



Analyzing Turkey's Education Strategies and Policy Documents in the Context of Digital Transformation, Development and Artificial Intelligence*

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Article Information	ABSTRACT
<p><i>Received:</i> 25.05.2025</p> <p><i>Accepted:</i> 06.10.2025</p> <p><i>Online First:</i> 27.04.2026</p> <p><i>Published:</i> 30.04.2026</p>	<p>This systematic analysis evaluates Turkey's education strategies and policy documents, focusing on their compatibility with digital transformation and artificial intelligence (AI). The study aims to provide a comprehensive overview of the country's current educational landscape and its preparedness for emerging technologies. Employing content analysis, documents were selected based on their direct relevance to national education policy, digital transformation, and AI integration, including recent publications like the Higher Education Council's (YÖK) guide on generative AI. Findings indicate a significant gap between policy aspirations for digitalization and the on-the-ground realities of educational inequality and infrastructure deficits. While policy documents acknowledge these challenges, they often lack concrete mechanisms for sustainable implementation, a concern also highlighted in global reports. AI presents significant opportunities for personalized learning, teacher support, and curriculum development; however, it also raises critical ethical concerns regarding data privacy and equity. In conclusion, a multi-faceted and sustainable strategy is proposed to accelerate Turkey's digital transformation in education. This strategy should focus on strengthening the digital infrastructure to ensure equity of opportunity, aligning teacher training with new pedagogical models, establishing robust ethical guidelines for artificial intelligence, digitizing educational materials, centering stakeholder involvement in the system, and continuously feeding this entire process with research and development studies.</p> <p>Keywords: Turkish Education Policy, Digital Transformation, Artificial Intelligence in Education, Educational Technology, Policy Analysis</p>
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1. INTRODUCTION

In recent years, the use of artificial intelligence (AI) in education has been increasingly recognized for its transformative potential in shaping the future of learning. As countries strive to keep pace with technological developments, AI has become a focal point due to its significant impact. AI applications are revolutionizing electronic environments and transforming our interactions with technology (Dwivedi et al., 2021). Among the most notable AI innovations is ChatGPT, which became publicly available in late 2022 (Sallam, 2023). Despite the benefits, the widespread use of AI in education has brought a number of concerns. From completing homework assignments to conducting academic research, there are growing fears that authenticity is threatened (Rudolph et al., 2023). This situation is similar to the protests by maths teachers in the United States in 1988 against the use of calculators in schools (Mijwil et al., 2023). Nowadays, similar debates have emerged regarding the restriction of AI technologies in education.

In order to understand the role of AI in education, it is considered important to analyze the strategy and policy documents of various countries. These documents provide a basis for discussions and insights into the use of AI in education systems. In Turkey, various strategic plans and policies have been developed to pursue digital transformation, economic growth and

* This article was conducted on document analysis and does not contain any studies with human or animal subjects. All data have been obtained and reported by ethical concerns, principles, and rules.

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innovation in education (Ministry of Industry and Technology & Presidential Digital Transformation Office, 2021; Ministry of Science, Industry and Technology, 2018; Presidential Presidency of Strategy and Budget, 2023; MoNE, 2019).

This study aims to provide a comprehensive overview of the country's education policy by systematically analyzing documents published in Turkey that are directly or indirectly related to digital transformation, development and AI. Among the documents analyzed in the study, the Twelfth Development Plan, which emphasizes the country's long-term vision for economic growth, education and digital transformation is particularly significant. Turkey's holistic approach integrates technology into various societal domains and positions education as a central pillar for future development. The Digital Turkey 2030 vision further elaborates policies and strategies for comprehensive digital transformation (Presidency of the Republic of Turkey Strategy and Budget Directorate, 2023).

Analyzing strategy and policy documents in the educational context is important for several reasons. Firstly, strategy and policy documents provide insights into how schools manage external demands, set goals and make decisions (Honig & Hatch, 2004). This alignment helps schools navigate their way through complex educational environments and achieve broader educational goals. Second, such analyses shed light on the interactions between governments' actions and policy changes, especially during critical times such as the COVID-19 pandemic (Liu, 2021). These analyses provide important perspectives on the impact on policy formulation, implementation and educational practices.

Stakeholders can gain insights into possible strategies and directions by analyzing key policy documents such as national strategic plans and education frameworks (Sulong, 2022). This information is vital in shaping educational practices, resource allocation and overall quality of education. By analyzing policy documents at the national and university level, researchers can identify patterns, gaps and opportunities for improvement. Qualitative document analysis techniques provide valuable data on policy goals, strategies and objectives in education (Ahmad et al., 2024). This analysis is crucial for identifying gaps, inconsistencies and areas for improvement in educational policies. Furthermore, evaluating the impact and effectiveness of policies through document analysis helps to assess the roles of teachers, students and technologies in the education sector (Melese et al., 2024). Critical analysis of these documents also reveals areas where definitions or strategies need to be improved to better achieve educational goals.

Consequently, analyzing strategy and policy documents in education is essential to guide decision-making processes, understand the actions of governments, shape educational practices and promote excellence in education. Through this analysis, researchers, policy makers and educators can gain valuable insights into the dynamics of education systems, identify areas for improvement and work towards creating more effective and inclusive educational environments.

1.1. Purpose of the Study

This study evaluates the digital transformation, development and AI compatibility of Turkey's education strategies and policy documents, which have been systematically analyzed, and aims to provide a comprehensive overview of the country's education policy in this direction. Three objectives were set to achieve this goal. Firstly, it was aimed to systematically review and categorize the main themes, objectives and scope of Turkey's education policy documents in order to understand the strategic priorities. Secondly, to assess the proposed strategies and the expected impact on educational outcomes to reveal how digital transformation, development and AI are integrated into education policies. Third and finally, it is aimed to document how stakeholders' views and concerns, if any, are reflected in policy documents. In line with these aims and objectives, answers to the following research questions were sought:

1. In relation to the policy documents in Turkey;
 - a) What is their purpose and scope?
 - b) What are the main themes?
2. What are the common themes/concepts in policy documents in Turkey?
3. In policy documents in Turkey;
 - a) Which targets and findings are reported?
 - b) In which ways are these objectives and findings similar?
 - c) What is the place of artificial intelligence?
 - d) Which educational success criteria are reported?
4. How are stakeholder views, challenges and concerns regarding the use of AI in education reflected in policy documents in Turkey?

2. METHODOLOGY

Content analysis method was used in this study. Content analysis is a scientific approach that allows verbal, written and other materials to be analyzed objectively and systematically (Tavşancıl & Aslan, 2001). In the domain of educational sciences, content analysis is a prevalent methodology, offering a systematic and replicable approach. This technique entails the condensation of textual elements, such as books, chapters, reports, and historical documents, into smaller categories through coding that

adheres to predefined criteria. Yıldırım and Şimşek (2006) explained the main purpose of content analysis as reaching concepts and relationships that can explain the collected data. For this purpose, the data collected must first be conceptualized and then organized in a meaningful way according to the emerging concepts and themes explaining the data must be determined accordingly. Accordingly, content analysis has four stages: processing the qualitative data obtained from the documents, coding the data, determining the themes, organizing the codes and themes, defining and interpreting the findings.

In this study, firstly, various categories were created with the criteria to be used in policy document selection. Then, a subject-based search strategy was preferred and the year range to be used in the selection of the policy documents were determined. The methods and techniques to be used in data analysis were selected in order to examine, interpret and synthesize the identified policy documents. Then, coding was done and various themes were reached in this context. After this stage, the data were organized, grouped according to the themes and, where appropriate, the data were quantified and presented. Finally, the findings were interpreted. In the following sections, the methodology of the research is explained in detail.

2.1. Creating Categories with Criteria

In this study, a systematic analysis of Turkey's education strategies and policy documents has been conducted, focusing on their compatibility with digital transformation, development and AI. The aim of this analysis is to provide a comprehensive overview of Turkey's approach to the use of AI in education, focusing on understanding the main themes, objectives, recommendations and the evolution of these policies over time. To achieve this, a set of criteria and categories were established to guide the analysis.

Criteria included relevance, date of publication, publishing institution/organization, purpose of the document, scope and depth. The authors and one expert held three iterative discussion sessions during the criteria setting process. These criteria were used to ensure the selection of policy documents that were directly related to the research objectives, to measure the reliability of the sources, and to assess the scope and depth of each document. Table 1 presents the criteria and the rationale for these criteria.

