# Identification of Strategies and Outcomes of the E-Learning Model in the Education Ecosystem of Iraq's Primary Education

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| **Article type:** *Original Research* <br><br> **How to cite this article:** <br> Alkhafaji H, Shahtalebi B, Altamimi W, Sadat Fadavi M. (2024). Identification of Strategies and Outcomes of the E-Learning Model in the Education Ecosystem of Iraq's Primary Education. *Iranian Journal of Educational Sociology, 7*(4), 108-120. http://dx.doi.org/10.61838/kman.ijes.7.4.11 <br><br> © 2024 the authors. Published by Iranian Association for Sociology of Education, Tehran, Iran. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License. | **Purpose:** The purpose of this study was to identify the strategies and outcomes of the e-learning model within the education ecosystem of Iraq's primary education sector. The research aimed to explore the essential strategies for effective e-learning implementation and assess the individual, organizational, and social outcomes of such educational approaches. <br> **Methodology:** This research employed a mixed-methods approach, combining qualitative research based on grounded theory and quantitative descriptive-survey research. The study sample included administrators, teachers, and technology experts selected through purposive criterion-based sampling. In the quantitative phase, a sample of 381 primary school teachers and administrators in Iraq was selected. Data collection instruments included semi-structured interviews for the qualitative phase and a researcher-made questionnaire for the quantitative phase. AMOS23 software was used for confirmatory factor analysis to assess construct validity. <br> **Findings:** The findings revealed three main e-learning strategies: human development (including student preparation and teacher empowerment), systemic development (encompassing hardware and software development), and learning space management (comprising process management and physical reorganization). The quantitative analysis confirmed that all factor loadings for these categories were above 0.3, indicating robust model fit. The study also identified significant individual, organizational, and social outcomes of e-learning, such as enhanced teacher and student capabilities, improved classroom management, and positive environmental impacts. <br> **Conclusion:** The study concludes that e-learning strategies, particularly in human and systemic development and learning space management, are crucial for enhancing the quality of primary education in Iraq. Empowering teachers and students, developing robust hardware and software infrastructures, and effectively managing learning environments are essential. <br> *Keywords: learning, Education in Iraq, Strategies, Outcomes* |

## 1.    Introduction

The competitive environment of the 21st century, characterized by its unique features such as environmental dynamism and turbulence, the intensity of uncertainty within organizations, and the ever-increasing volume of knowledge related to various organizational dimensions, presents a completely different situation compared to the conditions prevailing in the 20th century. In these circumstances, leaders must navigate their organizations through uncharted territories. Traditional management approaches are no longer adequate, as the existing problems in organizations have transformed into challenges that are entirely different from those of the past. This means that today's dynamic educational environments require adaptive organizational structures, flexible execution procedures, the formation of informal interactions, and modern management approaches that align with these needs (Brix, 2019).

Additionally, in today's fast-paced world, changing environmental conditions have compelled organizations to make diverse and multi-dimensional decisions and adopt processes that allow them to continue their activities with greater quantity and quality in the face of changing conditions or alignment with global changes in various fields, including education (Qazi et al., 2024). Furthermore, the increasing volume of information and knowledge related to various aspects of education and conditions of uncertainty has necessitated that large educational organizations effectively utilize modern educational methods and structures. Adopting such approaches ensures organizational survival and helps avoid falling behind in the complex and turbulent world of today (Al-Khasawneh et al., 2024).

Considering that the virtual world, a phenomenon of the third millennium of human civilization, has brought unprecedented achievements to contemporary societies, including massive information networks, large economic enterprises, powerful information search engines, virtual institutions, and associations, and one of its greatest achievements being e-learning (Gashi et al., 2024). E-learning, the most important application of information technology, is presented in various systems such as computer-based learning, online learning, network-based learning, and networked education (Hakimi et al., 2024). In recent years, the prefix "e" has appeared alongside words such as mail, commerce, banking, government, library, resources, and more. This prefix, a product of information technology, symbolizes the conduct and management of affairs in electronic environments and has led to terms such as e-mail, e-commerce, e-banking, e-government, e-library, and e-resources. Education has also followed this trend, and with the acceptance of changes in the educational process, the idea of e-learning has emerged.

