# Empowering education through digital transformation: Confronting educational wastage in basic education schools in Jordan

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## Abstract

Activating digital transformation in basic education holds the potential to effectively address educational wastage by leveraging innovative technologies and strategies to optimize teaching and learning processes, enhance student engagement and outcomes and mitigate inefficiencies in educational practices. The objective of this research was to explore the feasibility of implementing digital transformation as a solution to address educational wastage in basic education schools within the Irbid Governorate. The study adopted a descriptive and analytical methodology employing a random sampling technique to select a sample of 270 principals and teachers from elementary education schools in Irbid Governorate. Data collection was facilitated through the utilization of a questionnaire as the research instrument. The validity and reliability of the instrument underwent a meticulous examination and validation process through a series of rigorous steps. The findings revealed several obstacles hindering the activation of digital transformation in basic education including the absence of integrated digital systems that function cohesively, limited utilization of modern techniques, technologies and teaching methods and insufficient teacher proficiency in technology usage and training. The study recommends overcoming these challenges by transitioning the school environment into a digital ecosystem, supporting the professional growth of teachers in scientific, educational and technical domains, establishing systems and regulations to enhance the school environment and improving teaching methods and learning strategies.

**Keywords:** Basic education, Digital transformation, Educational wastage, Obstacles.

# 1. Introduction

Education serves as a foundational pillar within the community playing a pivotal role in its success. However, the educational process faces numerous challenges that can have adverse effects on desired societal development across various domains. One significant challenge revolves around the financing and allocation of resources for education. Adequate funding for education serves as a critical driver for societal progress enabling the realization of national renaissance and directing multifaceted processes within nations. In fact, the progress of societies is now measured by the extent to which their diverse activities and sectors are financially supported. There is a growing interest in understanding the intricacies of education financing, expenditure and the availability of necessary funds. Financing education serves as a fundamental input into the educational system and bears substantial responsibility for addressing the myriad problems faced in education. Moreover, it stands as a vital factor in achieving the efficiency, development and fulfillment of resource requirements within the educational sector. Insufficient funding hampers the ability of education to fulfill its fundamental and material obligations impeding the attainment of educational aspirations held by nations.

Educational wastage occurs when the volume of inputs exceeds the volume of outputs due to an imbalance in the functional equilibrium of the educational process. This phenomenon imposes an additional burden on the education budget and presents a significant challenge for educational authorities. The manifestations of educational wastage are evident in various forms, including high dropout rates, academic failure, student absenteeism, suboptimal utilization of instructional techniques and tools and the inability of schools to effectively use available instructional time. The occurrence of dropouts and failures within the educational system hinders its effectiveness and diminishes its quantitative outcomes. These issues have far-reaching negative implications for the educational, social and economic fabric of society. The consequences arising from the persistence of these problems can be summarized as follows [1, 2]:

1. Insufficient attainment of educational objectives at different stages of the educational process leads to a lack of expected efficiency. This shortfall indicates a misalignment between the intended educational goals and the actual outcomes achieved.
2. The occurrence of failure, dropouts and unexcused absences generates psychological frustration that profoundly affects all stakeholders involved in the educational process. This frustration arises from the inability to meet educational expectations and can have detrimental consequences for individuals' well-being and motivation.
3. The insufficient internal efficiency of the educational system is one of the factors contributing to the lower results observed in different educational stages. This implies that the educational process is not effectively using resources, instructional methodologies and support mechanisms to maximize the desired learning outcomes.

Conversely, there is a growing imperative for all stakeholders involved in the educational process and the broader societal environment to adapt to technological advancements. The rapid pace of cognitive and technological transformations has necessitated the integration of information technology within the educational landscape leading to a digital transformation of education. This paradigm shift brings about substantial changes across multiple facets of educational tasks including the reimagining of teaching and research activities. It becomes imperative to introduce new elements that facilitate successful educational practices in order to ensure the efficacy of the educational process within this evolving landscape. This entails enabling novel forms of educational engagement, encompassing methods and strategies for interaction, communication, participation within the new educational environment, knowledge acquisition, fostering self-learning capabilities and facilitating seamless communication and collaboration with others. Such adaptations are crucial for keeping pace with the transformative potential of technology in education [3].

The advent of digital transformation has revolutionized the educational process, significantly reducing time and effort for all stakeholders involved. The requirement for significant seeking has been eliminated because both teachers and students now have access to a wide variety of learning materials at their fingertips. This digital revolution also brings about solutions to individual challenges, fostering development and ensuring its sustainability across economic, social, interface and cultural domains. Improving the customer experience, encouraging adaptability and creativity throughout the process and developing new revenue streams and information-enabled ecosystems that power business model transformations are essential components of a successful digital transformation [4, 5]. Numerous benefits can be realized by implementing digital transformation in a careful and gradual manner. These include expediting the completion of tasks and activities, streamlining and unifying work procedures and enhancing information security through preservation, easy storage and retrieval. This eliminates the need for traditional paper archives which occupy substantial space and require significant time for document retrieval [6].

## 1.1. The Study Problem

Educational inefficiency persists at considerable levels even with increased attempts to mitigate educational failure rates. These initiatives include addressing dropouts, using available energies and talents, expanding competency and improving educational efficacy. According to Muhammad [7] traditional educational approaches are insufficient in the context of the continuous explosion of knowledge especially in third-world countries. Numerous studies by Al-Sharif [3], Mohamed [8], Amin [9] and King and South [10] emphasize the imperative for the educational system to align with technological advancements highlighting the need to incorporate information technology into the educational landscape. This shift has the potential to instigate transformative changes across various educational domains, necessitating the reimagining of teaching and research activities. There is a compelling need to introduce new elements to achieve success in this evolving educational landscape. These elements should address methods and strategies for fostering interaction, communication and participation in the emerging educational environment. Furthermore, they should facilitate knowledge acquisition, promote self-learning abilities and streamline communication and interaction among educational stakeholders.

This technological focus has the potential to narrow the knowledge gap between teachers and students, fostering an increased enthusiasm for learning and a commitment to completing compulsory studies. Consequently, the occurrence of academic failure and dropout may diminish leading to a reduction in educational inefficiencies. This not only conserves state resources but also steers education towards optimal investment in human capital. On one hand, the challenge lies in enhancing student retention until the completion of their academic stage despite the relative success of educational policies in elevating enrollment rates in basic education. Issues such as repetition and dropout persist, impeding the overall effectiveness of the educational system. There is a necessity to equip community members with robust skills and knowledge derived from technology-driven methodologies and contemporary educational systems [11].

Thus, the significance of embracing digital transformation becomes evident in tackling educational inefficiencies, particularly within the realm of basic education. The initial stages of an individual's education form a foundational cornerstone that shapes their principles, beliefs, thought processes and life approach. It marks the true commencement of intellectual development. Students acquire a diverse set of skills and knowledge during this pivotal stage. In light of these considerations, the central inquiry is articulated as follows:

What are the key steps and strategies that can be employed to activate digital transformation and address educational wastage in basic education schools?

