Analyzing the Role of Digital Transformation in Education by a Focus on Innovation with a Meta-Synthesis Method

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Abstract

Due to the direction of trends toward 5.0 industry technologies, a new concept called digital transformation has emerged, which has affected various areas of society. Since reaching the desired level of application of Industry 5.0 requires the training of skilled human resources in the application and development of technologies in this field, its widespread use in education was quickly followed in many countries. The innovative integration of these technologies in education has made the traditional methods of education extinct, which has led to a serious transformation in the learning process in schools and universities. Identifying the dimensions and components of digital transformation in education can help policymakers facilitate this process and lead to accelerating the achievement of digitalization goals. Intending to identify these dimensions and components, this research has examined 47 related articles with the meta synthesis method. Then, in the quantitative section, to determine the order of importance of the dimensions and their weighting factor, a ranking has been done. The results of the research showed that among the six identified dimensions, organizational transformation with a weighting factor of 0.217 has the highest priority and infrastructural transformation with a weighting factor of 0.201 has the second priority. The general results of the research have also shown the importance of adopting an ecosystem approach in the implementation of digital transformation in schools.

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Introduction

With the emergence of Industry 5.0, digital transformation has become one of the main goals of educational institutions in the leading countries of the world. International studies and research also indicate a change in the educational paradigm using Industry 5.0 technologies. Digital transformation has been being pursued in the academic space of many countries in the world in the last decade, because it increases educational innovations, improves organization management, reduces costs, and improves learning environments for students. In recent years, the issue of digital transformation in international documents has also received attention.

In the national documents of some countries, the importance of digital transformation in education as one of the trends affecting the future and the achievement of technology, innovation and entrepreneurship has been noted. In the documents of the international organization of UNESCO, the importance of digital transformation, frameworks of schools connected to the Internet and distance education are emphasized and the need to pay attention to the fourfold approach: map, connection, finance and empowerment, to reach the desired level in schools. It is emphasized.

Digital transformation in the education of some countries has been followed qualitatively and with a focus on the personalization of education. As an example, we can refer to China's programs in this field. The issue of digital transformation in China's education has attracted increasing attention in recent years as the country continues to rapidly develop its digital infrastructure.

Problem statement

The research's main gap lies in the absence of comprehensive attention to the various components and dimensions of digital transformation in Iran's education. This is a crucial step towards integrated planning and implementation. Therefore, the main issue with the current research is the need for coherent and comprehensive planning to attain a higher level of digital transformation in Iranian schools and to identify the dimensions and components that affect digital transformation in education.

Purpose

In this research, we aim to determine the relative importance of each dimension of digital transformation in Iran's education from the perspective of innovation. This is particularly crucial as it can pave the way for the successful implementation of digital transformation in education. It is important to note that digital transformation is not solely a technological event. Our objective is to identify and categorize the sub-components into dimensions by reviewing both domestic and foreign research and assessing their significance in the context of Iran's education, as perceived by experts.

Questions / Hypothesis

The primary focus of this research is to examine the main dimensions, components, and indicators of digital transformation in education. Additionally, the research aims to determine the relative importance of digital transformation dimensions for planning and implementation in Iran, with the ultimate goal of fostering innovation.

Methodology

In this research, a mixed method approach (qualitative-quantitative) was used. The qualitative part involved conducting a comprehensive search of Persian and English documents, books, and articles to identify the components and dimensions of the research. The meta-synthesis approach of Sandelowski and Barroso was utilized, involving seven stages: setting the research question, systematically reviewing relevant articles on "digital transformation in education", extracting information, analyzing qualitative results, ensuring quality control, and presenting the findings.

For our research, we focused on keywords such as "digital transformation dimensions," "digital

leadership," "digital maturity," "digital transformation in education," "educational digital transformation," and "digital innovation." We gathered articles by using the library method and reviewing domestic and foreign research from 2013 to 2023. Our study centered on education in Iran in 2023. In the quantitative part of our research, we targeted 9 experts to prioritize the dimensions of digital transformation using a questionnaire, and we calculated the weighting coefficients of these dimensions for Iran's education using the Swara method.

Findings

According to Sandelowski and Barroso's method, 47 final articles were analyzed using classification analysis, which involved open, central, and selective coding. First, expressions related to "digital transformation in education" were extracted as primary codes. These primary codes were then identified as concepts representing patterns in the findings through open coding and categorized as sub-components. Subsequently, the sub-components were further categorized to identify semantic relationships using axial coding under the title of components, including dimensions such as "digital transformation of education."