In general, e-learning is a type of learning that is delivered through various electronic tools such as the internet, intranet, satellite networks, audio and video tapes, and portable memories. It can be conducted in different ways, either self-guided or controlled by an instructor. This modern educational method is implemented through various structures such as courses, modules, and small learning activities, without geographical or time limitations, and learning can occur synchronously or asynchronously (Abdelfattah et al., 2024).

E-learning, as one of the modern educational methods, has gained significant attention from educational managers and organizations in recent years. This type of education offers beneficial aspects such as enhancing the performance of educational organizations, improving the performance of teachers and learners, fostering positive and constructive interaction between traditional and modern educational strategies in new environments, providing education to those who have been left out, and promoting environmental sustainability and health (Poon et al., 2024). Therefore, e-learning can be defined as a formal educational approach where learners are not physically present together (Mehrotra). In this type of education, the learner is located outside the educational environment, and it is expected that the teacher and student have minimal physical interaction and emphasize electronic relationships (Puniatmaja et al., 2024).

E-learning courses, in addition to benefiting learners, also offer extensive benefits to educational systems. For instance, they reduce the exorbitant costs associated with preparing physical environments such as constructing or renting classrooms, as well as the ongoing costs of educational environments like heating and cooling expenses, allowing these savings to be used to enrich education through other means. It can be claimed that e-learning is a beneficial approach for both learners and organizations (Sharifi et al., 2019).

However, e-learning has also been noted to have disadvantages, such as the lack of face-to-face interaction between the instructor and learners, network speed disruptions, difficulty in producing standard and high-quality content, the need for learners to have computer literacy, challenges in applying this type of education for

some subjects, technical problems, and the high costs of establishing e-learning centers (Kian, 2014). Therefore, e-learning can be a double-edged sword, and if not implemented properly, achieving the mentioned benefits is not possible. Consequently, alongside the advantages of e-learning, there are obstacles and challenges such as preparing and producing e-learning content, teaching methods in electronic environments, training teachers and teaching specialists, and evaluating learners that need to be identified, examined, and standardized to achieve maximum benefit at minimal cost (Latip et al., 2020).

E-learning is a reality that has permeated educational systems and has managed to establish its place and demonstrate its efficiency to a large extent. The presence of this modern educational method, which aligns with the characteristics of the current era, is inevitable in these systems.

In the current educational system of Iraq, the inability to respond to internal and external changes and the inconsistency of educational activities with the pace of changes have led to weaknesses in adapting to new conditions. Additionally, past methods are heavily relied upon, and maintaining the status quo is emphasized. This approach cannot contribute to the development of the educational system. The inflexible structure due to the formal model of the Iraqi educational system and the lack of independent access to human, financial, and technological resources are among the barriers to the growth and sustainability of educational organizations. Therefore, if these organizations want to overcome today's challenges and pace their progress with future changes, they must be both efficient and innovative. Utilizing modern educational methods such as e-learning is an ability that can assist education in solving these issues, as it empowers the organization to research, monitor future environmental changes, and adapt to them, and to exploit existing capabilities. Therefore, educational organizations must incorporate change into their strategic agenda, as relying on today's advantages can be very dangerous. The threat of facing a competitive world that has discovered and is exploiting tomorrow's opportunities poses a severe threat to the educational system. If the educational system seeks success, it must, on one hand, rely on its core competencies to create value and, on the other hand, dedicate part of its resources to exploring future opportunities and utilizing these opportunities, including adopting modern educational methods (Tambak et al., 2022).

Despite the limited research conducted on various types of learning in the virtual space, a review of existing educational studies in Iraq indicates that a native model in this field, particularly emphasizing primary education, has not yet been designed. Therefore, given the limited resources in the educational system, the centralized and inflexible structure, the use of traditional methods to solve issues, and its inability to respond to educational changes and needs, the presentation of an e-learning model for Iraq's primary education system is felt necessary. Based on the results of this research, a significant step can be taken to improve the conditions of educational organizations and achieve long-term success. This article aims to present an e-learning model for Iraq's primary education system, focusing on strategies and outcomes.

