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EDUCATIONAL CURRICULA IN THE AGE OF DIGITAL TRANSFORMATION AND ARTIFICIAL INTELLIGENCE

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Abstract:

Tough consequences the digital revolution is having a profound impact on the education of the young generation of today, with schooling becoming increasingly technology-based. AI has become a powerful tool to enrich the content of studies, since it can produce personalized contents for a specific subject and analyze students' performance to detect their weakness, thus facilitating plans for learning. Studies have shown that students learn more effectively when educational software is used rather than purely traditional teaching methods. More Stringent Traditional education is no longer adequate for 21st century requirements. Critical thinking, problem solving and creativity are also considered essential skills to be taught as well as digital skills, programming and data analysis; these are now required to play an increasingly important role in education beyond rote learning and memorization. There are significant changes in methodologies, the most popular being blended learning .It provides a mix of an on-campus component with an online component, while simulation, virtual reality and augmented reality allow interactively and experientially approach to some more difficult doubts. Evaluation too, has become augmented and personalized by the usage of AI tools for monitoring students' accomplishment and refining instruction in an iterative matter. Notwithstanding these opportunities Education is confronted with a number of challenges, among them the digital divide between students ,the need to train teachers in the effective use of technology, and the significance of data protection and privacy. Yet, future trends signal that educational institutions will need to implement their curricula flexibly to keep pace with technological evolution, and to focus on...

The personalized learning and digital and ethical skills of students change the educational process from the learning of content to the development of vital life skills that should be acquired in an era of digital transformation and artificial intelligence.

Keywords: Digital transformation – Artificial intelligence – Blended learning – Digital skills – Modern curricula

INTRODUCTION

Historically, in the past couple of decades, we have seen a world reshaped by the digital revolution, resulting in new ways of thinking, producing, and communicating. Artificial intelligence has been at the forefront of these changes. The effect of this revolution has also been felt by educational systems, which are seeing themselves compelled to review their philosophies, goals, and curricula in order to keep pace with the changes .Faced with the necessity to adapt to a situation where knowledge is marching ever more rapidly forward and the labor market is demanding skills that are shifting at an unprecedented tempo, the education based on memorizing is becoming an education no longer able to satisfy the needs of learners in a world dominated by data and intelligent technologies. For this reason, a fundamental concern has arisen regarding the preparedness of education curricula .The current trend is to support the digital transformation and to be well integrated with artificial intelligence applications. A growing number of recent research demonstrates a distinct discrepancy between educational outcomes and the requirements of the digital economy, necessitating a recasting of the curriculum around new resources that help learners to develop critical thinking and problem-solving abilities .Creativity and learning on your own, and being flexible in the face of rapid changes are important. Digital transformation also gave birth to other educational models, such as blended, adaptive, and data-driven learning ,which in turn pose challenges to curriculum design and development. Artificial intelligence is one of the best instruments that can be used in this process.

Curriculum reform, based on the stronger learner data analysis, educational content personalization, real-time feedback, supporting continuous assessment, and prediction of academic performance, has redefined teacher and learner roles in the educational system. THE TEACHER IS NOW both the facilitator and designer of learning experiences, and the learner has been transformed into the focal point of the education system and a coarchitect of knowledge development .Nonetheless, the incorporation of AI in education teaching and learning curricula is still challenging from ethical, regulatory, and pedagogical perspectives concerning privacy and data security protection, and equal access to up-to-date technologies. And the importance of such research is underlined by concerns surrounding algorithmic bias, as well as the need to train teachers and build the digital infrastructure of schools. It aims to focus on educational syllabus in the age of digital transformation and artificial intelligence by reviewing the theoretical and practical aspects and analyzing future trends of development.

CHAPTER ONE: THE METHODOLOGICAL FRAMEWORK OF THE STUDY

Worldwide education systems are experiencing rapid changes, as a result of the digital revolution and dramatic development of artificial intelligence technologies, bringing about unparalleled challenges and chances for educational curricula. This chapter aims to provide the method of how.

1.1 Problem of study

the study adopts to grasp these changes and examine their effect on curriculum making .Issue under Investigation This study examines challenges in education systems in the digital uprisings, especially with infiltration of artificial intelligence technologies in many spheres of life. Despite such technical progress, many educational curricula still depend on traditional patterns in terms of structure aims and methodology. Its implementation is frequently centered exclusively on the dissemination of theoretical knowledge, with the higher cognitive skills application and digital competencies of the current era demanded being ignored.The problem is even larger when seen in the widening gulf between orthodox educational curricula and the practical needs of the digital age ,that age being based on artificial intelligence and the knowledge economy. They weren't built for these settings. Smart learning, i.e., traditional learning method with analytical and personalization tool features offered by artificial intelligence based technologies, leads to a weak learner that is less flexible to adapt to newly learning environments and less prepared to get a job in a labor market that depend more and more in creativity, data analysis and technology-based decision making.