According to the articles we gathered, we identified 2 dimensions, 9 components, and 62 sub-components. After analyzing the components and sub-components obtained from the research, we presented the conceptual model of the research as Figure 1.
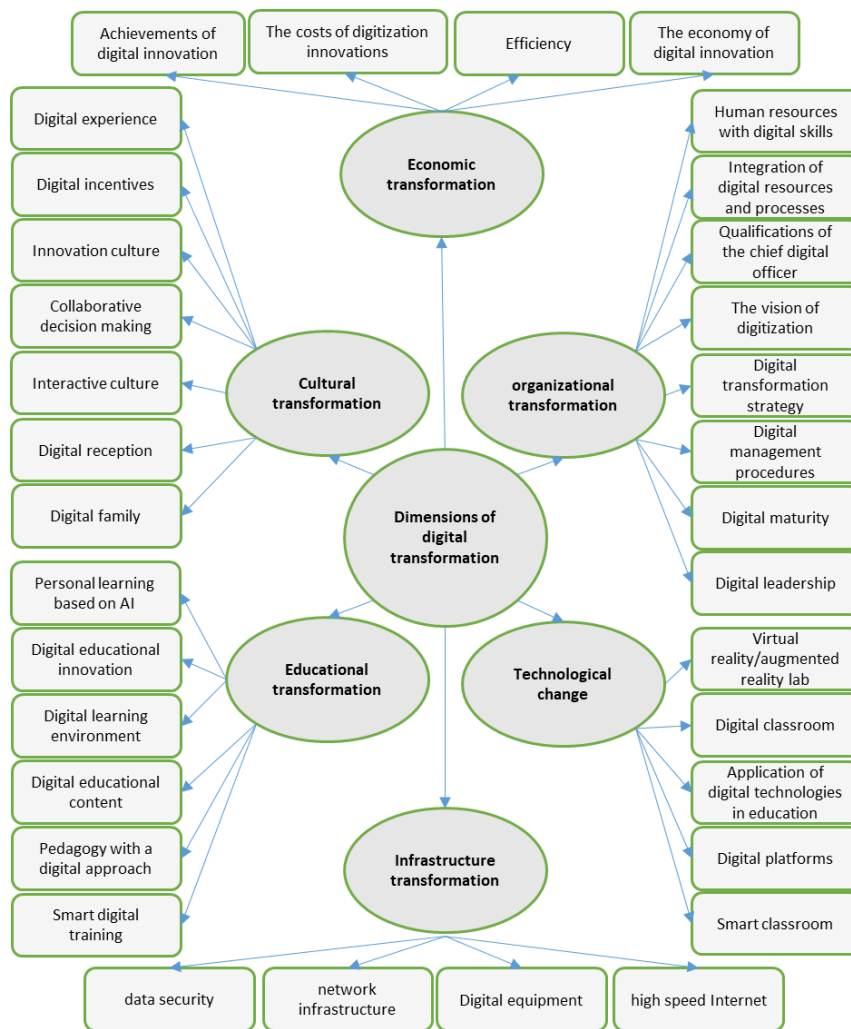
Figure 1: Conceptual model depicting dimensions and components of digital transformation in education.

In the quantitative portion, the Swara method was utilized to prioritize and establish the relative importance of digital transformation dimensions in education. The results of experts' opinions and the weighting factor of each dimension of digital transformation are presented in Table 8.

Table 8: Calculation of the weight of dimensions influencing digital transformation in education using the approach of effectiveness and innovation.

Code	Criterion	Comparative Importance of Average Value S_j	Coefficient $K_j = S_j + 1$	Recalculated Weight $q_j = \frac{q_{j-1}}{k_j}$	W $w_j = \frac{q_j}{\sum q_j}$
C6	OT	0	1.000	1.000	0.217
C2	IT	0.08	1.080	0.926	0.201
C4	CT	0.148889	1.149	0.806	0.175
C3	ET	0.086667	1.087	0.742	0.161
C1	TT	0.153333	1.153	0.643	0.139
C5	ECT	0.294444	1.294	0.497	0.108

Conclusion

In this study, we aimed to identify the main dimensions and components of digital transformation in schools and determine their relative importance based on the innovation approach in Iran's education system. Through a comprehensive review of domestic and international literature, we developed a research model consisting of six dimensions: economic transformation, organizational transformation, cultural transformation, technological transformation, educational transformation, and infrastructural transformation, each with their own sub-components.

The research utilized the Swara method to gather expert opinions about the different dimensions identified in the qualitative phase. The results of the Swara analysis revealed that organizational transformation holds the highest importance and priority with a value of 0.217. This highlights the need for organizations to have a clear vision of digital transformation along with a well-defined strategy. Following closely behind is infrastructural transformation with a value of 0.201, indicating that simultaneous attention and planning for both dimensions is essential.

In the study, cultural transformation received a score of 0.175, while educational transformation received a score of 0.161, indicating their relative importance. The close weight coefficients of these dimensions highlight the need for an integrated and ecosystem view of digital transformation across all dimensions.

Based on the research findings, achieving the desired level of digital transformation in Iranian schools will require a comprehensive approach that addresses all aspects of digital transformation and involves cohesive planning for implementation.

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