## 2. Methods and Materials

### 2.1. Study Design and Participants

In this mixed-method study, the method used in the qualitative phase of the research is grounded theory with an inductive approach. Grounded theory is a qualitative research design in which the researcher generates a general explanation (theory) of a process, action, or interaction shaped by the views of a large number of participants (Strauss & Corbin, 1997). The grounded theory approach used in the present research is the systematic approach, characterized by orderly and analytical processes. In this approach, the researcher systematically seeks to develop a theory that explains the process, action, and interaction in the subject under study (Strauss & Corbin, 1997). Participants in this research included technology specialists, experienced education administrators, and teachers. In the present study, to select the research sample, considering the qualitative approach to sampling in the data collection and analysis process, individuals with suitable and sufficient knowledge and understanding of the subject (e-learning) or its aspects were consulted, based on the saturation degree of the collected information.

The inclusion criteria for participants were technology specialists, administrators, teachers employed in education, and university professors with sufficient knowledge of the subject and an interest in participating in the research. The researcher reached saturation after interviewing 17 individuals. The main technique used for data collection in the qualitative phase was semi-structured in-depth interviews. To achieve the necessary trust for the scientific confirmation of the results of this phase of the research,

common validation techniques in grounded theory methodology were employed, including member checking (Strauss & Corbin, 1997) and external auditor techniques (Creswell & Creswell, 2023). In this regard, the data obtained from coding were returned to the participants, and necessary adjustments and changes were made based on their feedback and reactions. Ultimately, data analysis was conducted according to the grounded theory data analysis process and the systematic approach, based on three coding methods: open, axial, and selective coding.

In the quantitative part of the research, a descriptive-survey method was used. The statistical population of the present research, based on the Krejcie and Morgan table (1970) and observed variables and constructs, was estimated to be 381 individuals. In the quantitative phase, data were collected using a researcher-made questionnaire with 155 items based on a five-point Likert scale as the primary research tool. It is worth noting that the questionnaire for the quantitative phase was prepared and compiled based on the concepts and categories identified in the qualitative phase of the research. In the preliminary stage of the research, content validity ratio and face validity methods were used and confirmed. To assess reliability, Cronbach's alpha was used with the Statistical Package for the Social Sciences (SPSS), and reliability coefficients for the e-learning questionnaire in the educational system and its dimensions were calculated, all of which were above 0.7, indicating high accuracy of the measurement tool used. For data analysis, demographic variables of the research, including gender, educational level, and service experience, were first examined using descriptive statistics. Then, to investigate the research questions and test the main hypothesis and sub-hypotheses, descriptive statistics and covariance-based structural equation modeling were used.

## 3. Findings and Results

The e-learning strategies in Iraq's education system include "human development," "systemic development," and "learning space management." Each of these categories is discussed in detail below. The category "human development" encompasses two subcategories: "student preparation" and "teacher empowerment." The category "systemic development" includes two subcategories: "hardware development" and "software development," and the category "learning space management" includes two subcategories: "process management" and "physical reorganization." According to the research results, human development includes two subcategories: "student preparation" and "teacher empowerment." The quantitative section of the research indicated that all factor loadings related to this category were above 0.3 and thus were confirmed. Additionally, the model fit indices for the confirmatory factor analysis of the human development category indicated their appropriateness. For construct validity of the research questionnaire, AMOS23 software was used. As shown in the software output, the primary model of confirmatory factor analysis is presented in Figure 1, illustrating the relationships between the observed variables (items) and the latent variables (human development) and the standardized coefficients (factor loadings) of each question. As depicted in Figure 1, all factor loadings of the questionnaire dimensions were above 0.3 and thus confirmed. Table 1 shows the subcategories and related concepts of the main category of human development.

**Table 1**

*Subcategories and Related Concepts of the Main Category of Human Development*

| Initial Concepts | Questions | Conceptual Statement |
|---|---|---|
| Student Preparation | Question 1 | Helping reduce student stress through collaboration and ... |
| | Question 2 | Overcoming fear of the electronic environment through repetition and practice |
| | Question 3 | Using advanced organizers in learning |
| | Question 4 | Teaching basic technology skills to students |
| | Question 5 | Teaching interaction with peers in chat rooms |
| | Question 6 | Enhancing self-regulatory skills |
| Teacher Empowerment | Question 7 | Empowerment in content production |
| | Question 8 | Understanding the child as a learner |
| | Question 9 | Familiarity with various types of software |
| | Question 10 | Preparing for designing different assessments in e-learning |
| | Question 11 | Using group teaching methods |
| | Question 12 | Training related to stress management |
| | Question 13 | Empowerment in using different educational platforms |
| | Question 14 | Developing professional ethics in the electronic space |