This overarching question branches into the following sub-questions:

1. What are the key components within the educational environment that contribute to the process of digital transformation aimed at addressing educational wastage in basic education schools located in the Irbid Governorate?
2. What are the primary obstacles and challenges that hinder the progress of digital transformation initiatives intended to tackle educational wastage in basic education schools within the Irbid Governorate?
3. What are the fundamental and essential requirements that need to be fulfilled in order to successfully activate digital transformation efforts to confront educational wastage in basic education schools situated in the Irbid Governorate?

### 1.2. Objectives of the Study

The objective of the present study is to explore the feasibility of implementing digital transformation as a means to address educational wastage in primary education schools. This goal will be accomplished through the following methods:

- Analyzing the elements within the educational environment that foster digital transformation in order to address educational wastage in primary education institutions.
- Identifying the barriers that impede digital transformation and addressing educational wastage in primary education schools.
- Establishing the fundamental prerequisites necessary to facilitate the implementation of digital transformation as a means to combat educational wastage in primary education schools.

### 1.3. The Significance of the Study

The significance of this study can be categorized into two main aspects:

A) Theoretical importance: The relevance of this topic lies in the impact of digital transformation within primary education schools on the acquisition of practical and technological skills. Consequently, this raises a generation that is more prepared to function in the contemporary workforce particularly during the crucial period of basic education when personal skills develop. The educational system can align with the demands of diverse environments by catering to students' inclinations and providing them with appropriate values, behaviors, knowledge and scientific and professional skills.

B) Practical importance: This aspect encompasses the identification of fundamental prerequisites for implementing digital transformation as a means to address educational wastage in primary education schools. Optimal utilization of financial resources allocated to education can be achieved by ensuring that they are directed towards attaining the desired educational objectives by pinpointing these requirements.

### 1.4. Terms of Study

*Educational wastage: It* refers to the extent of inefficiency and loss within the education system due to the inadequate realization of the efforts invested in education resulting in suboptimal quantitative and qualitative outcomes.

*Digital transformation*: It denotes the shift from conventional educational practices to a digitally-driven system that leverages information and communication technology incorporating a range of modern digital technologies to enhance teaching, learning and administrative processes.

## 2. Previous Studies

### 2.1. First: Studies that Addressed Educational Wastage

Pinto's study [12] aimed to investigate the factors influencing student attrition in high school and to identify the leadership behaviors and practices of high school principals and staff that contribute to student retention. The study participants recognized three primary factors impacting students in general, namely low socioeconomic status, student behavior and emotional difficulties. The findings highlighted the crucial role of principals in promoting attendance and punctuality, fostering positive relationships ensuring the quality of the teaching staff and providing support to students at risk of dropping out. Moore [13] had the objective of examining the factors contributing to student attrition prior to graduation and identifying preventive strategies to mitigate this issue. The study yielded several noteworthy findings revealing that the main reasons behind student departure encompassed a lack of connectedness among students, instances

of bullying, language barriers, economic constraints and insufficient academic credits. The study aimed to provide valuable insights for implementing effective measures to prevent student attrition by shedding light on these factors.

Al-Mohsen's [14] study focused on educational wastage and the effectiveness of the school system in Saudi Arabia. The research acknowledged the significant importance given to education in the country as reflected in substantial budget allocations. Saudi Arabia has made notable progress in education ensuring widespread access, gender enrollment, free education and encouraging enrollment. However, the study identified challenges within the system, including low student achievement in subjects like mathematics, English and Arabic indicating deficiencies in keeping up with advancements and meeting developmental needs. The study emphasized that educational wastage serves as an indicator of the system's inefficiency. It also highlighted the objectives of the authority responsible for evaluating public education which involve establishing an evaluation system, monitoring quality standards and developing criteria for assessing performance efficiency in both public and private schools, reviewed and approved periodically in accordance with set standards.

Mujahed's study [15] aimed to examine the impact of educational wastage on the Egyptian economy and propose strategies to mitigate this issue. The study adopted a descriptive approach and covered several key areas. Firstly, it explored the interconnected relationship between education and the economy. Secondly, it analyzed various types of wastage in education and their implications for the Egyptian economy. These included failures attributed to individual and school-related factors, student dropout rates and the prevalence of private lessons. Additionally, the study addressed the mismatch between the outcomes of the education system and the demands of the labor market. The third area focused on maximizing the economic benefits of education and presented potential solutions to reduce wastage in the Egyptian education system. These solutions encompassed addressing failure and dropout rates tackling the issue of private lessons, managing the growing social demand for higher education and promoting alignment between higher education and the labor market to alleviate graduate unemployment.

Al-Qahtan's [16] aimed to explore the concept of educational wastage, its underlying causes and effects as well as methods for its measurement. The issue of educational wastage emerged as the most influential factor leading to escalated expenditures on education among the challenges affecting the efficiency of the educational system. Consequently, educational research has increasingly shifted towards an economic perspective highlighting the economic returns associated with education. The research findings indicated a shift in the perception of education from a form of consumption to an investment. Furthermore, the results highlighted that economic development has driven a surge in the demand for education and qualified human resources, necessitating the development of an educational philosophy that aligns with the requirements of the contemporary economy.

Baker, et al. [17] sought to develop a method for predicting and identifying students who are at risk of dropping out of school. This predictive capability assists school principals in implementing interventions to support student retention, particularly by monitoring attendance and regularity. The study's findings indicated that students with irregular attendance are the most vulnerable to dropping out. Notably, the study highlighted the significance of accurately identifying students at risk, as schools that successfully predict and intervene with these students are more likely to prevent dropout occurrences. The study conducted by Al-Jabiri [18] aimed to establish the conceptual framework of wastage in educational spending, identify key obstacles that contribute to the misallocation of resources in primary education and propose a set of mechanisms to address this issue in Egypt. The study concluded by presenting recommended strategies to confront insufficient spending in primary education. It specifically focused on tackling the problems of student failure and dropout rates during the primary stage aiming to alleviate the economic burden imposed on the educational system. Careful consideration in the selection of teachers and recruitment of competent professionals in the field was emphasized recognizing the pivotal role of teachers as instrumental agents in delivering quality education. Additionally, the study emphasized the importance of addressing wastage in various aspects of the educational system, including financial processes and enhancing overall efficiency to ensure optimal investment in educational resources and outcomes.

*2.2. Second, Digital Transformation: A Review of Relevant Studies*

Closing the digital gap: An examination of King Abdul-Aziz University students by Al-Refaie [19] focused on investigating the digital divide among students, identifying influential factors and proposing strategies to bridge this gap. The study emphasized the significance of university education in equipping students with the necessary skills to effectively engage with social networking platforms. Additionally, it recommended conducting an analysis of students' perceptions regarding the utilization of the internet for educational purposes. The study sought to address the digital divide and promote digital literacy among university students by shedding light on these findings.