Table 1.

Criteria Used in Policy Document Selection

No	Criteria	Purpose/Justification for Use
1	Compliance	Relevance to research objectives.
2	Publication Date	Date of publication of the document to track changes in policies and strategies related to the use of AI in education.
3	Publishing Institution/Organization	Reliability and impact of the information. Is it an official policy document of a government agency, an academic report or a recommendation of an educational institution?
4	Objective	Objective for which the document was published.
5	Scope and Depth	The scope and depth of the document. Some of the documents provide a broad overview of AI in education, while others may delve into specific aspects.

In the study, the main aspects of the policy documents were categorized (See Table 2). The main categories identified within the scope of the study include the main theme of the document, the objectives set out in the policy and the recommendations for the use of AI in education. Furthermore, the perspectives of various stakeholders, including governmental organizations, educators, students and industry experts, if any, were also taken into account. Finally, the challenges and concerns raised in these documents are analyzed and categorized.

Table 2.

Categories Used in the Evaluation of Policy Documents

No	Criteria	Purpose/Justification for Use
1	Main Themes	Categorization of the main themes in the policy documents. Key themes may include concepts such as increasing digital literacy, personalized learning, teacher support, curriculum development or AI ethics. In documents, frequently used keywords can be related to the theme of the document or to the policies of the organization/institution that published the document.
2	Educational Objectives and Findings	Identification and categorization of the educational objectives stated in the documents. The objectives may be to improve student performance, improve access to education, promote innovation or increase the efficiency of the education system.

3	Place of AI	Identification and categorization of references to AI in documents.
4	Success Criteria	Classification of indicators or metrics to measure the success of the use of AI in education. Indicators can be focal points such as student outcomes, cost or technology adoption.
5	Educational Recommendations and Stakeholder Views	Classifying and analyzing the recommendations in the documents. Recommendations could be curriculum changes, teacher training, improvement of technological infrastructure, code of ethics and research funding.
6	Challenges and Concerns	Reporting the challenges and concerns expressed in the documents. Challenges and concerns can be categorized according to issues such as privacy, equity, barriers to implementation or ethics.

With the analysis approach presented in Table 2 within the scope of the study, it is thought that by providing a comprehensive and structured analysis, it can provide a common language in the process of obtaining valuable insights for policy makers, educators and researchers who want to understand and contribute to the use of AI in education in the Turkish context.

2.2. Selection of Policy Documents

The policy documents to be analyzed within the scope of the study were selected by a research group consisting of two researchers other than the authors of the study. The researchers collected the names of the documents or the institutions/organizations that published policy documents in the field of education in a search list. Based on this list, the year criteria for the documents to be included in the research were determined by *systematic mapping* method before starting the document searching. In this context, the Web of Science database was searched as it covers a wide range of high-quality educational journals. A subject-based search strategy was preferred for accessing the studies. This strategy is preferred to select articles from a pool of words labelled by their authors. In this context, two different keyword sets were created. One of these sets is related to AI, while the other is focused on education. Using the OR operator, synonymous and closely related terms in each set of keywords were combined and then linked using the AND operator to relate both sets. The search was conducted in November 2023 using the following English keywords.

- (ALL=(**artificial intelligence**) OR ALL=(**AI**) OR ALL=(**generative AI**)) AND
- (ALL=(**education**) OR ALL=(**education policy**) OR ALL=(**education strategy**))

The accessed studies were filtered and limited with the category of education and educational research considering the scope of the study. As a result, 1,676 studies were accessed in this review. The distribution of these studies according to publication years is presented in Figure 1.

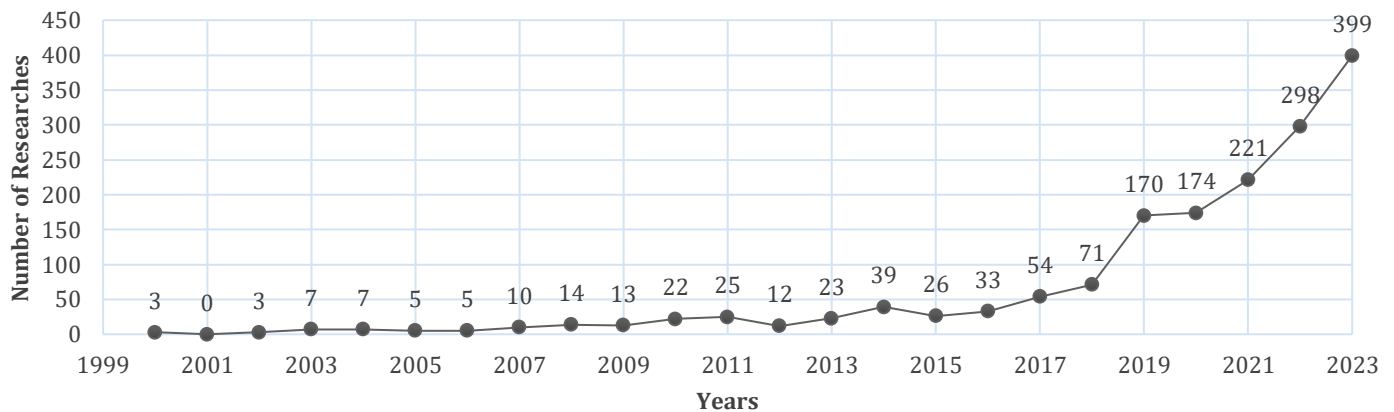


Figure 1. Distribution of studies in which education and AI are analyzed together by years.

As can be seen in Figure 1, the number of studies showed a steady distribution until 2018. While the number of studies was 71 in 2018, it increased significantly to 170 in 2019. When analyzing the total number of studies, it can be seen that while 301 studies were conducted until 2018, this number has reached 1,333 since 2018. As a result, the number of studies carried out in this field in the last five years is four times higher than the number of studies carried out in 18 years. In this context, documents published in 2018 and later were included in the review. The year 2018 was chosen as the starting point because, as shown in the data presented in Figure 1, it marks a turning point where the number of academic publications on artificial intelligence and education began to increase sharply. This suggests that policy documents from 2018 onwards are more likely to reflect the growing strategic focus on this topic.

The policy documents published with reference to the searching list were obtained from the websites of the relevant institutions and collected in a pool. Then, the working group came together again and analyzed the pool and possible document suggestions were put forward. The pool of policy documents is presented in Table 3 according to the criteria determined in the previous section.

Table 3.

Policy Documents Analyzed in the Scope of the Research and Their Compliance with the Determined Criteria

No	Document Title	Compliance	Publication Date	Publishing Organization	In-Text Citation
1	2022 Education Evaluation Report	Education Policies and Strategies	2023	TEDMEM (Turkish Education Association)	(TEDMEM, 2023a)
2	Digital Turkey 2030: Economic Impacts and Policy Framework	Digital Transformation and Technology Policies	2023	Vodafone & Policy Analysis Laboratory	(Vodafone & Policy Analysis Lab., 2023)
3	Twelfth Development Plan (2024 - 2028)	Development Plans and Strategic Documentation	2023	Presidency of the Republic of Turkey Presidency of Strategy and Budget	(Presidency Strategy and Budget Directorate, 2023)
4	TRAI Productive Artificial Intelligence Report	AI Policies and Strategies	2023	TR AI	(TR AI, 2023)
5	Call to Action for High Technology in Turkey's 2nd Century	Digital Transformation and Technology Policies	2023	TÜSİAD (Turkish Industry and Business Association) & TÜBİSAD (Informatics Industrialists' Association)	(TÜSİAD & TÜBİSAD, 2023)
6	A New Understanding of Education is Necessary	Education Policies and Strategies	2023	TEDMEM (Turkish Education Association)	(TEDMEM, 2023b)
7	2021 Education Evaluation Report	Education Policies and Strategies	2022	TEDMEM (Turkish Education Association)	(TEDMEM, 2022)
8	Education Monitoring Report 2022	Education Policies and Strategies	2022	ERG (Education Reform Initiative) & Education Observatory	(ERG & Education Observatory, 2022)
9	2020 Education Evaluation Report	Education Policies and Strategies	2021	TED (Turkish Education Association)	(TED, 2021)
10	Education in Turkey under COVID-19	Education Policies and Strategies	2021	ERG (Education Reform Initiative) & TÜSİAD	(ERG & Education Observatory, 2021a)
11	Education Monitoring Report 2021: Educational Environments	Education Policies and Strategies	2021	ERG (Education Reform Initiative) & Education Observatory	(ERG & Education Observatory, 2021b)
12	Future of Software Ecosystem in Turkey	Digital Transformation and Technology Policies	2021	Deloitte & TÜSİAD (Turkish Industry and Business Association)	(Deloitte & TÜSİAD, 2021)
13	National Artificial Intelligence Strategy Document 2021 - 2025	Digital Transformation and Technology Policies	2021	Republic of Turkey Ministry of Industry and Technology & Republic of Turkey Presidency Digital Transformation Office	(Ministry of Industry and Technology & Presidency Digital Transformation Office, 2021)
14	2019 Education Evaluation Report	Education Policies and Strategies	2020	TED (Turkish Education Association)	(TED, 2020a)
15	Education in the COVID-19 Process: Distance Learning,	Education Policies and Strategies	2020	TED (Turkish Education Association)	(TED, 2020b)