The challenge being tackled in this research is that the conceptual and practical frameworks for education in relation to the incorporation of artificial intelligence in the classroom have been limited, and visions to address this challenge which enable exploiting the capacities of the technology while maintaining educational and ethical values have been blurred. Therefore, the significance of this study is to try to examine these facets and the consequences of the problem at hand .Its reasons for existing, and considering possible solutions in the form of developing educational curricula that meet the needs of the digital age.

1.2 Research Questions

1. What does digital transformation and artificial intelligence mean in the context of education?
2. How has the philosophy of curriculum construction been influenced by digital transformations?
3. In which ways is artificial intelligence used in the design of educational curriculum?
4. What are the key challenges and ethical issues related to artificial intelligence use in education?

1.3 Study Objectives

1. To study the theoretical basis of educational curricula in the context of the digital age.
2. To emphasise the importance of education access through an AI contribution to content development and teaching.
3. To introduce a practical model for the design of educational curricula in the context of digital expectations.
4. To prepare relevant scientific suggestions for the advancement of quality in education.

1.4 Study Methodology

Given the nature of the topic and its objectives, this research belongs to the descriptive-analytical type. It enables the description and systematic scientific analysis of educational phenomena concerning curricula in the digital era. This method was used to analyze and evaluate the educative curricula nowadays .In response to these challenges of artificial intelligence and knowledge economy, the research was founded on the conceptualisation from peer-reviewed scientific literature in international books and journals in the fields of curriculum, digital education, and artificial intelligence in education. The purpose of this review is to create a theoretical framework through which to better analyze the subject of the study. The procedures also included. This article accounts for the contributions of some of the most influential international models and experiences in the design of digital curricula and the integration of artificial intelligence technologies in the teaching-learning process with the purpose of finding new trends and best harnessed practices in this field. Based on the reviewed literature and the implemented models, the research intends to deduce scientific findings,

CHAPTER TWO: THEORETICAL FRAMEWORK

The theoretical foundation explains the theory that underpin the study. As a result, it can shed light on the phenomena and the topics and the link between these and the existing literature. It also allows the investigator to determine existing gaps in knowledge and provide a focused direction for the study. Thus, the theoretical framework is a conceptual tool that guides research by providing a path to be followed(1).

2.1 Digital Transformations in Education

2.1.1 The Notion of Digital Transformations in Education

The term digital transformations in education implies a transformative and integrative procedure involving the redesign of educational systems in their philosophy, organization, and pedagogical methodologies, supported by contemporary digital technologies, such as systems Learning management, virtual learning environments, data analytics, and artificial intelligence(2). This change is not simply about bringing new tools into the educational process, it involves a qualitative change when the traditional rote learning centered education is replaced by an interactive digital education focusing on the learner as the centre of the education process. (3) The digitalization of education is considered primarily as a cultural and organizational change rather than a technological one, with implications for the roles of teachers and learners, for the ways we teach and assess, and in how we design and implement curricula. (4) This change also promotes lifelong learning and the intelligent use of knowledge, creating opportunities for more access to knowledge and better flexibility. Bigger in scale and in scope, racing after the needs of the knowledge society and the digital globalisation.(5)

2.1.2 The Role of Digital

Transformations in Education Rationale for the Significance of Education Digital Transformations: When considering the nature of education digital transformations (i.e., what they are and how they can be perceived), the focus should be placed on their significance for enhancing educational quality and effectiveness, as well as for reacting to Align with the Demands of the Digital Age These changes allow the creation of interactive learning settings that increase learners' involvement and learning motivation, and facilitate self-directed and lifelong learning. Digital technologies also offer many possibilities to adapt learning to the talents and needs of learners, which helps to close the educational gap and deliver more equal education(6). The significance of digital transformation in this context is that it can help to foster digital and future skill competencies (such as information literacy, critical thinking, problem-solving, and working collaboratively in digital environments) among learners. Furthermore, digital transformation provides support for education administrators by enabling them to access accurate information and educational analytics to enhance education management and policy making based on evidence (7)