**Figure 1**

*Second-Order Confirmatory Factor Analysis Model of the Main Category of Human Development*
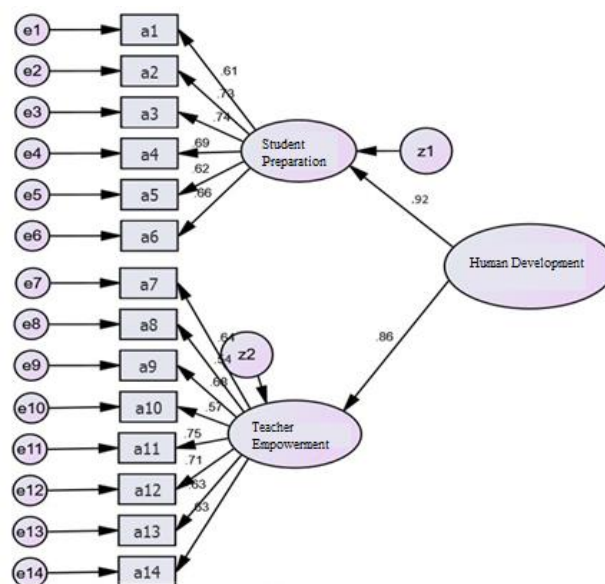


For construct validity of the research questionnaire, AMOS23 software was used. As shown in the software output, the primary model of confirmatory factor analysis is presented in Figure 2, illustrating the relationships between the observed variables (items) and the latent variables (systemic development) and the standardized coefficients (factor loadings) of each question. As depicted in Figure 2, all factor loadings of the questionnaire dimensions were above 0.3 and thus confirmed. Table 2 shows the subcategories and related concepts of the main category of systemic development.

**Table 2**

*Subcategories and Related Concepts of the Main Category of Systemic Development*

| Initial Concepts | Questions | Conceptual Statement |
| --- | --- | --- |
| Hardware Development | Question 15 | Increasing electronic bandwidth |
| | Question 16 | Expanding modern personal and organizational computers |
| | Question 17 | Developing stable internet |
| Software Development | Question 18 | Developing and producing appropriate educational podcasts |
| | Question 19 | Creating suitable educational videos |
| | Question 20 | Producing interactive content |
| | Question 21 | Developing diverse learning applications |
| | Question 22 | Coaching in electronic content production |

**Figure 2**

*Second-Order Confirmatory Factor Analysis Model of the Main Category of Systemic Development*
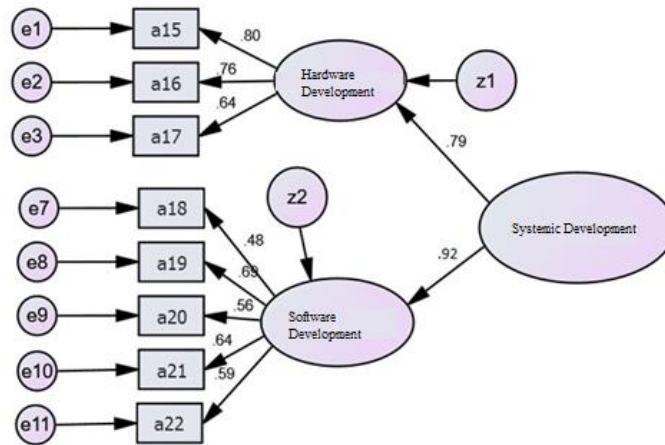


For construct validity of the research questionnaire, AMOS23 software was used. As shown in the software output, the primary model of confirmatory factor analysis is presented in Figure 3, illustrating the relationships between the observed variables (items) and the latent variables (learning space management) and the standardized coefficients (factor loadings) of each question. As depicted in Figure 3, all factor loadings of the questionnaire dimensions were above 0.3 and thus confirmed. Table 3 shows the subcategories and related concepts of the main category of learning space management.