16	Problems and Solutions Education Monitoring Report 2020: Educational Environments	Education Policies and Strategies	2020	ERG (Education Reform Initiative) & Education Observatory	(ERG & Education Observatory, 2020)
17	STEM Education for Industry 4.0 in Vocational and Technical High Schools	Education Policies and Strategies	2020	TÜSİAD (Turkish Industry and Business Association) & Istanbul Aydın University STEM Education Application and Research Centre	(TÜSİAD & Istanbul Aydın University, 2020)
18	Opinions and Suggestions for the Development of Artificial Intelligence in Turkey	AI Policies and Strategies	2020	TBD (Turkish Informatics Association)	(TBD, 2020)
19	2018 Education Evaluation Report	Education Policies and Strategies	2019	TED (Turkish Education Association)	(TED, 2019)
20	Education Monitoring Report 2019: Content of Education	Education Policies and Strategies	2019	ERG (Education Reform Initiative) & Education Observatory	(ERG & Education Observatory, 2019)
21	Eleventh Development Plan (2019 - 2023)	Development Plans and Strategic Documentation	2019	Strategy and Budget Directorate of the Presidency of the Republic of Turkey	(Presidency Strategy and Budget Directorate, 2019)
22	Republic of Turkey Ministry of National Education 2019-2023 Strategic Plan	Education Policies and Strategies	2019	Republic of Turkey Ministry of National Education (MoNE)	(MoNE, 2019)
23	Digital Technologies and Economic Growth	Digital Transformation and Technology Policies	2018	TÜSİAD (Turkish Industrialists' and Businessmen's Association)	(TÜSİAD, 2018)

As seen in Table 3, there are 23 policy documents accessed and analyzed within the scope of the research. The publication dates of these documents cover the years 2018-2023. During the document searching process, the backward search channel was also used to expand the scope of the study. The backward search involves considering the list of references cited by the documents analyzed as a result of the search (Xiao & Watson, 2019). In this context, the documents in Table 4 were also included in the study.

Table 4.
Documents Included in the Study within the Scope of Retrospective Research

No	Document Name	Compliance	Publication Date	Publishing Organization	In-Text Citation
1	Turkey's Industrial Revolution: Digital Turkey Roadmap	Digital Transformation and Technology Policies	2018	Republic of Turkey Ministry of Science, Industry and Technology	(Ministry of Science, Industry and Technology, 2018)

As seen in Table 4, 1 document was reached in the retrospective research and the relevant document was included in the study.

2.3. Analyzing Data

In this study, in which both qualitative and quantitative approaches were adopted, the reports examined and the data obtained were analyzed using methods appropriate to both approaches. Qualitative data analysis is a process in which the researcher organizes the data, divides them into units of analysis, synthesizes them, divides them into categories and themes, and decides which of them should be reflected in the report by considering them from an interpretive perspective (Bogdan & Biklen, 1997).

2.4. Reliability and Validity

One of the researchers conducted a document search using the research strategy. The reports were downloaded to the researcher's computer and the titles of the studies, the year and the publishing institution/organization were reported in a spreadsheet file.

The internal validity of the research can be expressed as whether the differences on the dependent variable are directly caused by the independent variable. External validity is related to the generalizability of the findings obtained at the end of the research (Fraenkel & Wallen, 2006). In the study, various measures were taken to ensure internal validity. Firstly, the selection of documents was unbiased and the relevant documents were selected by a working group including the authors according to the criteria determined before the research. The processes of document selection and data extraction in the selected documents are explained in detail. In order to ensure the external validity of the research, the process followed about the methodology of the research, such as how the documents and data were analyzed and how the results were reached, was reported in detail. In addition, during the analysis process, continuous and repeated revisions were made through discussion, doubt removal and consensus building (Boesch et al., 2013). This iterative approach ensured that any disagreements in coding were resolved and a shared understanding was maintained throughout the analysis.

3. POLICY DOCUMENTS

Within the scope of this study, the policy documents listed in Tables 3 and 4 were analyzed. Selected according to the criteria in Table 1, these documents, published between 2018 and 2023, collectively map the evolution of Turkey's policy discourse. Rather than being standalone publications, they form a dynamic dialogue between government bodies, industry associations, and civil society organizations. This section presents these documents sequentially to trace this conversation, highlighting how early diagnostic reports prompted official strategies, which in turn were scrutinized by independent evaluations, leading to a more nuanced and mature policy landscape. The analysis below aims to illuminate the interplay between these different voices, focusing on the converging and diverging perspectives on Turkey's digital and educational transformation.

3.1. Digital Technologies and Economic Growth: Turkey's Position, Opportunities and Options in Digital Technology Sectors

The policy dialogue of this period was significantly shaped by an early diagnostic from the private sector. TÜSİAD's 2018 paper functions as a foundational text, framing digital transformation not merely as a technological shift but as a critical economic imperative. By analyzing Turkey's position and identifying threats and opportunities, the document effectively set the agenda for subsequent government action. It articulated the private sector's perspective on the urgency of developing a national strategy, thereby creating a benchmark against which future official policies could be compared.

3.2. Turkey's Industrial Revolution "Digital Turkey" Road Map

Responding to the same global pressures identified by industry actors like TÜSİAD, the Ministry of Science, Industry and Technology released its official strategy in the same year. This 2018 roadmap represents the government's formal acceptance of the challenge. In contrast to the diagnostic nature of the TÜSİAD report, this document is a prescriptive framework, conceptualizing the digital transformation of manufacturing as a long-term journey. Its formulation around six core components—people, technology, infrastructure, suppliers, users, and governance—demonstrates a comprehensive, state-led ambition to orchestrate a complex ecosystem.

3.3. Republic of Turkey Ministry of National Education 2019 - 2023 Strategic Plan

Concurrent with the push for industrial digitalization, a parallel and equally critical effort was underway to reform the human capital pipeline. The Ministry of National Education's 2019-2023 Strategic Plan represents the official reform agenda in this domain. Aiming for a "quality revolution," this plan serves as the primary government narrative on education, outlining a top-down vision for systemic improvement. Its reliance on analytical tools like PESTLE and SWOT signals an intent to create a data-informed policy, establishing an official set of objectives and strategies for the nation's educational future.

3.4. Eleventh Development Plan (2019 - 2023)

The Eleventh Development Plan serves as a high-level strategic umbrella, integrating the distinct goals of industrial transformation and human capital development into a single national vision. As the first development plan of the Presidential Government System, it elevates themes like the "national technology move" to the highest level of state policy. This document is crucial because it codifies the ambitions outlined in more specific roadmaps (like the "Digital Turkey" roadmap) and educational plans, framing them as integral components of Turkey's long-term quest for global competitiveness and public welfare.

3.5. Education Monitoring Report 2019: Content of Education

While the Development Plan outlined the national vision, the Education Reform Initiative (ERI) provided a granular, independent analysis of the education system's realities. Published in the same year, this report introduces a critical counter-narrative from civil society. By focusing on specific issues like secondary education design, vocational training, and gender equality, ERI's work provides a necessary on-the-ground assessment of the policies promoted by the Ministry. It marks the entry of a consistent, evidence-based monitoring voice into the policy conversation.