2.1.3 Aspects of Digital Transformations in Education Several dimensions or key constituents which determine the nature of the variable can be used to tackle the issue of digital transformations in education. The most prominent of these are the following (8)

First: Digital Infrastructure

It involves access to digital tools, communication infrastructure, broadband, and learning management systems, which form the basis the process of digital transformation in educational organizations.(9)

Second: Reform in Teaching Practice

This is a general term for the adoption of digital technologies and methods in education, including traditional educational activities, such as blended learning, project-based learning, cooperative learning and technology-enabled adaptive learning (10)

Third: Change in the Roles of Teachers and Students

The role of the teacher changes from that of a knowledge provider to a learning process facilitator and guide while the learner assumes the responsibility of becoming an active contributor in the creation of knowledge and an autonomous learner (11).

Fourth: Changing Assessment Practices

These involve employing digital assessment tools, continuous assessment, immediate feedback as well as using data to gauge learning outcomes rather than confining assessment to traditional examinations(12)

Fifth: Learning Management and Digital Environments

This aspect is realized through activities involving intelligent education, virtual reality (VR), and/or e-learning applications that assist in better structuring the teaching process and in more effective monitoring of students' achievements. Sixth: Digital Culture and Ethics of Use It concerns the enhancement of digital competence of students and teachers, the raise of awareness for responsible use of technology respecting privacy, securing information, and following ethical behaviour within the digital environment. (13)

2.1.4 Curriculum Design and DTs

Digital transformations facilitates the transformation of curricula by promoting the creation of flexible, updatable and transdisciplinary curricula with emphasis on skills more than the contents of knowledge. Such transformations also allow for the combination of different sources of learning and for educational content to be adapted to learners' lives and the needs of the labor market, to increase their effectiveness in cultivating the minds of students and to be future-oriented(14)

2.2AI in Education and Software-based Learning the topic

2.2.1The Meaning of AI in Eductaion

Artificial intelligence in education refers to the application of computer systems and intelligent algorithms which can simulate human cognitive processes (learning, reasoning, analyzing, and making decisions) and can be used to assist and enhance the education process(). The integration between advanced technologies such as machine learning, natural language processing, computer vision and educational data mining in curriculum development, learning management and learner assessment is also pertinent (15)

The idea of artificial intelligence in education (AIEd) is not only about automation or technical application, but also about reshaping the dynamic among the learner-content-teacher interaction through intelligent learning environments that are able to customize the learning process according to the individual learner's needs, foresee learning obstacles, and provide just-in-time educational supports. Artificial intelligence is thus viewed as a key enabler for the future data- and knowledge-driven education

2 2.2 .The Role of Artificial Intelligence in Education

The significance of AI in education lies in its ability to promote the quality and efficiency of education, transforming the traditional education extrapolating from learning performance, providing personalized and flexible learning services. AI serves so as to address the diverse needs of learners by enabling the creation of customized learning pathways considering factors such as abilities, interests, and learning styles, having positive effects on the motivation of learners.

AI also contributes to intelligent assessment in that it offers accurate tools for analyzing learner performance, such as real-time feedback and enhancement of continuous assessment methodologies. In addition, AI contributes to the reduction of teachers 'administrative workload, enabling them to concentrate more on the pedagogical and human side of the education process (16)

Artificial intelligence also facilitates data-based educational decisions by accurately reflecting the effectiveness of curricula and pedagogies (17).

2.2.3 Properties of Artificial Intelligence in Education Some aspects of AI in education that can make it a powerful tool for the development of education, are described as follows:

1. Adaptive Learning: Intelligent systems adapt content and presentation style to the learner with respect to learner ability and pace.
2. Predictive Analytics: Application of data to learn about learning difficulties or chances of success and failure.
3. Intelligent Interaction: Among other things, this includes the supply of interactive learning environments based on human dialogue with virtual teachers and intelligent assistants.
4. Continuity and Updating: Intelligent systems can continue to learn and enhance their performance with time (18)

2.2.4 Dimensions of Artificial Intelligence in Education

Artificial intelligence in education can be analyzed via a set of fundamental dimensions (for some of these dimensions, there exist online questions answering systems(mini- QSs) like: (19) the following are some of them:

First: Adaptive Learning Systems They are intelligent systems that adapt educational content to the learner according to their performance and educational needs.

Second: Learning Analytics and Big

Data It covers also the application of AI-related methods to L&D data to identify indicators useful to the improvement of curricula and teaching approaches (1). Third: Intelligent Assessment and Instant Feedback It exploits automated procedures to evaluate the performance of learners and offers instantaneous and precise feedback to them, the quality of which contributes to better learning. Fourth :Virtual Teachers and Intelligent Assistants Such as in educational chatbots and intelligent assistants that assist learners and answer to their questions.