**Table 3**

*Subcategories and Related Concepts of the Main Category of Learning Space Management*

| Initial Concepts | Questions | Conceptual Statement |
|---|---|---|
| Process Management | Question 23 | Using parental involvement in education |
| | Question 24 | Designing various support platforms |
| | Question 25 | Preparing regulations and guidelines for electronic education |
| | Question 26 | Controlling and monitoring the educational space |
| | Question 27 | Codifying ethical issues in the electronic education environment |
| | Question 28 | Monitoring classroom management by teachers |
| | Question 29 | Training e-learning space supporters |
| Physical Reorganization | Question 30 | Designing an attractive learning environment |
| | Question 31 | Using aesthetic techniques in the electronic environment |
| | Question 32 | Preparing web conference environments for students |
| | Question 33 | Preparing web conference environments for educational staff |

**Figure 3**

*Second-Order Confirmatory Factor Analysis Model of the Main Category of Learning Space Management*
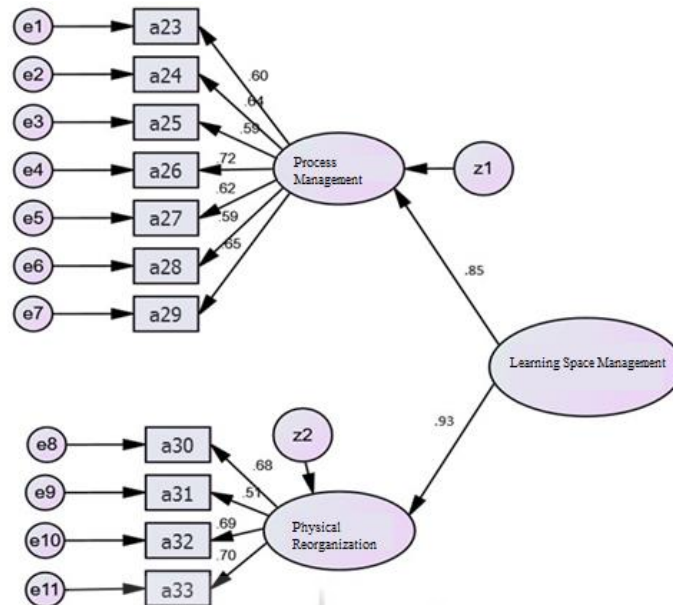


The outcomes of e-learning in Iraq's education system include "individual outcomes," "organizational outcomes," and "social outcomes." Each of these categories is discussed in detail below. The category "individual outcomes" encompasses two subcategories: "deconstructing student capabilities" and "teacher skill development." The category "organizational outcomes" includes the subcategory "changing classroom environment and process management," and the category "social outcomes" includes two subcategories: "environmental outcomes" and "collective satisfaction."

According to the research results, individual outcomes include two subcategories: "deconstructing student capabilities" and "teacher skill development." The quantitative section of the research indicated that all factor loadings related to this category were above 0.3 and thus were confirmed. Table 4 shows the subcategories and related concepts of the main category of individual outcomes.

**Table 4**

*Subcategories and Related Concepts of the Main Category of Individual Outcomes*

| Initial Concepts | Questions | Conceptual Statement |
|---|---|---|
| Deconstructing Student Capabilities | Question 34 | Ability to generate ideas |
| | Question 35 | Developing research and inquiry capabilities |
| | Question 36 | Developing cooperative learning and empathy growth |
| | Question 37 | Fostering self-creation among students |
| | Question 38 | Enhancing self-directed learning |
| | Question 39 | Developing self-regulation |
| | Question 40 | Time management and individual discipline |
| | Question 41 | Accessing knowledge anytime and anywhere |
| Teacher Empowerment | Question 42 | Reducing class absenteeism |
| | Question 43 | Updating teacher information |
| | Question 44 | Increasing enthusiasm and reducing burnout |
| | Question 45 | Changing the teacher's role to a mentor |
| | Question 46 | Diversifying teacher roles |
| | Question 47 | Increasing self-confidence and self-belief |
| | Question 48 | Time management |