3.6. 2018 Education Evaluation Report

Similarly, the Turkish Education Association's (TED) 2019 report on the preceding year offers another critical perspective, reinforcing the role of non-governmental organizations in policy evaluation. Complementing the ERI's focus, TEDMEM's report provides a comprehensive, nine-part analysis of the entire education system, from governance to teacher training. The existence of multiple, data-rich evaluation reports from both ERI and TEDMEM demonstrates a robust civil society ecosystem dedicated to holding public policy accountable and enriching the debate with independent data.

3.7. Opinions and Suggestions for the Development of Artificial Intelligence in Turkey

As the general discussion on digital transformation matured, the focus began to narrow onto specific disruptive technologies. The Turkish Informatics Association's (TBD) 2020 report represents a pivotal conceptual step in this direction. Defined as a "conceptual document" rather than a formal strategy, it served to socialize ideas and build consensus around the necessary steps for developing a national AI ecosystem. This report can be seen as the intellectual groundwork that paved the way for the more formal, state-led strategy that would follow.

3.8. STEM Education for Industry 4.0 in Vocational and Technical High Schools

This 2020 report provides a critical link between the ambitions for a high-tech economy (as discussed in documents 3.1, 3.2, and 3.7) and the educational reforms needed to support it (as outlined in document 3.3). By investigating the implementation of STEM and Industry 4.0 concepts within vocational high schools, this TÜSİAD and Istanbul Aydın University study tests the practical feasibility of national strategy at the classroom level. It highlights the potential gap between high-level policy goals and the actual capacity of the education system to produce the required skilled workforce.

3.9. Education Monitoring Report 2020: Educational Environments

The established policy trajectory was abruptly disrupted by the onset of global and national crises. ERI's 2020 report reflects this shift, as its analysis of "Educational Environments" is inevitably framed by the impacts of the COVID-19 pandemic and earthquakes. This document shows how external shocks forced a re-evaluation of educational priorities, moving beyond curriculum to fundamental issues of physical, social, and emotional safety. It marks a point where crisis response began to intersect with long-term reform efforts.

3.10. Education in the COVID-19 Process: Distance Learning, Problems and Solutions

TED's 2020 report directly confronts the primary educational challenge of the year. It provides an immediate and focused analysis of the emergency transition to distance learning, documenting the problems encountered and proposing solutions. In dialogue with ERI's broader report on educational environments, this document offers a specific critique of the pandemic response, examining the effectiveness of tools and strategies deployed under crisis conditions and contributing to a real-time policy feedback loop.

3.11. 2019 Education Evaluation Report

Published in 2020, TED's evaluation of the pre-pandemic year of 2019 serves as an important baseline. By analyzing the state of the education system just before the COVID-19 crisis, this report provides a crucial "before" picture. When read alongside the pandemic-focused reports of the same year, it allows for a clearer understanding of which challenges were chronic and which were acutely triggered by the emergency, enriching the overall analysis of the system's resilience.

3.12. National Artificial Intelligence Strategy 2021 - 2025

This official strategy document represents the culmination of the earlier, more conceptual discussions on AI (e.g., TBD's 2020 report). Published by the Ministry of Industry and Technology and the Digital Transformation Office, it marks the transition from ideas to a concrete, actionable state policy. With its 24 objectives and 119 measures, the strategy institutionalizes Turkey's

AI ambitions, providing a formal framework for public and private sector action and signaling a new level of maturity in the country's technology policy.

3.13. Future of Software Ecosystem in Turkey

Just as the government was formalizing its AI strategy, this 2021 report from Deloitte and TÜSİAD introduced a sobering reality check from the industry. It argues that despite strategic planning and a growing startup ecosystem, Turkey has failed to capture its deserved share of the global software market. This document creates a productive tension with the optimistic tone of official strategies, highlighting a persistent gap between policy ambition and economic outcomes and suggesting that the existing support mechanisms were insufficient.

3.14. Education Monitoring Report 2021: Educational Environments

ERI's 2021 report continues the analysis of education under crisis, deepening the themes from its 2020 predecessor. The focus on home environments, digital media, and the "school as the third teacher" reflects a more profound understanding of the pandemic's impact. Significantly, this report expands the definition of "crisis" to include climate change, arguing for a "holistic resilience approach." This represents an evolution in the thinking of civil society, pushing the policy debate beyond immediate emergencies toward long-term systemic preparedness.

3.15. Education in Turkey under COVID-19

This joint ERI and TÜSİAD report from 2021 synthesizes the lessons learned from over a year of pandemic-affected education. Drawing on a webinar series, it consolidates expert opinions and official data to provide a comprehensive assessment. It functions as a capstone analysis of the initial crisis period, formalizing the challenges and opportunities for transformation that were first identified in the more immediate response reports of 2020.

3.16. 2020 Education Evaluation Report

TEDMEM's 2021 evaluation of the first pandemic year provides a structured historical record of the educational system's response. It methodically analyzes the challenges, setbacks, and coping mechanisms across all major sub-domains of education. This report complements the more thematic analyses from ERI by offering a comprehensive, almanac-style review, solidifying the data-based understanding of the pandemic's profound impact.

3.17. Education Monitoring Report 2022

In its 2022 report, ERI shifts its focus to systemic issues that persisted through the crisis: preschool education, vocational training, and teacher policies. The use of content analysis to map the Ministry of National Education's own public communications is a novel methodological approach, allowing ERI to critically evaluate the Ministry's stated priorities against its actual public messaging. This demonstrates a growing sophistication in the monitoring techniques used by civil society organizations.

3.18. 2021 Education Evaluation Report

TEDMEM's 2022 report examines the "return to school" year of 2021. The central theme is the need to build a system resilient against "unknown crises," reflecting the key lesson learned from the pandemic. This document moves the conversation from reactive crisis management to proactive resilience-building. By providing data-based contributions, it aims to influence future policy to be more durable and adaptive.

3.19. A New Understanding of Education is Necessary

Published in 2023, this TEDMEM document elevates the policy discussion to a higher conceptual level. It argues that the cumulative weight of recent crises necessitates a fundamental paradigm shift in education. By categorizing the core problems of the Turkish system—from rote learning to a lack of crisis resilience—and offering solutions, it serves as a manifesto for deep-seated change, synthesizing the findings of its previous annual reports into an urgent call for a new educational philosophy.

3.20. Call to Action for High Technology in Turkey's 2nd Century

This 2023 report from TÜSİAD and TÜBİSAD represents a renewed and more forceful push from the industry. It directly addresses the persistent implementation gaps identified in earlier reports (like the 2021 software ecosystem analysis). Its concrete, ambitious proposals—such as a "Technology Development Bank" and restructuring incentives—are not just

recommendations but a clear "call to action," signaling the private sector's view that the current pace and direction of digital transformation are inadequate to meet Turkey's long-term goals.

3.21. TRAI Productive Artificial Intelligence Report

Reflecting the hyper-accelerated pace of technological change, this 2023 report brings the policy conversation to the cutting edge of AI. Its focus on Generative AI—a topic not central to the 2021 National AI Strategy—demonstrates how quickly official strategies can be outpaced. The report serves as an urgent update for all stakeholders, mapping the new landscape and highlighting the transformative impact on businesses, implicitly arguing that any national strategy must now account for this new paradigm.

3.22. Twelfth Development Plan (2024 - 2028)

The Twelfth Development Plan is the government's latest comprehensive vision, and it clearly reflects the policy dialogues of the preceding five years. Its explicit central axis of "green and digital transformation" shows that the themes championed by industry and civil society have been fully integrated into the highest level of national strategy. This plan can be read as a response to the entire body of literature that precedes it, attempting to provide a stable, long-term roadmap that incorporates lessons learned from past challenges and crises.

3.23. Digital Turkey 2030: Economic Impacts and Policy Framework

This 2023 report from Vodafone and Policy Analysis Laboratory acts as a forward-looking policy brief, designed to directly inform strategy documents like the Twelfth Development Plan. By comparatively analyzing Turkey's digitalization across society, companies, and government, it synthesizes the challenges and offers a consolidated set of recommendations. It represents a constructive effort to bridge analysis and action, providing a ready-made framework for policymakers aiming to accelerate digital transformation.