Enabling digital transformation in Egyptian universities proposed mechanisms and key insights by Ali [20] aim to identify a set of recommended mechanisms to facilitate the digital transformation of Egyptian universities. The study concluded that the success of the digital transformation process relies not only on the effectiveness of the transformation itself but also on the skills and personal characteristics of university leaders and members of the university community. The extent of their belief in and commitment to the digital transformation process as well as their ability to develop additional strategies play a crucial role in supporting and embracing change. Furthermore, the study emphasized the importance of integrating information technology and communication concepts across all areas and activities of the university. The findings highlighted the need to build the capabilities of leaders and individuals to enhance their readiness for digital transformation and ensure its successful implementation.

The study conducted by Lahtinen and Weaver [21] shed light on the challenge of digital transformation in the context of university education. It identified three parallel approaches that program designers and faculty members can employ to

effectively design educational content in response to this challenge. Non-digital educational activities focus on enhancing digital literacy. The provision of digital opportunities enhances traditional classroom practices.

Full digital transformation of university education: This method refers to the opportunity to transition university education to a fully digital environment. The study conducted by Elliot, et al. [22] aimed to identify the mechanisms through which institutions can leverage digital content, technologies and practices to engage students and their families effectively within the university context. The study's findings emphasized the pivotal role of university presidents in making informed decisions regarding investments in human resources and various technologies. These decisions are crucial for enhancing the digital competitiveness of universities, fostering operational improvements, developing expertise in managing digital resources and facilitating industry collaboration to leverage the outputs of universities. The study concluded that by strategically investing in human resources and technology, universities can enhance their digital capabilities, improve operational efficiency and establish a strong foundation for engaging in meaningful dialogue on digital transformation. These actions ultimately benefit the students and other beneficiaries of university outputs allowing them to effectively navigate the digital landscape and contribute to industry advancements. The study conducted by Al-Zein [23] aimed to investigate the advantages of e-learning and the obstacles associated with transitioning from traditional teaching and learning methods. The study concluded that adopting a digital curriculum does not imply a complete replacement of the teacher's role and authority. Instead, it emphasizes the importance of developing and updating the teacher's role to align with the evolving educational landscape. The study underscores the benefits of e-learning while acknowledging the concerns of teachers. It highlights the need to redefine the roles of teachers in the digital era and demonstrates that information technology can be leveraged to improve the quality of education enabling more efficient and effective knowledge transfer.

The study conducted by Amin [9] aimed to assess the extent to which digital transformation in universities contributes to the realization of a knowledge society. The study encompassed multiple dimensions, including defining the characteristics of a knowledge society elucidating the philosophy behind digital transformation, examining ongoing efforts towards digital transformation in both Egyptian and foreign universities and identifying the requirements necessary for digital transformation in Egyptian universities. The study encompassed a range of requirements and mechanisms for digital transformation including the development of a comprehensive strategy for digital transformation, promoting a culture of digital transformation, designing digital educational programs and effectively managing and adapting to the changes brought about by digital transformation. Additionally, the study highlighted the importance of addressing various aspects such as human resources, technological infrastructure, security measures and legislative frameworks to successfully implement digital transformation in universities. In Shehata's [24] study, the dimensions crucial for successful digital transformation were examined. The research identified four key dimensions: using technologies to align with the strategic role of government institutions and support their future vision, embracing changes in creating value, transforming education and learning systems to develop skills for digital work and activating digital transformation mechanisms to enhance financial inclusion and improve services. Additionally, the study emphasized the importance of governance, standards and procedures in protecting digital data, promoting transparency and building trust between service providers and the public. Overall, the findings underscored the significance of these dimensions in driving successful digital transformation initiatives and their potential to contribute to societal and economic growth.

Al-Sharif's [3] study aimed to propose a vision for establishing an enabling environment that supports the success and sustainability of digital transformation in education, aligning with Egypt's digital vision. The study's key findings highlighted the foundations of this enabling environment. These foundations included raising awareness about digital content, its applications and its significance in developing personal capabilities to address contemporary challenges. Furthermore, the study emphasized the importance of disseminating digital transformation methods to all educational stakeholders. Additionally, the study identified the necessary elements for an effective digital teaching and learning environment, such as advanced digital devices, high-speed and high-quality internet connectivity, technical support, data and network security measures. The research also emphasized the importance of establishing institutional foundations and ensuring the readiness and sustainability of the digital transformation environment in education. The study provides insights into creating an environment that fosters successful and sustainable digital transformation in the educational context by focusing on these foundations.

## 3. Theoretical Framework
### 3.1. First: Digital Transformation in Education
Digital transformation encompasses the utilization of computer technology and the internet to enhance economic value creation in a more efficient and effective manner. It encompasses the broader scope of changes brought about by new technologies in our work processes and interactions. Previous studies have provided various definitions of digital transformation and its exploration has been extensively examined in relation to strategic concepts such as digital business strategy and digital transformation strategy. The central concept in digital business strategy revolves around perceiving information technology as a fundamental enabler for innovation and achieving competitiveness with digital transformation being the outcome of employing a combination of information, computing and communication technologies like computers, artificial intelligence and cloud computing. These technologies are employed to enhance services, streamline operations or establish new business models [24].

Digital transformation in education refers to the integration of digital technology within the established educational system with the aim of benefiting all stakeholders involved. This transformation entails the implementation of smart classrooms equipped with advanced educational tools and the provision of diverse technology-based learning methods such

as distance learning through interactive virtual classrooms. Moreover, it is essential to diversify teaching approaches, incorporating blended learning that combines e-learning and traditional methods. The impact of digital transformation in education is multifaceted including providing students with self-learning opportunities that enable immersive experiences, using the internet in the educational environment, ensuring security through digital devices, fostering a culture of digital technology among individuals, facilitating data organization and processing and leveraging the vast quantity of digital resources for scientific research [25, 26].

The goals of digital transformation in education are crucial for educational institutions to establish a successful strategy. In higher education, these goals encompass various aspects including enhancing student experiences by improving metrics such as retention and graduation rates, course success rates and overall success indicators. Another goal is to improve competitiveness by using digital methods to differentiate the institution from its competitors. Creating a culture of data-based decision-making is also essential involving the adoption of a digital mindset among students, leaders, teachers and administrators throughout the educational institution. Additionally, goals focus on improving resources such as enhancing communication among officials and reducing electricity-related costs [27]. Al-Sharif [3] further explains the strategic objectives of digital transformation in education aligned with these goals. These objectives include developing educational curricula and programs that are designed based on international foundations and standards. The aim is to move away from memorization-based education towards a self-learning system that promotes positive engagement in the educational process. Another objective is to enhance the quality of education and learning outcomes by applying cognitive and constructivist theories that foster active learning and leveraging modern technologies and ICT techniques. Achieving equality and equal educational opportunities is also emphasized allowing everyone to access education, express opinions engage in discussions and experience the joy of learning. Moreover, digital education aims to achieve educational excellence and availability by providing flexible learning environments that accommodate large numbers of learners and cater to individual differences. Additionally, it focuses on developing the professional performance of teachers by offering diverse education and training opportunities and expanding their knowledge and skills. Lastly, digital education saves time and accelerates the learning process by providing electronic access to curricula, tests and facilitating communication between teachers and learners, thereby supporting continuous education [3].