**Figure 4**

*Second-Order Confirmatory Factor Analysis Model of the Main Category of Individual Outcomes*
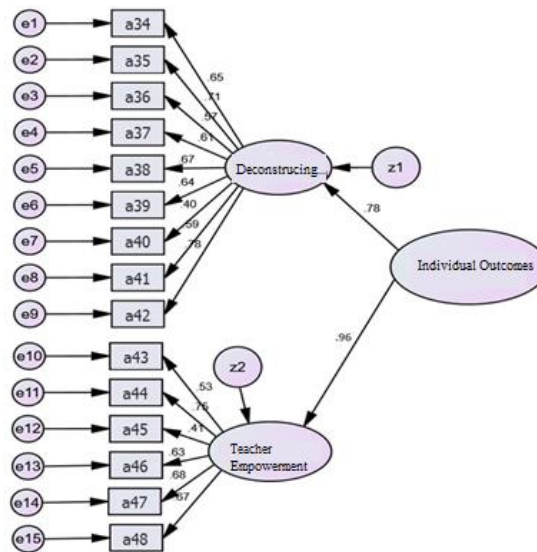


For construct validity of the research questionnaire, AMOS23 software was used. As shown in the software output, the primary model of confirmatory factor analysis is presented in Figure 5, illustrating the relationships between the observed variables (items) and the latent variables (organizational outcomes) and the standardized coefficients (factor loadings) of each question. As depicted in Figure 5, all factor loadings of the questionnaire dimensions were above 0.3 and thus confirmed. Table 5 shows the subcategories and related concepts of the main category of organizational outcomes.

**Table 5**

*Subcategories and Related Concepts of the Main Category of Organizational Outcomes*

| Initial Concepts | Questions | Conceptual Statement |
| --- | --- | --- |
| Changing Classroom Environment | Question 49 | Enhancing education quality through diverse tools and strategies |
| | Question 50 | Increasing collective enthusiasm |
| | Question 51 | Cost management |
| | Question 52 | Enhancing student intake capacity |
| | Question 53 | Covering the population requiring education |
| | Question 54 | Making education more attractive |
| | Question 55 | Enriching education |
| | Question 56 | Facilitating education and learning |

**Figure 5**

*First-Order Confirmatory Factor Analysis Model of the Main Category of Organizational Outcomes*
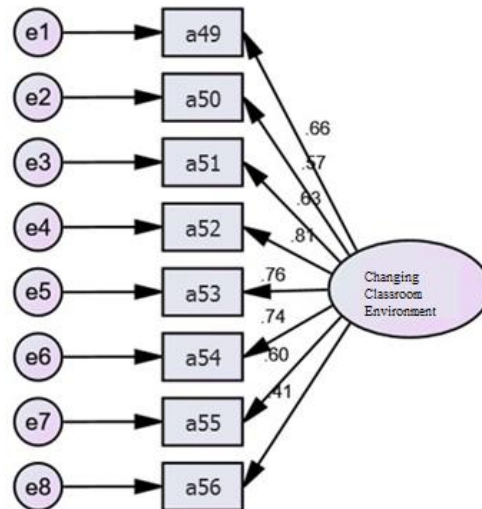


For construct validity of the research questionnaire, AMOS23 software was used. As shown in the software output, the primary model of confirmatory factor analysis is presented in Figure 6, illustrating the relationships between the observed variables (items) and the latent variables (social outcomes) and the standardized coefficients (factor loadings) of each question. As depicted in Figure 6, all factor loadings of the questionnaire dimensions were above 0.3 and thus confirmed. Table 6 shows the subcategories and related concepts of the main category of social outcomes.

**Table 6**

*Subcategories and Related Concepts of the Main Category of Social Outcomes*

| Initial Concepts | Questions | Conceptual Statement |
|---|---|---|
| Environmental Outcomes | Question 57 | Reducing environmental pollution |
| | Question 58 | Managing urban traffic |
| | Question 59 | Managing scarce resources (paper, etc.) |
| Collective Satisfaction | Question 60 | Creating psychological comfort for parents |
| | Question 61 | Enhancing collective life skills |
| | Question 62 | Direct parental supervision of the learning process |

