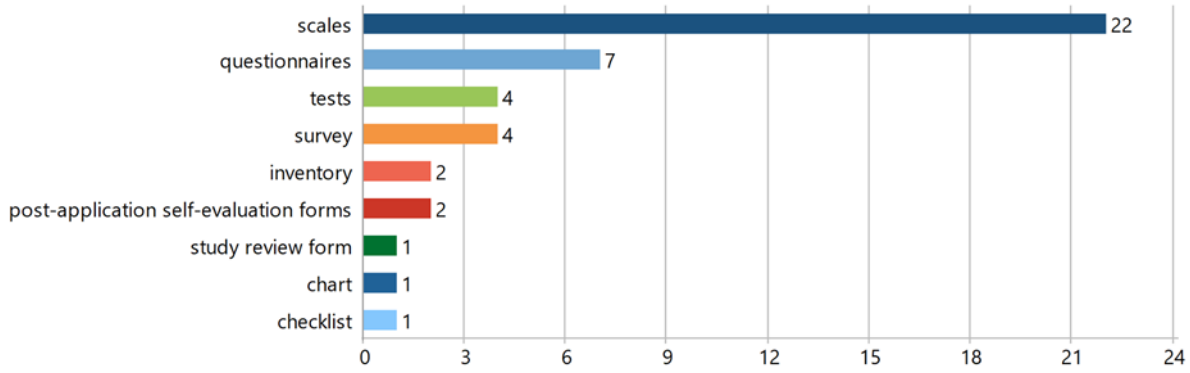


Table 5 indicates that the data collection tools for eight theses that used qualitative research methods include semi-structured interview forms. Four of the theses used document analysis. Three of these used observation tools, and the rest of the tools include activity papers, diaries, rubrics, and letters.

Table 6

The Distribution of Data Collection Tools According to Quantitative Research



With regard to the quantitative tools, 22 theses that used quantitative research method preferred attitude scales as the research tool. The other most preferred tools were questionnaires in seven theses, tests in four theses, and lastly, surveys in four theses. The total number of data collection tools in Table 6 is greater than the number of theses, as more than one data collection tool was chosen in the theses.

Table 7

Distribution of Theses According to the Purposes of the Studies

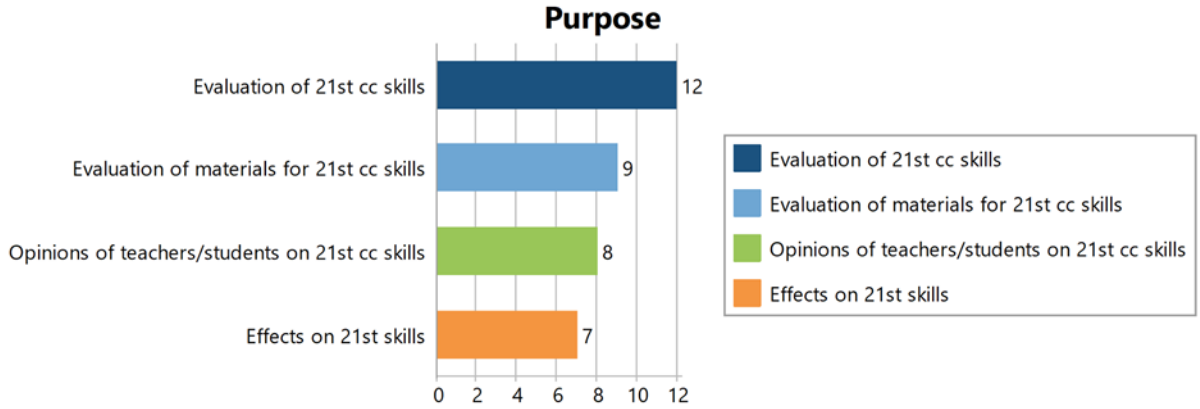


Table 7 presents the distribution of 36 theses based on the purpose of the research. The data reveal that the largest group of theses (12) aimed to assess the 21st-century skills of the participants. Nine theses focused on evaluating instructional materials related to 21st-century skills, while eight investigated the perspectives of teachers and students on these skills. Lastly, seven theses examined the factors influencing the development of 21st-century skills.

An analysis of the results from these 36 theses shows that the majority (16) centered on findings directly related to 21st-century skills. Fifteen theses explored teachers' and/or students' opinions on these skills, 11 evaluated 21st-century skills themselves, five focused on assessing educational materials for these skills, and another five examined the factors impacting the development of 21st-century skills.

5. Discussion and Conclusion

This study aimed to analyze curriculum and instruction graduate theses featuring 21st-century skills from 2014 to 2024, focusing on their distribution, methodologies, and content. A total of 36 theses were analyzed using MAXQDA, revealing insightful trends and patterns in academic research on this topic.

Analysis of the word cloud generated from the theses (Figure 1) shows a strong focus on the impact of the pandemic on education, with the term "education" appearing most frequently (34 occurrences), closely followed by "becerileri" (skills), "yüzyıl" (century), "bilgi" (information), "öğretmen" (teacher), and “öğrenme” (learning). This finding reflects global shifts in educational research toward examining skills that address current global challenges, including rapid technological advances and social changes (Xing & Marwala, 2017). The impact of COVID-19 has brought particular focus to the role of education in building resilience, adaptability, and digital competencies in learners, a trend seen globally (Bozkurt et al., 2020; Hodges et al., 2020).