In a nutshell, digital transformation in education strives to achieve the following objectives [26]:

- Enhancing the performance of educational and administrative tasks to ensure accuracy and efficiency.
- Offering a range of electronic benefits and services to all stakeholders involved in the educational process.
- Improving the outcomes of the educational process and attaining the desired results.
- Keeping up with the advancements in technology that surround us.
- Encouraging the development of innovative approaches to problem-solving.
- Fostering a culture of creativity, excellence and healthy competition.

The significance of digital transformation stems from its capacity to address human challenges and drive development while promoting sustainability. This encompasses economic, social, environmental and cultural dimensions with technology serving as a supportive catalyst across all these domains. In practical terms, digital transformation is characterized by enhancing the customer experience, fostering agility and promoting end-to-end innovation. It also involves the exploration of new revenue sources and the establishment of information-enabled ecosystems that facilitate business model transformations [4].

### 3.1.1. Strategies for Implementing Digital Transformation

According to Matt, et al. , strategies for implementing digital transformation involve several key dimensions [28]. These dimensions provide a framework for effectively navigating the complexities of digital transformation.

1. Technology adoption: This dimension focuses on an organization's stance towards new technologies and its ability to leverage them. It encompasses the strategic role of information technology within the organization and its aspirations for future technological advancements.

2. Value creation changes: The emphasis is on how digital transformation strategies impact an organization's value chains. It explores the extent to which new digital activities deviate from traditional core business practices, offering opportunities to expand and enhance services. However, these deviations may require additional technological capabilities and entail higher risks due to limited experience in the new digital landscape.

3. Structural adjustments: Structural changes are often necessary to provide a suitable framework for new digital operations. This dimension refers to the organizational adjustments required to accommodate and integrate new digital activities within existing structures and administrative units.

- Financial considerations: The previous dimensions cannot be effectively implemented without considering the financial aspects. This includes assessing the organization's financial capacity to finance digital transformation initiatives which may involve diverting resources from core business operations. Financial considerations act as both a driving force and a constraint for digital transformation. While reduced financial strain on the core business may reduce the urgency for implementation, organizations under financial pressure may face challenges in finding external resources to enable transformation. Therefore, organizations must confront the need for digital transformation and explore available options openly and proactively. The process of digital transformation in education can be accomplished through the following strategies based on the information provided by Al-Falsh [26]: Classroom integration: Creating technology-enhanced learning environments by using interactive educational platforms, virtual classrooms, digital learning resources like electronic libraries and multimedia educational content

(including images, audio, video and text). This also involves converting the curriculum into multi-format files and equipping classrooms with digital tools such as computers, internet access, smart boards, slide projectors, 3D augmented reality environments and other relevant resources.

- Diversification of education: Offering various forms of digital education including e-learning, distance learning and blended learning. Shifting from traditional methods of education that focus on rote learning towards modern approaches centered on research, innovation, creativity and self-learning. This approach aligns with constructivist theory where the student becomes the focal point of learning.
- Assessment process: Incorporating technology into student evaluation through the use of surveillance cameras, computer-based testing programs and automated result generation.
- Educational process management: Adopting learning management systems to efficiently manage the educational process. Establishing official websites for educational institutions to facilitate tasks such as admissions, registration, inquiries, communication between stakeholders, data processing, information management and teacher training through electronic programs like mobile applications such as Microsoft Teams and Google Meet.
- Clear vision: Providing a well-defined vision to educational leaders and administrators regarding the integration of technology across teaching, evaluation, learning, curriculum development and vocational training processes.
- Financial support: Allocating adequate funding to establish the necessary infrastructure for integrating information and communications technology into the educational environment. This includes investments in hardware, software, connectivity and other digital resources.
- Technical support: Establishing a dedicated team of staff members to provide technical support within the educational environment. These individuals would assist in troubleshooting technology-related issues, maintaining equipment and ensuring the smooth operation of digital tools and systems.

Teacher training: Offering comprehensive training programs for teachers to effectively use digital technology in their classrooms. This training should include providing teachers with the necessary knowledge, skills and resources to integrate digital tools and platforms into their teaching practices, promoting digital literacy and facilitating the creation of engaging and interactive learning experiences for students. It becomes evident that digital transformation in the educational process is a complex endeavor that necessitates a broader societal shift based on the previous discussion. It cannot be achieved abruptly but demands strategic thinking and planning that surpasses mere restructuring of the educational system or isolated adaptation efforts. Central to this transformation is the utilization of knowledge as the fundamental bedrock for change as well as the promotion of lifelong learning. Attaining these objectives requires the establishment of robust educational systems, the reassessment of diverse educational materials, curriculum review and the achievement of closer alignment between the outcomes of the educational process and the demands of the labor market. The educational landscape can be effectively transformed to meet the challenges and opportunities of the digital era by undertaking these measures.

### 3.2. Second: Educational Wastage

According to Muhammad's [7] definitions of educational wastage revolve around the impact on the school's efficiency, including the underperformance of its staff which affects internal efficiency, productivity and the achievement of educational goals. The following are manifestations of educational wastage:

1. Student attrition: The educational system's inability to retain certain students and provide them with the necessary support to succeed within the designated study period.
2. Dropout and repeat enrollment: Losses incurred when students leave school after enrollment or when some students need to repeat years due to failure, interruptions or re-enrollment [29].
3. Mismatch with labor market needs: The educational system's failure to strike a balance between its outputs and the demands of the labor market. This includes graduating insufficient numbers of specializations required by the labor market while focusing on teaching specializations with low demand.
4. Inefficiency and challenges: Poor educational efficiency resulting from curriculum and textbook inadequacies, overcrowded classrooms, uneven distribution of teachers or frequent teacher absence and a lack of rationalization and effective spending by educational administrators.
5. Limited job opportunities: Insufficient availability of suitable employment opportunities for graduates leading to hidden unemployment or a decrease in graduates' performance levels where their abilities do not align with the requirements of the job market. This can be attributed to shortcomings in the educational system's ability to adapt to external societal changes.
6. Failure to achieve universal education: The educational system's inability to ensure universal access to education, attract children to school and effectively achieve its goals [30].

Educational wastage is a detrimental phenomenon that hinders the attainment of goals and objectives within the educational system. Researchers must consider two dimensions that characterize this phenomenon to study educational wastage. The first dimension is the quantitative educational dimension which arises from failure and dropout phenomena. This dimension can be quantified by directly adding the number of dropouts and failures and calculating their ratio to the total number of enrolled students. This provides a measure of quantitative educational wastage. The second dimension is qualitative educational wastage which pertains to the type and quality of education imparted by the educational system to its constituents. Assessing this dimension is challenging as it does not lend itself to direct measurement. In order for an educational system to accomplish its goals, it must strive for high educational efficiency. Achieving this is contingent upon the system's capacity to mitigate educational wastage in both its quantitative and qualitative aspects. The relationship

between educational efficiency and educational wastage is inversely correlated and their interconnection is so strong that comprehending one without considering the other becomes arduous [29].