**Figure 6**

*Second-Order Confirmatory Factor Analysis Model of the Main Category of Social Outcomes*
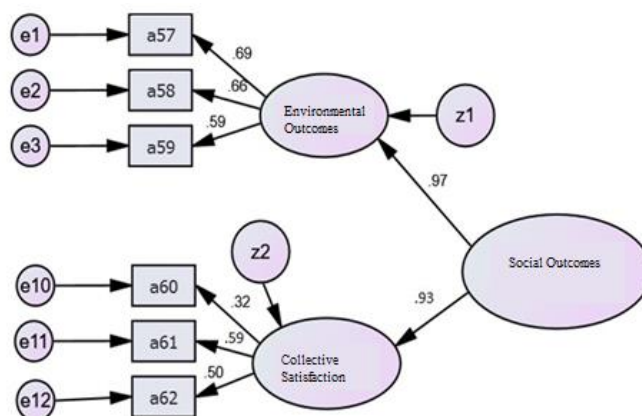
## 4.   Discussion and Conclusion

First Sub-Question: What are the E-Learning Strategies for Primary Education in Iraq?

The e-learning strategies in Iraq's education system include "human development," "systemic development," and "learning space management." Each of these categories is discussed and analyzed below. The "human development" category includes two subcategories: "student preparation" and "teacher empowerment." The "systemic development" category encompasses two subcategories: "hardware development" and "software development," and the "learning space management" category comprises two subcategories: "process management" and "physical reorganization."

Based on the research results, human development includes two subcategories: "student preparation" and "teacher empowerment." The quantitative section of the research indicated that all factor loadings related to this category were above 0.3 and thus were confirmed. In explaining this result, it can be said that the education system consists of interconnected components, each with its own specific functions. The most important element in delivering quality education is the teacher. Therefore, training competent and committed teachers who can creatively and innovatively foster the education of the next generation is a fundamental requirement that planners must seriously consider. Because teachers not only serve as mentors but also hold scientific authority. Enhancing teachers' capabilities, updating their knowledge, retraining, and professional growth improve education quality, expand educational equity, create equal opportunities, and increase teachers' specialized skills for teaching students and working in electronic environments (Shariati et al., 2024). The opportunities provided by new technologies compel education specialists to rethink the nature of learning and re-engineer educational activities. This re-engineering transforms the role of teachers from "information providers" to "learning facilitators" within a learner-centered approach. Teachers' roles in new learning environments have undergone significant changes (Por Jafari shir Joposht et al., 2024). In these learning environments, educators guide learners and manage resources instead of lecturing and providing information. Rather than answering questions, they guide learners to find answers. Instead of merely preparing content, they design learning experiences for learners, set up the main structure and framework for

learners, and encourage them to direct their own learning processes. They present different perspectives on a topic and emphasize the most critical viewpoints, and they manage the teaching environment with the participation of learners (Haseli Songhori & Salamti, 2024). Alongside these changes, learners' roles have also evolved due to new learning perspectives. In new environments, learners are active and produce knowledge instead of passively receiving it. They engage in solving complex problems rather than memorizing information and facts. They view educational topics from multiple perspectives, explore their own questions, and seek appropriate answers (Delghandi et al., 2024). They work collaboratively and take responsibility for directing their learning through participatory activities. They strive to perform activities relevant to their professional lives, become independent, self-directed, and self-motivated, and regulate their learning time and pace. Instead of focusing on passing exams, they think about applying their knowledge. They seek suitable learning strategies for themselves and strive to optimize their learning accordingly (Shariati et al., 2024). Therefore, empowering teachers and students is one of the essential strategies for preparing for e-learning.

In explaining systemic development and its two subcategories, "hardware development" and "software development," it can be said that simplicity, user-friendliness, attractiveness, flexibility, community-centeredness, interactivity, similarity to classroom environments, innovation, personalization capability, security, content management, and social sharing features characterize the e-learning environment, which is made possible through hardware and software development.

In explaining learning space management and its two subcategories, "process management" and "physical reorganization," it should be noted that managing educational courses serves as a robust resource for maintaining educational data and content. An effective learning management system should support a wide range of different content formats. Additionally, it should facilitate the straightforward and direct transfer of data. The system should also integrate seamlessly with other upstream and downstream systems (Asgharinezhad et al., 2024; Delghandi et al., 2024; Faghiharam, 2019). Addressing questions such as whether the modern educational environment supports the latest international standards for e-learning, whether it can upload existing documents, videos, and exams, whether curricula, learning materials, and assessments can be transformed into meaningful and effective learning paths,

and whether learning materials and events can be shared across courses or learning paths are crucial considerations in process management and physical reorganization of the e-learning space.