The distribution of dissertations by year shows a notable increase in research on 21st-century skills in 2022, with 11 dissertations completed in that year. This trend reflects a growing academic interest in these skills, likely driven by the need to adapt education to rapidly changing technological and societal contexts. The relatively lower numbers in earlier years, such as 2016 and 2017, suggest that the focus on 21st-century skills has gained momentum more recently. This aligns with the rising demand for educational systems to equip students with skills essential for success in an increasingly digitalized world, such as digital literacy, problem-solving, and creativity (Scott, 2015; Voogt et al., 2013). Studies indicate that the evolving job market and digital economy require students to develop these adaptable skills to succeed in various fields (Kim et al., 2019).

The analysis of the distribution of theses by type of university shows that the majority of research on 21st-century skills was conducted at state universities (31 theses), with a smaller number at foundation universities (5 theses). This division might be due to larger-scale research funding at state institutions, which typically support extensive educational research (Altbach et al., 2009).

The methods used in these dissertations show a preference for quantitative methods (20 dissertations), followed by mixed methods (12 dissertations) and qualitative methods (5 dissertations). This trend suggests a strong inclination toward empirical, data-driven research in curriculum and instruction. Quantitative methods provide robust statistical analyses, while mixed methods combine qualitative insights with quantitative data to provide a comprehensive understanding of educational phenomena. These trends are consistent with the emphasis on evidence-based practices within educational research, where quantitative and mixed methodologies are valued for validating educational interventions' efficacy and impacts (Merriam & Tisdell, 2015; Creswell & Plano Clark, 2017). Research suggests that combining qualitative insights with quantitative data allows a more nuanced understanding of complex, skill-oriented educational outcomes (Yin, 2017; Tashakkori & Teddlie, 2010). However, increasing qualitative studies could enrich the field by offering deeper, context-specific insights (Miles et al., 2014).

The data collection tools used in the qualitative and quantitative research further illustrate the variety of approaches to studying 21st-century skills. Qualitative studies often use semi-structured interviews, document analysis, and observations, providing in-depth insights into participants' experiences and perspectives. On the other hand, quantitative studies primarily used attitude scales, questionnaires, and tests to measure specific variables and identify patterns and correlations. This use of diverse data collection methods aligns with research emphasizing the value of triangulation in increasing validity and capturing multi-dimensional aspects of educational contexts (Patton, 2015; Teddlie & Tashakkori, 2009).

In conclusion, this study provides a comprehensive analysis of curriculum and instruction graduate theses on 21st-century skills from 2014 to 2024. The findings reveal a growing academic interest in this

area, particularly in recent years, and highlight the diverse methodologies and research tools employed by scholars. The predominance of quantitative and mixed methods reflects a strong emphasis on empirical research, while the varied use of data collection tools underscores the complexity of studying 21st-century skills. These insights contribute to a deeper understanding of the academic landscape of 21st-century skills and emphasize the importance of continued research in this critical area of education. With rapid advances in technology and developments such as artificial intelligence transforming the educational landscape, it is essential for education systems to adapt and ensure that students and teachers are equipped with the skills needed to succeed in a complex, interconnected world (Zawacki-Richter et al., 2019).

6. Suggestions

To this end, research must be expanded based on the recent improvements to investigate the integration of 21st-century skills into curriculum and instruction programs. This research provides valuable insights into effective teaching practices and curriculum designs that aim to foster critical thinking, creativity, collaboration, and digital literacy, preparing students for the challenges and opportunities of the modern era. Building on the current study, which investigated 36 dissertations and theses, further research could also focus on a broader range of studies from diverse educational contexts around the world. That would provide a more comprehensive understanding of how 21st-century skills are being integrated globally.

Based on the results, the following recommendations are suggested to support the continued development of research on 21st-century skills:

1. **Encourage Diversified Research Approaches**: As most studies employ quantitative and mixed methods, incorporating more qualitative studies could provide deeper insights into the nuanced aspects of 21st-century skills, particularly around skills development and application.
2. **Promote Doctoral-Level Research**: Increasing the focus on doctoral research in this area can contribute to more advanced theoretical frameworks and long-term studies, deepening the academic understanding of how 21st-century skills evolve.
3. **Expand Research in Foundation Universities**: Since research from foundation universities appears limited, expanding studies within these institutions could diversify perspectives and methodologies, enriching the broader academic discourse.
4. **Integrate Interdisciplinary Studies**: Given the complexity of 21st-century skills, encouraging interdisciplinary research could bridge gaps between fields, enhancing the robustness of findings and their applicability in educational settings.
5. **Develop Specialized Data Collection Tools**: With diverse methodologies and data needs, creating or refining tools specific to assessing 21st-century skills could improve data accuracy and support more detailed analysis across studies.

These suggestions aim to deepen the research base, addressing gaps and promoting a comprehensive academic approach to 21st-century skills.

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Article Information Form

Author Notes: The author would like to express her sincere thanks to the editor and the anonymous reviewers for their helpful comments and suggestions.

Conflict of Interest Disclosure: No potential conflict of interest was declared by the author.

Artificial Intelligence Statement: Declaration of generative AI and AI-assisted technologies in the writing process. During the preparation of this work, the author used ChatGPT 4 in order to improve the readability and language of the manuscript. After using this tool/service, the author reviewed and edited the content as needed and took full responsibility for the content of the published article.

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