The causes of educational wastage as outlined by Kamal[31] can be attributed to the following factors:

A. Failure: This phenomenon stems from various factors including inadequate educational guidance for students, shortcomings in the examination system that prioritizes rote memorization over comprehension and understanding, insufficient elements of engagement in certain curricula, limited use of modern teaching methods, students' weak academic performance, a weak connection between the family and school and the employment of unqualified teachers.

B. Dropout: The causes of dropout are multifaceted and interconnected. They can be attributed to issues within the educational system as well as social and economic circumstances, unfavorable educational environments and other external influences related to the student, their parents or the surrounding community. The educational reasons for dropout can be summarized as follows: a weak alignment between the curriculum and the needs of the local environment, inadequate teacher competence, reliance on traditional examination-based evaluation methods, insufficient educational resources such as buildings, equipment and opportunities for sports activities. Additionally, cultural, social, economic and emergency factors such as wars and displacement can also contribute to dropout rates.

The factors contributing to both failure and dropout can be attributed to various elements related to the student, school, family and society as outlined by Al-Jaidi and Al-Ajami [32]:

- Personal reasons related to the student include poor health, difficulties in understanding certain academic subjects, frequent absences, prioritizing playtime with friends over studying, a lack of ambition among students, a sense of insecurity and dependence at home and a desire particularly at the secondary stage to attain early financial independence.

- School reasons: These encompass an overcrowded study plan, a large number of school curricula that may not adequately address the needs and preferences of students, insufficient consideration of individual differences in the curricula, high student-to-teacher ratios, deficiencies in teaching methods and educational techniques, inflexibility in the examination system and methods, inadequate teacher capacity, weak teacher personalities, a lack of effective communication between school and home, insufficient guidance and counseling services within the school and a lack of genuine interest in student attendance.

- Family reasons: These factors include a lack of parental responsibility for their children's future particularly concerning girls' education, family disintegration resulting from divorce or polygamy, ongoing conflicts between parents, sibling rivalries, low cultural levels within the family, unfavorable economic conditions, unrealistic expectations from parents that surpass their children's capabilities and some parents' inclination to encourage early marriage among their middle and high school-aged children.

- Social reasons: These encompass negative societal attitudes towards the importance of education, inadequate media coverage and awareness campaigns highlighting the significance of education particularly for girls. A high standard of living leads to students obtaining what they desire easily, thereby diminishing the perceived value and benefits of education.

C. Inefficient time management leads to incomplete and subpar completion of required tasks resulting in a failure to achieve desired goals within predetermined deadlines. Time wastage can be attributed to various factors including the disregard for the role of teachers in participating in school decision-making processes, overburdening teachers with multiple administrative responsibilities and an excessive focus on clerical or administrative duties [33].

D. Educational wastage resulting from school buildings and equipment is a significant concern. Constructing schools and providing and maintaining the necessary equipment for the educational process, including suitable furniture and various educational tools and resources involves substantial financial investments. However, several problems arise in relation to school buildings [2].

- Unequal distribution: The equitable distribution of school buildings among regions and villages within districts and governorates is often lacking. This leads to the construction of multiple schools in close proximity in certain areas, while neglecting others.

- Incomplete construction: Some schools are built incompletely leading to additional costs due to delays, damage to school property and a decrease in the expected lifespan of these buildings.

- Underutilization: School buildings are often not used to their full capacity, resulting in wastage of resources and inefficiency.

- Lack of control and supervision: Insufficient control and engineering supervision over contracting works contribute to the construction of school buildings with shorter useful lives, requiring frequent repairs and restoration.

- Absence of accountability: There is a lack of a reward and punishment system for individuals, groups and organizations that engage in destructive practices within school buildings.

The aforementioned discussion highlights the highly detrimental nature of educational wastage for both individuals and society. It entails a significant loss of state resources and allocated budgets for education as well as the graduation of people who lack competence in their respective fields, possess fragile cultural foundations and are susceptible to deviating from societal norms and values. Consequently, it becomes imperative to explore diverse alternatives to address this issue. This includes examining strategies to alleviate the economic burden on the educational system and maximizing the effective utilization of educational resources and outcomes through optimal investment. It becomes possible to mitigate the impact of educational wastage and foster a more efficient and productive educational environment.

## 4. Methodology

The study methodology used a descriptive approach to align with the nature of the research. This approach involved a theoretical examination of digital transformation and educational wastage in basic education schools followed by a field study employing research tools to gather information. The field study focused on investigating the components of the educational environment that contribute to digital transformation in addressing educational wastage within basic education schools in Irbid Governorate. Additionally, the study explored the obstacles and prerequisites for digital transformation in tackling educational wastage in these schools.

### 4.1. Population and Sampling

The study population encompassed all principals, assistant principals and teachers affiliated with basic education schools in Irbid Governorate. The study employed a random sampling method to select a sample of 270 principals and teachers from basic education schools in Irbid Governorate.

### 4.2. Study Tool

The study used a questionnaire as the research tool to gather data from principals and teachers of basic education schools in Irbid Governorate. The questionnaire aimed to assess their perspectives regarding the components of the educational environment that contribute to digital transformation in addressing educational wastage in these schools. Additionally, the questionnaire aimed to identify the obstacles and challenges hindering the implementation of digital transformation to address educational wastage. Furthermore, it aimed to gather insights and proposals from participants regarding the activation of digital transformation to combat educational wastage in basic education schools in Irbid Governorate.

An instrument was developed for the purpose of this study after conducting a comprehensive review of the literature and previous studies. The objective was clearly defined and the dimensions of the instrument were determined. The items of the instrument were subsequently formulated. Selected criteria and items from relevant studies cited in the theoretical framework were incorporated to ensure the instrument's comprehensiveness and validity [1, 34]. The instrument was designed to assess the perspectives of principals and teachers in basic education schools. The instrument comprised three dimensions, namely: elements of the educational environment that contribute to digital transformation in addressing educational wastage (EEEDT) (9 items). Obstacles preventing the activation of digital transformation to address educational wastage (OPDT) (9 items). Fundamental requirements for the successful implementation of digital transformation to combat educational wastage (FRDT) (10 items). The final version of the instrument consisted of a total of 28 items encompassing the aforementioned dimensions.

The instrument's validity and reliability were rigorously examined and established through a series of steps. Firstly, nine experts from Saudi University critically evaluated the instrument's items. Based on their valuable opinions, the researchers made the necessary modifications and reformulations to enhance the instrument's quality. Additionally, certain items were omitted following expert suggestions. A pilot study was conducted with 30 respondents to further ensure the validity and reliability of the instrument. The responses and feedback received from the pilot study participants were carefully analyzed and used in refining the final version of the instrument. The collected data were analyzed using SPSS version 26. The discriminant coefficient (corrected item-total correlation) was calculated using SPSS to assess the instrument's validity. Items with a discriminant coefficient below 0.20 were excluded from the final instrument. The matrix correlation coefficients between the sub-scales were calculated using sample responses. These coefficients determine the degree of correlation between the sub-scales. Table 1 displays the matrix correlation coefficients indicating a relatively high level of correlation (ranging from 0.905 to 0.936). This finding suggests that all sub-scales effectively measure a single concept and highlights the strong correlation of sub-scores with the total score.