Second Sub-Question: What are the Outcomes of E-Learning for Primary Education in Iraq?

The outcomes of e-learning in Iraq's education system include "individual outcomes," "organizational outcomes," and "social outcomes." Each of these categories is discussed and analyzed below. The "individual outcomes" category includes two subcategories: "deconstructing student capabilities" and "teacher skill development." The "organizational outcomes" category includes the subcategory "changing classroom environment and process management," and the "social outcomes" category includes two subcategories: "environmental outcomes" and "collective satisfaction."

Based on the research results, individual outcomes include two subcategories: "deconstructing student capabilities" and "teacher skill development." The quantitative section of the research indicated that all factor loadings related to this category were above 0.3 and thus were confirmed.

In explaining this finding, it can be said that empowering teachers and students is the most critical challenge for educational managers today because the pace of changes in societies and organizations is rapid and unpredictable. Key factors driving such changes include the development and expansion of information technology and increasing competition in the global community, which have altered perspectives on human resources as conditions change. In this context, individuals within an educational organization, including students and teachers, are not merely tools for managers' success but are considered the organization's main assets and partners. Empowerment is a set of motivational techniques designed to improve individuals' performance by increasing participation and self-decision-making levels. Additionally, empowerment is a process through which educational environment participants enhance their competencies, advance their professional growth, and solve their problems (Maarefvand & Shafiabady, 2024; Salman Al-Oda et al., 2024; Sotoudeh Moghadam et al., 2024). Education experts believe that the new applications of communication and information technology, and the use of electronic tools such as email, the internet, the global web, and video conferencing provide various communication facilities for schools, students, and teachers. In a classroom where students have internet access, connections beyond the

school environment and culture can facilitate understanding beyond the immediate surroundings (Amiri et al., 2023; Shariati et al., 2024). Facing existing challenges can boost students' self-confidence and sense of empowerment, changing the teacher-student relationship. In this context, the teacher becomes a leader, guide, helper, collaborator, and evaluator. Electronic tools, by engaging students in collective work, transform a classroom into a comprehensive environment with broader inclusivity. Information technology creates a specialized educational environment in the classroom, significantly impacting the emergence of students' latent capacities. Electronic tools broadly encompass various computer devices, telecommunications equipment, software, and services and products that form the foundation for producing and effectively utilizing different types of information. This technology provides educational opportunities for everyone, anywhere and anytime, which traditional education systems lack (Delghandi et al., 2024; Russell & Qiu, 2024; Shariati et al., 2024). This creates unparalleled opportunities for both students and educational staff to achieve self-directed learning. Self-directed learning is a process in which learners take responsibility for designing and evaluating their own learning experiences. According to this perspective, learners are allowed to pursue learning independently, monitor their goals, determine and evaluate content and procedural strategies. Self-directed individuals possess self-control, meaning they are entirely independent and capable of analyzing, planning, executing, and evaluating their learning activities independently. They also exhibit self-management, enabling them to identify their needs during the learning process, set learning goals, control their time and energy for learning, and organize feedback. Additionally, one of the outcomes of e-learning is the motivation and enthusiasm for learning. Furthermore, the e-learning environment fosters creativity and self-direction, enabling both teachers and students to find and use practical learning strategies to overcome problems encountered during the learning process. Alongside these outcomes, the independence of teachers and students, transforming from passive to active individuals, and the self-actualization of both instructors and learners are significant outcomes of e-learning. Utilizing this type of education allows educational organizations to save costs, implement comprehensive and indirect monitoring of student and teacher performance. Due to the accessibility of these educational platforms for remote e-learning, many individuals can learn simultaneously in different subjects, without incurring costs for expensive textbooks. All courses will be available on a single e-

learning platform, and implementing and using e-learning by experts is straightforward, benefiting educational organizations from the organizational outcomes of such education. Moreover, e-learning facilitates the conservation of scarce resources, contributing to environmental protection and sustainable development.

## Authors' Contributions

The first author of this article was responsible for data collection and analysis, and the other authors were responsible for supervising the analysis and writing of the article.

## Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

## Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

## Acknowledgments

## Declaration of Interest

The authors report no conflict of interest.

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## Ethical Considerations

All procedures performed in studies involving human participants were under the ethical standards of the institutional and, or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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