3.24. 2022 Education Evaluation Report

As one of the final documents in this period, TEDMEM's 2023 evaluation of the 2022 school year serves as a comprehensive stocktaking. It functions as an "almanac of education," providing a data-rich summary of the system's state after the most acute phase of the pandemic had passed. By encompassing the evolution of TEDMEM's own monitoring efforts, the report not only evaluates the education system but also reflects on the practice of policy monitoring itself, closing the loop on a five-year cycle of intense scrutiny and debate.

A collective analysis of these policy documents reveals a recurring pattern in Turkey's approach to strategic transformation: a strong capacity for ambitious, centralized vision-setting that often struggles with cohesive and consistent on-the-ground implementation. This dynamic is not new; it reflects the legacy of large-scale initiatives like the FATİH Project, where the distribution of technological hardware took precedence over pedagogical integration and teacher preparedness, leaving a significant gap between investment and educational outcomes. Similarly, the rapid scaling of the EBA platform during the COVID-19 pandemic showcased the state's impressive reactive capabilities, yet it also laid bare the chronic digital divide and the challenges of ensuring equitable access—issues consistently highlighted in the monitoring reports by civil society organizations such as ERI and TEDMEM. Ultimately, the policy landscape of the 2018-2023 period suggests a system adept at generating forward-looking strategies for the digital economy and education, but less proficient at ensuring the two domains evolve in genuine synergy. The critical challenge for the coming period, therefore, lies not in the formulation of new plans but in creating resilient, flexible, and equitable implementation mechanisms that ensure technological advancements translate into tangible and widespread societal progress.

4. FINDINGS AND DISCUSSION

The findings are presented in such a way that the sub-problems identified in accordance with the purpose of this research are answered separately. In this context, headings were created for each research question.

4.1. Purpose, Scope and Main Themes of Policy Documents Published in Turkey

The reports analyzed in this study provide a general framework for the future of Turkey's education system. The 2023 Education Vision and the Eleventh Development Plan focus on increasing the quality and access to education, building the capacity of teachers and improving educational infrastructure. The TÜSİAD report provides recommendations on how digital transformation can be integrated into the education system. ERG and TEDMEM reports focus on monitoring and evaluating the performance of the education system in Turkey.

The reports reveal persistent inequalities in education, a shortage of teachers, and inadequate educational infrastructure. The negative impact of the COVID-19 pandemic on education is also highlighted in reports. Some reports focus on specific issues such as special education, the education of migrant and refugee children, and vocational education. These reports present the problems and solutions in these areas. A significant number of reports include content related to digital transformation in education. These reports provide information and recommendations on different aspects of the education system. The reports show that there are still many problems in education, but important steps have been taken to improve the education system. It is emphasized that all stakeholders (public, private sector, NGOs, academics, etc.) need to work together for a successful digital transformation of education in Turkey.

Analysis of the reports reveals several commonalities. Almost all reports emphasize that there are inequalities in education and teacher shortages in Turkey. The reports show that inadequate educational infrastructure is also an important problem. All reports emphasize the importance of digital transformation in education and argue that developments in this field will contribute to improving the education system. There are also points where the reports differ from each other. For example, while some reports focus on general education policies, others focus on specific issues such as “special education, education of migrant and refugee children, vocational education, etc.”. For example, the TEDMEM (2019) report focuses on inequalities in education in general, while the ERG & Education Observatory (2021b) report focuses on inequalities in migrant and refugee children's access to education.

Different approaches are also evident in the reports. While some reports adopt a more theoretical approach, others take a more practical approach. While the TÜSIAD (2018) report provides a theoretical framework on how digital transformation can be integrated into the education system, the National Artificial Intelligence Strategy prepared by the Ministry of Industry and Technology & Presidential Digital Transformation Office (2021) sets out concrete practices and targets in this area. Therefore, while some of the reports provide general recommendations, others offer more concrete and applicable suggestions. While the MoNE (2019) 2023 Education Vision offers general recommendations to eliminate inequalities in education, the ERG & Education Observatory (2021b) report offers concrete recommendations to increase access to education for migrant and refugee children.

As a result of the thematic analysis conducted within the scope of this study, the common themes that stand out in the reports examined are presented in Figure 2.

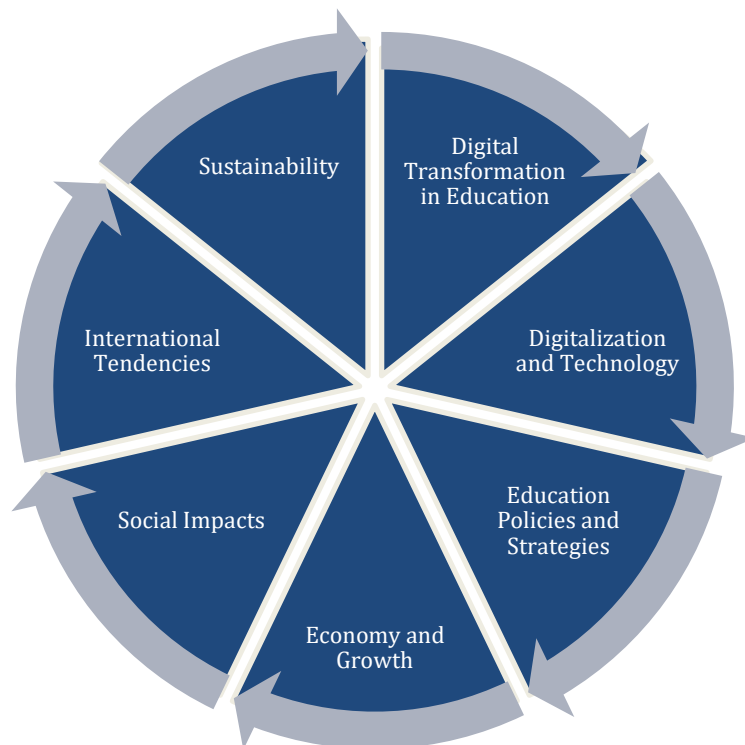


Figure 2. Themes emerging in the analyzed policy documents.

Figure 2 visualizes the themes as components of a single, interconnected system. Its circular design, where each theme is an equal segment, is deliberate. It argues that no single theme can be understood in isolation. For instance, "Digital Transformation in Education" is influenced by "International Tendencies" and has direct "Social Impacts." The arrows suggest a dynamic, continuous relationship, where all themes mutually influence one another. While this model posits a balanced interrelationship,

Table 5 provides the empirical data that quantifies the actual prevalence of these themes in the analyzed reports. The frequency counts (f) in the table reveal a distinct hierarchy among the themes, demonstrating which topics in fact dominate the current discourse.

Table 5.
Frequency Analysis and Explanation According to the Themes of the Analyzed Reports

Themes	f	Description	Sample Reports
Digital Transformation in Education	12	New technologies used in education, distance education, online learning, use of AI in education and educational technology trends.	TED, TEDMEM, ERG & Education Observatory, TÜSİAD & Istanbul Aydın University
Digitalization and Technology	10	The effects of digital transformation in different sectors, e-commerce, use of mobile technology, AI and automation, data security and privacy.	TÜSİAD, Ministry of Science, Industry and Technology, TBD, Deloitte & TÜSİAD, Vodafone & Policy Analysis Lab.
Education Policies and Strategies	8	Ministry of National Education's education policies and strategies, curriculum reforms, teaching profession, assessment and evaluation system, special education and vocational education.	MoNE, TED, ERG & Education Observatory, TEDMEM
Economy and Growth	7	Contributions of digital transformation to the economy, e-government applications, entrepreneurship and innovation, research and development (R&D) investments, employment and unemployment.	Presidential Strategy and Budget Directorate, TÜSİAD & TÜBİSAD
Social Impacts	5	The effects of digital transformation on society, social inequalities, digital literacy, cyberbullying, changing roles in family and society.	Vodafone & Policy Analysis Lab, ERG & Education Observatory
International Trends	4	Education and technology trends in the world, education policies of OECD countries, international exams, good practices in education.	TED, ERG & Education Observatory, Presidency Strategy and Budget Directorate
Sustainability	2	Environmental impacts of digital transformation, sustainable development goals, green technologies, energy efficiency.	Presidential Strategy and Budget Directorate

An analytical interpretation of the data presented in Table 5 reveals a distinct hierarchy of priorities within the discourse on digital transformation. The analysis of thematic frequencies indicates a predominant focus on the instrumental aspects of technology, with "Digital Transformation in Education" (f=12) and "Digitalization and Technology" (f=10) emerging as the most salient themes. This techno-centric orientation is followed by a secondary, yet significant, concern for the structural implications of these changes, as evidenced by the frequencies of "Education Policies and Strategies" (f=8) and "Economy and Growth" (f=7). In stark contrast, themes addressing the broader societal and ethical ramifications are notably marginalized. The relatively low frequencies for "Social Impacts" (f=5) and the minimal attention given to "Sustainability" (f=2) suggest that critical issues such as digital inequality, societal well-being, and environmental consequences are treated as peripheral concerns in the reports analyzed. This thematic distribution implies that the prevailing discourse prioritizes the implementation, governance, and economic leveraging of digital technologies over a more holistic examination of their long-term human and ecological impacts. While the involvement of diverse stakeholders—spanning government, private industry, and civil society—indicates a broad-based conversation, the data suggests this dialogue is currently weighted heavily towards technological and economic imperatives rather than social or environmental stewardship.