**Table 1.**
Correlation matrix of the scale.

| Dimension | | **AvEEEDT** | **AvOPDT** | **AvFRDT** | **AvTOT** |
|---|---|---|---|---|---|
| AvEEEDT | Pearson correlation | 1 | 0.944** | 0.913** | 0.932** |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 |
| AvOPDT | Pearson correlation | 0.944** | 1 | 0.904** | 0.936** |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 |
| AvFRDT | Pearson correlation | 0.913** | 0.904** | 1 | 0.905** |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 |
| AvTOT | Pearson correlation | 0.932** | 0.936** | 0.905** | 1 |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 |

**Note:** **. The correlation is significant at the 0.01 level (2-tailed).

The Cronbach's alpha coefficient based on standardized items for the entire instrument was calculated to be 0.954. This high value indicates that the instrument exhibits a strong level of reliability. The study-tool items were ranked using the formula: (the highest value of the alternative - minimum alternative) divided by the number of levels resulting in (3 - 1)/3 = 0.67. The Likert scale used in the study comprises three options or values: 1, 2 and 3. This classification is intended to categorize the responses. Accordingly, the levels are defined as follows: Disagree: 1.0–1.67, neutral : 1.67–2.34 and agree : 2.34–3.00. These classifications provide a framework for interpreting the participants' responses.

Confirmatory factor analysis (CFA) was employed to establish the construct validity of the instrument. The CFA aimed to examine the factorial construct validity of the scale [35]. The final version of the instrument was administered to the study sample for the purpose of conducting CFA on the instrument items within their respective dimensions. The adopted model visually represented the interrelationships among the 28 items of the instrument. These items were categorized into three distinct dimensions as illustrated in Figure 1. The CFA analysis allowed for a comprehensive exploration of the underlying structure and interconnections within the instrument.
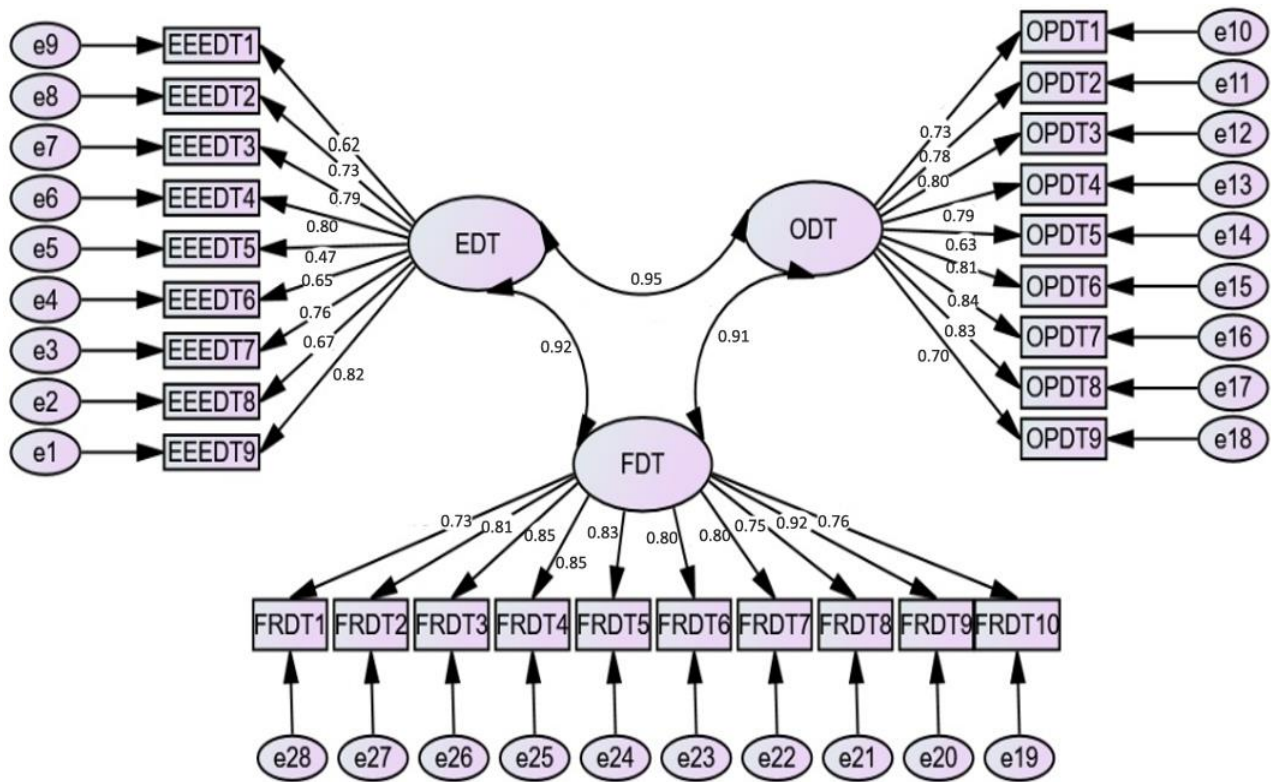


**Figure 1.**
Results of the confirmatory factor analysis of the model adopted for the relationship of the instrument items to their dimensions.

Figure 1 displays the loading factors of each item within their respective dimensions. It is worth noting that the loading factors for the first dimension, EEEDT (EDT) ranged from .47 to .82. Similarly, the loading factors for the second dimension, OPDT (ODT) ranged from .63 to .84. Additionally, the loading factors for the third dimension, FRDT (FDT) ranged from .73 to .92. These findings indicate that each item exhibited a substantial loading suggesting a strong association between the items and their respective dimensions. Moreover, the results revealed a robust correlation among the dimensions of the instrument. The alignment of the model with the collected data signifies that all indicators meet the predetermined criteria established for the study. Consequently, these findings serve as compelling evidence for the stability of the model in accurately capturing the relationships among the instrument items.

## 5. Results

This section elucidates the outcomes derived from the research with a specific emphasis on addressing the initial research query pertaining to the constituents or facets within the educational milieu that play a pivotal role in the digital transformation process designed to mitigate educational wastage in primary education institutions. The analytical process encompassed the computation of means, standard deviations, ranks and the significance level associated with the consensus on the presence of educational environment components. According to Table 2, for a comprehensive presentation of the means, standard deviations, ranks, agreement, disagreement and significance levels linked to the consensus on the accessibility of educational environment components.