Fifth: Educational management and decision-making It concerns the intelligent support to educational planning and management of institutions of education using smart data analytics of the educational domain. A Role for Ethics and Regulation with the

Sixth: Bullet Point

They have to do with protecting learner privacy, securing data, ensuring fairness and transparency in intelligent systems, and mitigating algorithmic bias (20)

2.2.5 The Concept of AI and Its Implications for Developing Curricula AI

Enables the development of curriculum with greater potential for personalization of content, connection of learning to real-world practice, and iterative updating of curricula on the basis of analysis of educational data. This would facilitate the development of adaptable curricula capable of interfacing with evolving job market needs and raising learners' digital and innovation competencies as per the requisites of the digital era (21)

2.3 .Premium Curricula in a Digital

World Digital age educational curricula are those planned educational experiences delivered to learners in technology- and artificial intelligence (AI)-enabled learning environments for the accomplishment of holistic and harmonious educational aims. Such curricula are learner-centered and highlight skill and competency development as opposed to knowledge consumption (22) Curricula in digital format include organisational flexibility, interdisciplinarity, active and collaborative learning, integration of continuous instruments of evaluation, with possibility to instant feedback. Particular focus is also on

the development of digital skills such as information literacy, digital security and ethical use of technology which empower learners to actively engage with the digital world.

2.4 Philosophy of Curriculum Design in Light of Digital Transformations and Artificial Intelligence

The philosophy of curriculum design in the digital age includes a shift from age-old philosophies grounded in unchanging knowledge toward contemporary educational philosophies that emphasize ongoing learning, knowledge construction, and personal growth in adapting to change. Within this framework clearly emerge the impact of constructivist theory, problem based learning theory, and adaptive learning theory supported by artificial intelligence, all stressing the active role of the learner in the knowledge construction .Contemporary philosophies of curriculum also place emphasis on the role of technology and artificial intelligence, which are embedded into the nature of learning as being tools to enhance rather than ends of learning. This entails a review of the aims of the curriculum and its contents, syllabus, and methods of delivery as well as techniques of evaluation so as to bring about a harmonious intertwinement of the cognitive, skill based and value-laden components (23)

2.5 The Relationship Between the Study Variables

The interrelationship of study variables lies at the convergent interaction of digital transformations, artificial intelligence, and educational curricula. Digital transformations are the higher order conceptual umbrella which allowed for the rising and utilization of artificial intelligence tools in education and artificial intelligence is the sophisticated technical instrument that aids in reforming and enhancing educational curricula .Digital transformations shape curriculum design philosophy in terms of goals, content, and organization, and artificial intelligence (AI) also shapes this design through intelligent means of personalization learning (24), supporting assessment, and educational decision-making. On the other hand, the feasibility of the integration of AI (25) is largely determined by how flexible the curricula are and how well those technologies fit in within a convergent pedagogical model .In this regard, educational curricula resemble the dependent variable that is affected by digital transformations and artificial intelligence (as independent variables), while educational philosophies and ethical frames of reference act as mediating (i.e., moral nurturing) variables that mediate the form of this relationship and govern the degree to which it might be realized. This mutual interaction leads to the construction of educational curricula that can equip learners to deal with intelligent and dynamic contexts (26) by ultimately giving them the digital competencies and cognitive skills.

Chapter Three: The Practical and Applied Framework

3.1 Field Research Methodology

This research is descriptive, with an analytical nature, and has been conducted in the field in order to understand the influence of digital transformations and artificial intelligence on the evolution of curricular development. The data were obtained via an online survey, which was designed a priori around three key themes (27) :Digital transformations in education

• Artificial intelligence in education •

Curriculum development The five-point Likert scale was employed (1 = Strongly Disagree, 5 = Strongly Agree) for ease of statistical analysis and interpretation of the findings (20)

3.2 Population and Sample of the Study

Table (1): Population and Sample of the Study

Category	Number	Percentage
Male teachers	70	46.7%
Female teachers	80	53.3%
Total	150	100%

The subjects in this study were a random sample selected from schools in the Babil Governorate to include all categories of school type, the educational stage, and the professional experience.