4.2. Themes/Concepts Commonly Used in Policy Documents Published in Turkey

The concepts in 24 policy documents published between 2018 and 2023, which were examined within the scope of this study, were analyzed using frequency analysis. For this purpose, a Python program was prepared by the researchers. In the program, firstly, the pdf format files of the policy documents were converted into text using the PyPDF2 library. Then, the words to be excluded from the document, which was brought to a single text format, were determined. Accordingly, words such as "but", "wonder", "yet" and "from" in the documents that would not be taken into consideration within the scope of the research were identified. Without including these words in the frequency analysis, the 100 most repeated words for each document were counted using the Counter library of the Python programming language and the result was saved in an excel file. The related words were then reviewed by the researchers and the word frequency table was finalized. Accordingly, 90 words with more than 100 occurrences and their frequencies are grouped and presented in Table 6.

of programs that train digital technology developers at universities stand out (TBD, 2020). In addition, activities such as updating curricula, providing teachers with digital competencies, and raising awareness of digital transformation can also be considered in this category.

The digital divide in education has deepened, and the difficulties in accessing digital infrastructure, especially during the pandemic, have increased injustices in education (ERG & Education Observatory, 2022). This situation reveals serious limitations in students' and teachers' access to digital content and communication tools (ERG & Education Observatory, 2021a). The resulting learning loss and learning poverty have become a critical topic of discussion, emphasizing the importance of compensating for the stagnation or regression of students' academic gains (ERG & Education Observatory, 2021a). Furthermore, it is noted that school-age children in Turkey from poor households have low rates of access to devices and the internet, which prevents the distance education process from being carried out effectively and leads to a deepening of unequal opportunities (ERG & Education Observatory, 2021a). This not only hinders individual student progress but also challenges the overall development of an ICT-based education system, which is crucial for fostering innovative ideas, developing digital skills, and minimizing the negative effects of inequality (Gupta & Hayath, 2022).

This situation in Turkey directly aligns with the global warning issued by UNESCO (2023), which cautions that artificial intelligence and digital technologies, without appropriate guidance and regulation, can exacerbate existing educational inequalities. The challenges observed—from disparate access to digital tools to the varying quality of online learning experiences—underscore UNESCO's concern that the benefits of technological advancements in education will not be shared equally, potentially leaving the most vulnerable students even further behind. Similarly, a report by the OECD (2023) emphasizes that a successful digital transformation in education requires more than just the provision of technology. It calls for the development of a strategic vision that ensures equitable access and usage opportunities for all students. The report suggests that without such a vision, simply introducing new technologies may fail to close, and could even widen, the educational gap.

While Turkish policy documents, such as the "Education Vision 2023" and the ambitious FATİH project, indicate the existence of a forward-looking vision for a digitally integrated education system, the practical realities highlight a significant disconnect. The persistent disparities in infrastructure and access, particularly affecting students in rural areas and from low-income families, underscore the gap between these national goals and the on-the-ground reality. This discrepancy reveals that despite a clear policy direction, the effective implementation and the equitable distribution of resources remain critical challenges, confirming that a strategic vision must be accompanied by concrete and equitable action to prevent the deepening of educational injustices in the digital age.

4.3.2. Enhancing Technology and Innovation Capacity

Policy documents emphasize the development of technology and innovation capacity (Ministry of Science, Industry and Technology, 2018). In this context, goals such as developing trainings and infrastructure for new technologies such as AI, cloud computing and big data, and preparing technology roadmaps for sectors stand out (TBD, 2020). The development of innovative delivery systems such as online training options is becoming increasingly important in workforce skills training (Robertson, 2018). In this context, initiatives such as Massive Open Online Courses, microloans and nano-certificates aim to provide high-quality, timely and affordable education and workforce training (Börner et al., 2018). Reforms in technical and vocational education and training systems are necessary to increase skills, competitiveness and productivity (Khan et al., 2022).

4.3.3. Improvement of Data Communication Infrastructure

Policy documents emphasize the strengthening of data communication infrastructure (Ministry of Science, Industry and Technology, 2018). Under this category, targets such as improving internet infrastructure and establishing a national big data infrastructure have been identified. Increasing investments in the education sector, especially in data communication infrastructure, can increase productivity, support skills development, and promote economic development by increasing labor productivity (Mukui, Awiti & Onjala, 2019).

4.3.4. Strengthening Corporate Governance

Policy documents include targets for strengthening institutional governance (MoNE, 2019). Effective governance is a necessity for meeting the instructional and other needs of stakeholders in educational institutions (Abdelaziz, 2022). This category includes goals such as improving management processes and organizational structures in line with contemporary norms and increasing public-private sector cooperation.

4.3.5. Supporting and Mainstreaming Digital Transformation

Policy documents emphasize the support and dissemination of digital transformation (Ministry of Science, Industry and Technology, 2018). Under this category, there are goals such as increasing awareness of digital transformation and supporting

the digital transformation of users. The support and diffusion of digital technologies leads to the development of sustainable curricula, digitalization of educational processes, and improvement of student performance (Shenkoya & Kim, 2023). As this study has found, the COVID-19 pandemic has further emphasized the importance of digital technologies in education, leading to a paradigm shift towards their institutionalization and highlighting their role in ensuring continuity in learning (Parveen & Ramzan, 2024).

4.3.6. Learning Objectives and Findings

Targets and findings for the education system in policy documents also constitute an important category (TÜSİAD & İstanbul Aydın University, 2020). Under this category, goals such as increasing STEM education competency levels and ensuring that students receive education in line with their interests and abilities are included. The Malaysian Ministry of Education has recognized the importance of aligning teachers' and students' competencies in STEM disciplines with the requirements of STEM careers (Rasid et al., 2020). Moreover, the integration of STEM education into the curriculum helps to develop core competencies such as critical thinking, problem solving, and innovation (Margot & Kettler, 2019).

4.3.7. Education Policies Regarding the Pandemic

Education policies and measures taken during the pandemic were also mentioned in policy documents (TED, 2020b). This category includes objectives and findings on how education infrastructure and processes were managed during the pandemic. The pandemic led to radical changes in the governance and management of educational institutions, affecting planning, implementation and evaluation processes (Laksono, 2021). In this context, crisis management strategies were implemented in education policies in various countries to ensure the continuity of education during the pandemic (Karsantik, 2021).

4.3.8. The Need for a Resilient and Flexible Structure

Policy documents emphasize the need to make the education system more resilient and flexible in the face of emergencies (Presidential Strategy and Budget Directorate, 2023). Flexibility and adaptability in education are essential for education systems to effectively address the changing needs, challenges and different learning contexts (Chand, 2024). Moreover, the incorporation of digital technologies into education requires flexibility to adapt to different pedagogical approaches and individual student characteristics (Berrocoso et al., 2021). In this framework, it is necessary to ensure the proper use of technology in education, increase technological literacy and reduce inequalities arising from the use of technology. In addition, the documents also emphasize steps such as supporting the professional development of teachers, structuring the learning process to adapt to different needs, and improving the quality of educational spaces. In this context, principles such as equality, flexibility and teacher professionalism are essential for the implementation of a successful education policy (Demboh & Susanti, 2021).