**Table 2.**
The means, standard deviation, ranks, agree, disagree and degree of consent on the availability of the components of the educational environment.

| Rank | Items | Mean | Std. deviation | Agree | Disagree | Degree of importance |
|------|-------|------|----------------|-------|----------|----------------------|
| 7 | EEEDT1 | 2.35 | 1.64 | 56.8 | 21.4 | High |
| 8 | EEEDT2 | 2.34 | 1.55 | 50.3 | 15.8 | High |
| 9 | EEEDT3 | 2.30 | 1.81 | 52.1 | 19.6 | Medium |
| 4 | EEEDT4 | 2.38 | 1.51 | 53.1 | 15.5 | High |
| 3 | EEEDT5 | 2.55 | 1.47 | 66.1 | 11.3 | High |
| 1 | EEEDT6 | 2.63 | 1.62 | 74.3 | 11.3 | High |
| 5 | EEEDT7 | 2.37 | 1.57 | 56.5 | 18.5 | High |
| 2 | EEEDT8 | 2.59 | 1.59 | 70.2 | 11.4 | High |
| 6 | EEEDT9 | 2.36 | 1.56 | 50.9 | 13.3 | High |
|  | Overall average | 2.43 | 1.52 |  |  | High |

It is evident that all items within this dimension achieved substantial agreement rates ranging from 50.3% to 74.3% based on the findings displayed in Table 2. Conversely, the percentage of disagreement was minimal ranging from 11.3% to 21.4% resulting in an average of 2.43 with a standard deviation of 1.52. This indicates a significant level of agreement among the sample participants regarding the components of the educational environment that contribute to digital transformation in basic education schools in order to address educational wastage.

Table 3 presents a comprehensive summary of the means, standard deviations, ranks, levels of agreement and disagreement as well as the significance levels associated with these obstacles in order to address the second question regarding the primary obstacles and challenges that impede the advancement of digital transformation initiatives aimed at addressing educational wastage in basic education schools within Irbid Governorate.

**Table 3.**
The means, standard deviation, ranks and consent levels of obstacles hindering digital transformation in addressing educational wastage.

| Rank | Items | Mean | Std. deviation | Agree | Disagree | Degree of importance |
|------|-------|------|----------------|-------|----------|----------------------|
| 8 | OPDT1 | 2.36 | 1.57 | 54.4 | 20.3 | High |
| 9 | OPDT2 | 2.32 | 1.51 | 48.7 | 15.9 | Medium |
| 5 | OPDT3 | 2.53 | 1.61 | 64.2 | 11.8 | High |
| 7 | OPDT4 | 2.38 | 1.54 | 50.2 | 15.7 | High |
| 3 | OPDT5 | 2.65 | 1.57 | 74.2 | 12.2 | High |
| 6 | OPDT6 | 2.40 | 1.62 | 56.5 | 17.3 | High |
| 4 | OPDT7 | 2.60 | 1.53 | 71.6 | 13.7 | High |
| 2 | OPDT8 | 2.70 | 1.55 | 72.1 | 1.7 | High |
| 1 | OPDT9 | 2.73 | 1.56 | 78.6 | 6.8 | High |
|  | Overall average | 2.52 | 1.57 |  |  | High |

It is evident that all items within this dimension achieved significant rates of agreement ranging from 48.7% to 78.6% based on the findings presented in Table 3. Conversely, the percentage of disagreement was relatively low ranging from 1.7% to 20.3% resulting in an average of 2.52 with a standard deviation of 1.57. This indicates a high level of agreement among the sample participants regarding the obstacles that hinder digital transformation in addressing educational wastage in basic education schools.

The responses of the total sample participants are summarized in Table 4 to address the third question regarding the fundamental requirements for activating digital transformation to address educational wastage in basic education schools.

**Table 4.**
The means, standard deviation, ranks and consent levels of obstacles hindering digital transformation in addressing educational wastage.

| Rank | Items | Mean | Std. deviation | Agree | Disagree | Degree of importance |
|------|-------|------|----------------|-------|----------|----------------------|
| 3 | FRDT1 | 2.81 | 1.82 | 86.1 | 4.1 | High |
| 2 | FRDT2 | 2.83 | 1.76 | 87.1 | 4.0 | High |
| 4 | FRDT3 | 2.79 | 1.59 | 86.3 | 3.7 | High |
| 6 | FRDT4 | 2.68 | 1.53 | 78.2 | 4.9 | High |
| 5 | FRDT5 | 2.71 | 1.65 | 80.3 | 5.8 | High |
| 1 | FRDT6 | 2.85 | 1.54 | 89.7 | 4.2 | High |
| 7 | FRDT7 | 2.50 | 1.67 | 62.4 | 11.2 | High |
| 9 | FRDT8 | 2.43 | 1.49 | 57.3 | 11.9 | High |
| 8 | FRDT9 | 2.46 | 1.61 | 56.7 | 10.3 | High |
| 10 | FRDT10 | 2.41 | 1.63 | 51.2 | 7.1 | High |
|  | Overall average | 2.65 | 1.66 |  |  | High |

It is evident that all items within this dimension received substantial rates of agreement ranging from 51.2% to 89.7% based on the findings presented in Table 4. Conversely, the percentage of disagreement was minimal ranging from 3.7% to 11.9% resulting in an average of 2.65 with a standard deviation of 1.66. This indicates a significant level of agreement among the sample participants regarding the basic requirements for activating digital transformation to address educational wastage in basic education schools.

## 6. Discussion

It is notable that all respondents in the sample expressed a high degree of agreement regarding the elements of the educational environment that contribute to digital transformation in basic education schools within Irbid Governorate, aiming to address educational wastage regarding the first question. Furthermore, the following observations can be made when considering the arrangement of the items based on the responses provided by the sample:

Item 6 " addressing multiple learning outcomes through the use of modern technologies" obtained the highest ranking with an average of 2.63 indicating significant relative importance. This finding can be attributed to the fact that education in the digital age is grounded in cognitive and constructivist theories and embraces the principles of active learning. This approach encompasses a wide range of learning outcomes that leverage modern technologies and information and communication technology techniques by going beyond mere information memorization. As a result, it contributes to the enhancement of education quality, improves its efficiency and enhances learner effectiveness. Item 8 "developing electronic programs that adhere to the principle of equality and equal opportunities" came in second with an average of "2.59" and great relative importance. This result is consistent with the study of Al-Jaidi and Al-Ajami [32] which emphasized the importance of taking individual differences into account. In digital education, this can be explained by the fact that education in the digital age provides opportunities for everyone to obtain their full opportunity in education, express opinions, discuss and dialogue while achieving the joy of learning and increasing motivation for learning working to support equal educational opportunities and their applications and achieving the principle of democratization of education. Item 5 "Offering digital courses and curricula" attained the third position with a mean of 2.55 indicating its significant relative importance. This outcome can be attributed to the design of programs, courses and educational materials based on international foundations and standards. Such an approach aims to stay well-informed of knowledge advancements and scientific specializations enabling the absorption of new information and knowledge. The implementation of a self-learning system is pursued leading to favorable outcomes for the learners in the educational process by replacing the traditional education system centered on rote memorization and indoctrination.