3.3 Data Collection Instrument

A combined survey was developed which contained the following • :Digital transformations (12 items) :digital infrastructure, digital teaching practices, teacher and student roles, contemporary assessment practices • .Artificial intelligence (15items): adaptive learning, learning analytics, intelligent assessment, virtual assistants, ethical and regulatory issues • .Education programmes (10 items): programme flexibility, use of technology, skills development of learners.

3.4 Validity and Reliability of the Questionnaire

Table (2): Validity and Reliability of the Questionnaire

Variable	Number of Items	Cronbach's Alpha
Digital transformations	12	0.89
Artificial intelligence	15	0.91
Educational curricula	10	0.87

All values are greater than 0.70, indicating a high level of reliability of the instrument.

3.5 Statistical Methods Used
3.5.1 Descriptive Analysis
- Arithmetic Mean
- Standard Deviation

3.5.2 Pearson Correlation Coefficient
3.5.3 Regression Analysis
3.5.4 Reliability Coefficient (Cronbach's Alpha)
3.6 Data Processing
The following processes were conducted using SPSS software
• :Descriptive Statistics (Means and Standard Deviations
• (Pearson Correlation Coefficient
• Linear Regression • Reliability analysis (Cronbach's Alpha
• (Tabular and graphical display of results
3.7 Research Results
3.7.1 Digital Transformations in Education

Table (3): Digital Transformations in Education

Item	Standard Deviation	Mean	Academic Interpretation
Digital infrastructure	0.65	4.2	High
Digital teaching methods	0.72	3.8	Moderate to High
Teacher and learner roles	0.68	4.0	High
Modern assessment methods	0.70	3.7	Moderate

3.7.2 Artificial Intelligence in Education

Table (4): Artificial Intelligence in Education

Item	Standard Deviation	Mean	Academic Interpretation
Adaptive learning	0.75	3.9	Moderate to High
Learning analytics	0.68	3.8	Moderate
Intelligent assessment	0.70	4.0	High
Virtual assistants	0.72	3.6	Moderate
Ethical aspects	0.64	4.1	High

3.7.3 Curriculum Development

Table (5): Curriculum Development

Item	Standard Deviation	Mean	Academic Interpretation
Curriculum flexibility	0.71	3.9	Moderate to High
Curriculum–technology integration	0.69	4.0	High
Development of learners' skills	0.70	3.8	Moderate to High

3.7.4 Relationship Between Variables Regression Analysis

Table (6): Correlation Between Variables

Independent Variable	Correlation Coefficient (r)	Significance (p)
Digital transformations	0.78	0.001
Artificial intelligence	0.82	0.001

Table (7): Regression Analysis

Independent Variable	Regression Coefficient (β)	Significance (p)
Digital transformations	0.42	0.002
Artificial intelligence	0.55	0.001

The findings of this study suggest that digital transformation offers modern teaching space that enables digital teaching and digital role in teaching and learning activities through its infrastructure. Artificial intelligence is becoming the critical enabler for better personalized learning and intelligent assessment, with more attention to virtual assistants. The results also suggest that curricula are starting to change to cater for the digital era by helping learners to develop their digital and innovative capabilities. In addition, the positive correlations among all the variables indicate that the adoption of digital transformation and artificial intelligence has a direct and positive effect on the extent of curriculum flexibility and curriculum

efficiency. Taken as a whole, the findings stress the significance of funding for technology and artificial intelligence to facilitate education and meet current curricular needs.

CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS

First: Conclusions

1. The nature of education is changing, with digital transformations and AI shifting learning from traditional, memorization-based education to interactive, skills-based training.
2. Technology solutions allow for personalized instruction for every student, making the teaching process more effective.
3. Digital books are designed to be interactive and experiential with the help of virtual reality, augmented reality and simulation.
4. Artificial intelligence offers fine-grained student evaluation and analysis of performance, allowing educators to make better teaching decisions. 5 .Challenges remain, including the digital divide and the need for curricula to be continually refreshed to keep pace with rapid technological change.
5. The application of technologist and artificial intelligence need to be balanced with human values, critical thinking, and social competencies development.

Second: Recommendations

1. Update programmes regularly to reflect digital trends and emerging technologies, emphasizing skills for the future.
2. Combine the best of digital and traditional education in a fluid system that enables interactive and personalized learning.
3. In-service training for how to best implement digital curricula and how to effectively use technology and artificial intelligence with students.
4. ...to advance digital equity and mitigate education disparities, provide devices and technological materials to all students.
5. Blend in 21st century skills (e.g., creativity, critical thinking, and problem solving) in the core curricula.
6. Enhance digital ethics and values to lead your students to be responsible and safe online users.

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