4.4. Artificial Intelligence in Policy Documents Published in Turkey

There is no clear definition and scope of AI in policy documents. Some documents define AI as the ability to solve problems and learn in a similar way to human intelligence, while others focus on specific technologies (e.g. deep learning, machine learning) using a narrower definition. The documents indicate that AI can play an important role in various policy areas. Accordingly, AI is expected to boost economic growth and productivity, create new jobs and reduce unemployment. AI can be used to diagnose and treat diseases, develop medicines and make healthcare more efficient. The documents emphasize that AI can be used to personalize education, make learning more effective, and provide a unique learning experience for each student. AI can also be used to fight crime, improve cyber security and ensure public safety.

TÜSİAD (2018) provides an example of how the APAS robot, an important element of the industry 4.0 transformation, is used in the quality control process thanks to AI. This example emphasizes the role of AI in production processes. Furthermore, the report of the Ministry of Science, Industry and Technology (2018) underlines the importance of AI in the digital transformation process of the manufacturing industry. AI is seen as a pioneering technology to ensure high levels of productivity, profitability and quality in combination with other technologies. The MoNE (2019) report emphasizes the importance of digital content and skills-based transformation to support learning processes. It is stated that AI is included in the innovations brought about by changes such as the development of information technologies, digitalization and industry 4.0. The Presidential Strategy and Budget Presidency (2019) report states that development roadmaps have been prepared in a number of technology areas, including AI, within the framework of the national technology move. It is stated that national policies for the production and widespread use of AI technologies will be determined and efforts will be made to develop domestic technology production capabilities.

Some of the documents include findings on the use of AI in education. AI offers various opportunities such as personalizing education, making learning more effective and providing a unique learning experience for each student. AI is used to support student learning, assist teachers and provide personalized educational experiences (Alkan, 2024). Research shows that AI can

enhance learning in various fields and emphasizes its potential to improve educational outcomes (Lillehaug & Lajoie, 1998). However, there are ethical concerns about the use of AI in education, such as data privacy, bias and inequality (See Figure 4). There are studies reporting similar findings in the literature. While educators acknowledge the necessity of using AI in classrooms, they also voice concerns about privacy, ethics and accessibility (Alam et al., 2024). Another striking finding is that success criteria were included in only one report. In the strategic plan published by the Ministry of National Education (MoNE, 2019), the increase in student success rates, increase in literacy rates and increase in the efficiency of the education system are shown.

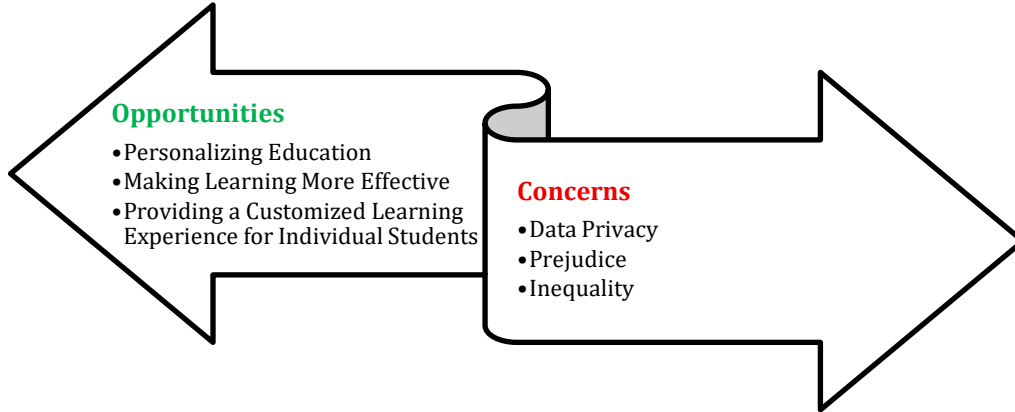


Figure 4. Opportunities and concerns emphasized for AI in the analyzed policy documents.

Policy documents also offer various recommendations to increase the use of AI in education. Accordingly, ethical concerns about the use of AI in education should be addressed first. Success criteria for the use of AI in education should be determined and monitoring and evaluation should be carried out according to these criteria. Teachers and students should be trained in using AI. In this context, there are studies emphasizing the necessity of AI education in the literature (Alenezi, 2023; Wu et al., 2024). Research and development studies on the use of AI in education should be supported.

4.5. The Use of Artificial Intelligence in Education in Policy Documents Published in Turkey and Stakeholder Views

When the policy documents identified within the scope of this research are examined, it is seen that stakeholder views, challenges and concerns about the use of AI in education are clearly revealed in various documents. This situation is explained under the following headings.

4.5.1. Digital Technologies and Education Policies

TÜSiAD (2018) report emphasizes that Turkey lags behind Europe in the use of digital technologies in education. Despite its young population, the rate of internet use for educational purposes is low. This shows that more effort is needed for digital transformation.

4.5.2. Digital Skills Development

The Ministry of Science, Industry and Technology (2018) report emphasizes that digitalization has changed workforce expectations and the importance of training a qualified workforce. For this, it is stated that the education system should focus on developing digital skills. In this direction, the importance of digital skills acquisition in education for the development of the digital economy is emphasized and it is stated that the education curriculum should be updated.

4.5.3. Updating Training Content and Teacher Training

The MoNE (2019) report emphasizes the need to digitalize educational materials, increase teachers' digital skills and develop digital platforms such as education portals. In addition, it is important to provide students with skills and develop their cognitive thinking abilities, especially in the field of STEM (Presidency Strategy and Budget Presidency, 2019). It is also stated that teachers should be supported in areas such as defining administrative competencies and measuring the skills required for educational leadership (TED, 2019). Supporting teachers in the use of technology, providing students with digital skills, including digital skills modules in curricula, and promoting digital literacy skills throughout society are common views expressed in the documents.

While policy documents emphasize teacher training, there are uncertainties regarding the sustainability and effectiveness of these training programs. The OECD (2023) states that the continuous professional development of teachers in digital pedagogy is the cornerstone of digital transformation. UNESCO (2023) states that in the age of artificial intelligence, the role of teachers has evolved from being mere technology users to becoming guides who equip students with critical thinking and ethical reasoning skills. The current situation in Turkey shows how far behind these global trends are and that teacher training policies urgently need to be redesigned according to these new roles.

4.5.4. Science and Technology Focused Education

The Presidential Strategy and Budget Presidency (2019) report emphasizes the importance of equipping students with analytical and critical thinking skills in science, technology, engineering and mathematics. It is stated in various documents that it is important to integrate 21st century skills such as analytical thinking, creative thinking and technological literacy into the education system and to revise curricula to develop these skills.

4.5.5. Software and Technology Competence

TED (2019) report states that online training programs will be implemented to increase the quality and number of software developers. It is also recommended to establish scholarship programs for graduate students in the field of software. Deloitte & TÜSİAD (2021) report emphasizes the importance of application-oriented education models for training competent manpower in the software sector. This shows that flexible and short-term training programs should be developed in accordance with the needs of the sector.

4.5.6. Artificial Intelligence and Education

The TBD (2020) report emphasizes the use of AI technologies in education and the development of a domestic AI industry. For this purpose, it is recommended to create an R&D culture and infrastructure. At the same time, policy documents emphasize the importance of training a qualified workforce suitable for AI and other advanced technologies (TBD, 2020).

4.5.7. Strengthening Education Infrastructure

TÜSİAD & İstanbul Aydın University (2020) report points to the need to establish laboratories in educational institutions where Industry 4.0 components will be implemented. In this context, it is stated that vocational education programs should be updated and students should be provided with skills in line with sectoral needs (Ministry of Industry and Technology & Presidential Digital Transformation Office, 2021; TED, 2019).

4.5.8. Online and Distance Education

Especially in pandemic conditions, the importance of the distance education model has emerged. In this context, policy documents emphasized the need to develop distance education infrastructure and increase the online accessibility of educational materials (MoNE, 2019; TED, 2020B). Among the steps to be taken in education in the post-pandemic period, issues such as supporting the psychological resilience of students, conducting quantitative and qualitative evaluations in distance education, and providing support according to the different needs of teachers were shown.

4.5.9. Stakeholder Concerns

Stakeholders also expressed their concerns in the policy documents reviewed. Accordingly, stakeholders' concerns are compiled in Figure 5.