The findings of this study align with the research conducted by Al-Sunneen [36] who emphasized the potential reduction of educational wastage through the transformation of the school environment into a digital setting. This transformation encompasses various educational practices and administrative tasks involving students and their parents as well as supporting the enhancement of teachers' scientific, pedagogical and technical competencies. Additionally, the development of rules and regulations contributes to the improvement of the school environment, teaching methods and learning strategies. This technical focus facilitates bridging the knowledge gap between teachers and students, fostering students' motivation to learn and successfully complete their compulsory studies, thereby mitigating issues such as failure, dropout rates and educational losses. Consequently, these efforts save resources and financial investments for the state. Embracing technical solutions and digital transformation represents a critical challenge in education as it equips future generations with scientific knowledge and technical know-how enabling them to actively contribute to the development and prosperity of the educational process and compete globally.

Regarding the second question, the results revealed a significant level of agreement among the entire sample regarding the obstacles that hinder digital transformation in addressing educational wastage within basic education schools in Irbid Governorate. Furthermore, when considering the arrangement of the items based on the responses provided by the sample the following observations can be made:

Item 9, "the absence of integrated digital systems that operate harmoniously without conflicts" secured the top ranking with a mean of 2.73 signifying its significant relative importance. Following closely, item 8, "Inadequate utilization of contemporary techniques, technology and modern approaches in education" claimed the second position with a mean of 2.70 also demonstrating great relative importance. Additionally, item 5 "Insufficient proficiency and training among teachers in utilizing technology and technical skills" attained the third rank with a relative weight of 2.65, further highlighting its considerable relative importance. Item 2, " Limited social interaction among the stakeholders involved in the educational process" obtained the lowest ranking with a mean of 2.32 indicating a moderate level of relative importance.

The findings of this study align with the research conducted by Al-Halafi [2] who emphasized that deficiencies in teaching methods, techniques and the utilization of educational technologies represent obstacles to digital transformation. The process of digital transformation can be divided into two essential parts. The first part involves the absorption and acquisition of knowledge about new technologies while the second part entails understanding the nature of these technologies to facilitate their effective utilization in achieving educational objectives. It becomes evident from the aforementioned that digital transformation is closely tied to the availability of both technological infrastructure and human resources capable of adapting and leveraging these technologies to fulfill the goals of the educational process [6].

Regarding the third question, the results indicated a high level of agreement among the entire sample regarding the fundamental prerequisites for implementing digital transformation to address educational wastage in basic education schools in Irbid Governorate. Furthermore, the following observations can be made when considering the arrangement of the items based on the responses provided by the sample:

Item 6, "Establishing a comprehensive database and advanced information systems for schools " ranked highest with a mean of 2.85 indicating its significant relative importance. Item 2, "Conducting seminars to educate school staff on the significance of digital transformation and the methods of implementation" secured the second position with a mean of 2.83, also demonstrating great relative importance. Additionally, item 1, "Providing training for the stakeholders involved in the educational process to enhance their operational efficiency in using technology and minimize unnecessary expenses," attained the third rank with a mean of 2.81 further emphasizing its considerable relative importance. Item 10, " Propose recommendations aimed at enhancing school performance" obtained the lowest ranking with a mean of 2.41 signifying its significant relative importance.

This finding aligns with the findings of Mujahed [15] who recommended the extensive utilization of modern technological methods in education and distance learning. It is also in line with the study conducted by Amin [9] emphasizing the importance of developing a digital transformation strategy and fostering a culture of digital transformation. Moreover, the study by Shehata [24] highlighted the necessity of transforming education and learning systems to equip individuals with new skills and capabilities for excelling in the digital era. Additionally, Al-Sharif [3] emphasized the significance of raising awareness about digital content, its applications and the importance of digital transformation in developing personal competencies to meet the challenges of the modern age. The study also emphasized the need to disseminate digital transformation methods in education to all stakeholders in the educational process and establish the foundations for an enabling digital teaching and learning environment. These foundations include supporting infrastructure with advanced digital devices providing high-speed and high-quality internet connectivity and offering technical support for program execution, device maintenance, data and network security measures.

This outcome can be elucidated by the understanding that the success of the digital transformation process is not solely reliant on the efficacy of the transformation itself. It necessitates a range of capabilities, skills and personal attributes that reflect individuals' belief in and dedication to the digital transformation process and its prerequisites. Additionally, it requires the implementation of supplementary strategies to enhance the capacity and proficiency of a large number of individuals involved in the process.

## 7. Conclusion

The following conclusion can be drawn based on the theory and study in the field:

First, we need to focus on different aspects of the school environment to improve education in basic schools in Irbid Governorate and make better use of technology. This includes using modern technology for learning, using electronic programs that treat everyone fairly, offering online courses and materials, training teachers to use electronic resources well, improving communication between teachers and students and teaching everyone how to handle technical problems during online learning. However, there are challenges to making schools better such as not using new teaching methods enough, teachers and students not knowing enough about technology, people in society resisting using technology, not having a clear plan for using technology, problems with communication and internet, worries about keeping data safe, students not learning enough skills, feeling isolated and not having good digital systems.

Second, it's important to teach school staff about why using technology is important, make schools work better, use helpful technology, keep good records, connect schools and communities, give guidance on education, check how well things are going, share what works well, suggest ways to make schools better and train people to use technology in education and save school resources to solve these problems.

Third, we need to find out what parts of the school environment help digital learning and stop educational wastage. We should also figure out what problems make it hard to use technology in schools to reduce educational wastage. To do this, education leaders need to build and keep strong systems for digital communication, manage things well and make sure people can easily get what they need. Making education better with modern systems and technology is important and as is helping teachers grow in their knowledge and skills. Creating good systems and rules that help schools, improve teaching and learning and give legal guidance are important too. These steps aim to make sure changes happen smoothly, fix problems and improve education and learning systems so that future generations can learn new skills and technical knowledge. In this way, they'll be ready to face global challenges and keep up with new technology.

## 8. Recommendations, Limitations and Future Directions

We suggest doing a few things to make education better with technology. First, set up and improve the technological systems. Second, help teachers learn more through training. Third, make rules and plans to support the use of technology in education. Fourth, make the learning environment good for using technology. Fifth, work together with everyone involved. Sixth, teach students skills they'll need in the future. Seventh, check how well things are going and make sure everything is on track. Lastly, do more research and share what works best. These suggestions aim to make sure there are good systems, support for teachers, nice places to learn, collaboration, important skills, accountability and shared knowledge to make technology in education work well.

However, the study has some limitations. It only looks at how to use technology to improve basic schools and has some restrictions. It mostly involves principals and teachers in basic schools and it only looks at schools in Irbid Governorate, Jordan. These limitations should be kept in mind when understanding the findings and applying them to other situations.

For future research on using technology in basic schools, it could focus on checking how technology affects students' grades and interest over a long time. It could also explore good ways to train teachers and make sure everyone can use technology equally. Additionally, it could look into how parents and communities can support students using technology,

the right way to use technology ethically, creating a mix of in-person and online learning, adding social and emotional learning, understanding how technology affects relationships between teachers and students, finding new ways to test and give feedback and making sure technology changes last and can be used in many places. By studying these areas, teachers and leaders can learn more to make smart decisions and plans for using technology in basic education.

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