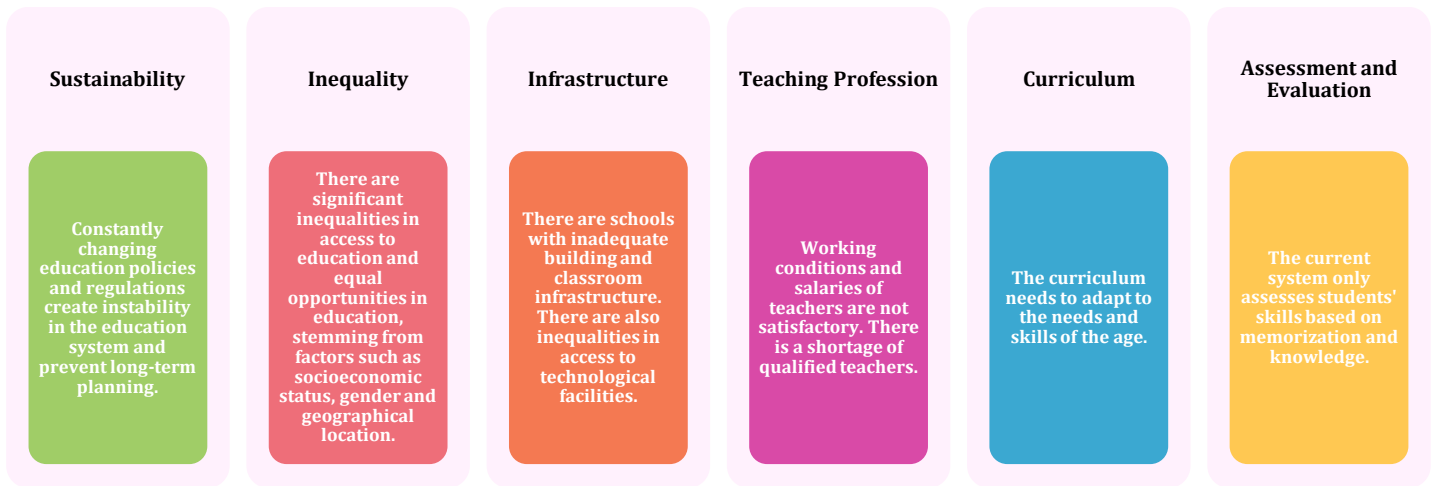


Figure 5. Stakeholder concerns highlighted in policy documents.

As can be seen in Figure 5, stakeholder concerns primarily focus on sustainability, inequality, infrastructure, the teaching profession, curriculum, and assessment and evaluation. In addition, various problems that emerged especially during the pandemic were also reflected in the documents. Inequalities in access to the internet and technological devices have led to inequalities in the utilization of distance education. Inadequate digital skills of teachers and students reduced the effectiveness of distance education. The pandemic and distance education negatively affected students' social and emotional development. Estimates that students suffered significant learning losses during the pandemic were also mentioned in the documents.

In the literature, there are studies in which stakeholder views on the use of AI in education are discussed. Accordingly, stakeholders have shown great interest in the use of AI in education, which presents both opportunities and challenges. Different views are expressed by stakeholders, with some emphasizing how AI can enhance educational opportunities and change the way people learn and teach (Chukwubueze & Vinella, 2024; Gligorea et al., 2023; Roshanaei et al., 2023). However, challenges related to data privacy, algorithmic bias and the need for teacher training, as well as the accuracy and reliability of AI-supported educational content have also been raised (Bobrytska et al., 2024; Uygun, 2024). In the educational context, stakeholders emphasize the importance of addressing ethical issues and guaranteeing fair access to AI resources (Arvin et al., 2023; Karimi & Khawaja, 2023; Roshanaei et al., 2023).

5. CONCLUSION AND RECOMMENDATIONS

The aim of this study is to comprehensively analyze Turkey's educational strategies and policy documents related to digital transformation, development and AI and to provide a comprehensive overview of the country's education policy. Using content analysis methodology, strategy and policy documents were selected, coded and analyzed in line with certain criteria. The results of the study indicate that the importance of digital transformation in education in Turkey is emphasized, but various challenges are encountered in this process. Structural problems such as inequalities in education, teacher shortages and inadequate digital infrastructure prevent the digital transformation process from taking place effectively. In particular, the negative repercussions of the COVID-19 pandemic on education have led to a deepening of the digital divide and increased learning losses. Difficulties in accessing digital infrastructure during the pandemic further increased inequalities in education and reduced the effectiveness of the distance education process.

The analysis reveals that foundational initiatives like the FATİH Project were crucial first steps in building the nation's digital education infrastructure, providing hardware such as interactive whiteboards and tablets, and creating rich e-content through platforms like the Education Information Network (EBA) (YEĞİTEK, 2015). However, the persistent challenges identified in this study—such as the digital divide, the need for sustainable teacher training, and ensuring equal access—demonstrate that the projections and goals of the FATİH Project are still highly relevant to current technology integration policies. The project highlighted the necessity of a multi-faceted approach that includes not only technology provision but also continuous professional development for teachers and the creation of high-quality digital pedagogical resources.

In response to the evolving demands for new competencies, recent policy shifts, most notably the "Century of Türkiye Education Model" ("Yeni Maarif Modeli"), aim to move the education system beyond knowledge transfer towards a holistic, skills-based framework (EPAM, 2025). This model's emphasis on integrating 21st-century skills—such as critical thinking, digital literacy, and problem-solving—with a strong foundation of national and moral values directly addresses the findings of this study. The model represents a strategic effort to cultivate well-rounded individuals who are not only competent but also virtuous, aligning with the need to prepare students for a complex, technology-driven world while preserving societal values.

Policy documents reveal that AI offers significant opportunities in education in areas such as personalized learning, teacher support and curriculum development. However, there are ethical concerns about the use of AI in education, such as data privacy, bias and inequality. The guide published by the Higher Education Council on the use of generative AI reinforces these concerns and provides a foundational ethical framework (YÖK, 2024). The guide stresses the importance of transparency, accountability, honesty, and fairness in the deployment of AI technologies in academic research and publishing. It warns against the risks of factual errors, bias in AI-generated content, and the potential for ethical violations like plagiarism if AI usage is not properly disclosed. This requires careful planning and implementation of AI-supported education applications.

In general, it is recommended that the steps outlined in Figure 6 be taken to successfully implement digital transformation in Turkey and utilize artificial intelligence in education policies.



Figure 6. Effective digital transformation and AI integration in education.

For the successful realization of digital transformation and the use of AI in Turkey's education policies, a multi-faceted approach is recommended. This process should begin by strengthening the digital infrastructure in educational institutions and increasing internet access, building on the lessons from the FATİH Project; it is especially important to include schools in disadvantaged regions in this transformation process to mitigate educational inequalities. Alongside infrastructure, continuous training programs should be organized to improve the digital skills of teachers, enabling them to use digital technologies effectively and preparing them to foster 21st-century skills and integrate AI tools into their teaching practices responsibly, in alignment with the goals of the "Century of Türkiye Education Model." Furthermore, as AI-supported education applications are developed and implemented, they must adhere to robust ethical rules, as outlined in the YÖK's ethics guide, paying close attention to issues such as data privacy, transparency in AI usage, accountability for AI-generated outputs, and preventing bias and inequality. This technological and ethical framework must be supported by the digitization of educational materials, providing online access to students and aligning the content with the interdisciplinary and skills-focused structure of the new curriculum models to make learning processes more effective. For the sustainability and success of all these initiatives, the views of stakeholders, including teachers, students, and parents, must be taken into account. Their active participation should be ensured in the implementation of new policies like the "Century of Türkiye Education Model." Finally, to continuously advance this dynamic field, R&D studies on the use of AI in education should be supported. The dissemination of innovative practices should also be encouraged.

These recommendations will contribute to the realization of AI and digital transformation processes in education in Turkey in a more effective and sustainable manner. Future research should examine the long-term effects of AI on education. However, in this direction, the opinions of stakeholders should be addressed more comprehensively and the effectiveness of AI-supported educational practices should be evaluated. Because these studies will accelerate the digital transformation of Turkey's education system and increase equality of opportunity in education.

Research and Publication Ethics Statement

This study complies with research and publication ethics.

Contribution Rates of Authors to the Article

The authors declare that they have contributed equally to the article.

Statement of Interest

The authors declare that there is no conflict of interest between them.

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