# AN ANALYTICAL STUDY OF PREVIOUS LITERATURE ON THE ROLE OF SMARTPHONE TECHNOLOGY AND ARTIFICIAL INTELLIGENCE IN EDUCATIONAL PERFORMANCE WITHIN SCHOOLS

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**Abstract**

This the aim of this study is to investigate the level of utilization of smartphone technology, artificial intelligence, self-efficacy, and educational performance among middle school students in Libyan schools in Malaysia. This will be achieved through a review of recent studies conducted in this domain. The researcher conducted a review of several prior studies pertaining to the utilization of smartphone technology and artificial intelligence in schools, examining how such usage has impacted students' educational performance. Drawing upon the reviewed studies, the researcher underscored the significance of the interrelationship between these variables, while also noting the absence of similar studies conducted within the context of Libyan schools in Malaysia. Consequently, the researcher recommends the imperative of undertaking an inquiry into the role of smartphone technology and artificial intelligence in educational performance within Malaysian schools.

**Keywords:** Artificial Intelligence, Smartphone, Educational Performance, Libyan Schools, Malaysia.

## 1. INTRODUCTION

The technological advancements accompanying the twenty-first century have significantly contributed to the evolution of artificial intelligence (AI) technology. In recent times, there has been a heightened interest in leveraging AI technology, particularly within major institutions, to enhance operational efficiency. AI has found widespread utilization in everyday life and routine tasks within institutions, aiding in the construction of functional systems and fostering trust through ethical integration into various AI applications (Al-Talidi, 2021).

Recent developments in information and communication technology have greatly enhanced the potential of smartphones as educational tools. The increased processing power, memory capacity, and connectivity have rendered these technologies more interactive. Moreover, students' proficiency in advanced multimedia technologies facilitates seamless file and message sharing. The current generation of students is adept at using electronic applications,

with their skills further refined in the era of mobile technology (Al-Masri, 2021).

The smartphone, a pocket-sized device with communication capabilities, storing contact information, offering text messaging features, and scheduling reminders, has faced challenges in capturing educators' attention due to concerns over classroom discipline and parental worries about constant child communication. Furthermore, activities relying on electronic applications often do not align well with traditional classroom environments (Al-Shibli, 2018).

Numerous educational benefits are associated with smartphone technologies, such as ease of content access, integration of a diverse range of educational activities, support for self-directed study and student organization, encouragement of student enthusiasm, fostering collaborative classroom interactions, and facilitating inquiry-based and active learning. Smartphone technologies have undeniably propelled this novel form of mobile learning.

Scholars have endeavored to formulate a unified definition of mobile learning, which is an extension of e-learning. Additionally, electronic learning can be defined as any instruction delivered through primary or dominant technologies, including handheld or mobile devices (Al-Masri, 2021). Al-Talidi (2021) affirms that mobile learning enables students to access information about educational activities that occur when they are not physically present, utilizing smartphone technology. One of its notable advantages is promoting active engagement with new information or its application, and facilitating its storage for accessible retrieval and reference. Mobile learning is recognized for stimulating student motivation, prioritizing problem-solving, and enhancing active learning skills.

Fundamental research investigating the effects of information and communication technology usage on student learning underscores the role of self-efficacy in enabling students to employ communication and information technologies for educational purposes. Additionally, students leverage their prior experiences and oral persuasion skills to improve their educational performance. Building upon these findings, this study aims to shed light on the impact of smartphone and AI technology usage on educational performance, with self-efficacy as a mediating variable, among middle school students in Libyan schools in Malaysia. This research seeks to ascertain the extent of smartphone and AI technology utilization, self-efficacy, and educational performance among the aforementioned student population. It is a pivotal study for researchers and specialists in the fields of technology, management, education, and pedagogy. Consequently, the results hold significant implications, unveiling strengths and weaknesses in Libyan schools' utilization of technology. Furthermore, the study reveals the importance of integrating AI technology within Libyan educational institutions, along with addressing traditional hindrances in smartphone and AI technology use. The research also underscores the prominent role of self-efficacy in students' adept utilization of smartphone and AI technology to enhance educational performance, fostering active learning methods and collaborative efforts among students, and catering to individual students' diverse learning needs.

## 2. LITERATURE REVIEW

The study reviewed a multitude of previous research works, encompassing recent investigations into the study variables through peer-reviewed research papers, master's theses, and doctoral dissertations. A retrospective analysis of the prior studies can be summarized as follows:

### 2.1 Studies Related to Artificial Intelligence

The researcher has reviewed several recent studies, including scientific articles in peer-reviewed journals and master's and doctoral theses:

1) **Al-Talidi, M. J. M. (2021). The Impact of Artificial Intelligence Implementation on the Future of Employees' Jobs in the Saudi Government Sector: An Applied Study on the Ministry of Justice in the Asir Region. Journal of Historical, Administrative, and Legal Sciences, 5(1), 79-96.**

The aim of this study was to investigate the impact of implementing artificial intelligence on the future of employees' jobs in the Saudi government sector, specifically at the Ministry of Justice in the Asir Region. The study addressed the problem of limited artificial intelligence implementation, which negatively affects Saudi government employees. The study's significance lies in shedding light on artificial intelligence in the Saudi government sector. It employed a quantitative approach to analyze the impact of artificial intelligence implementation on the future of employees' jobs in the aforementioned sector. The study's findings indicated a statistical relationship between artificial intelligence and the Saudi government sector. The study recommended the necessity of implementing artificial intelligence across all Saudi government institutions. The present study benefited from this research in understanding the theoretical framework of artificial intelligence, although it differs in its treatment of the dependent variable.

2) **Al-Masri, N. H., & Al-Agha, M. A. (2021). The Impact of Artificial Intelligence in Communication Technology on Organizational Immunity: The Mediating Role of Digital Media Characteristics in Palestinian Universities.**

This study aimed to examine the impact of artificial intelligence in communication technology on organizational immunity, considering the mediating role of digital media characteristics in Palestinian universities. The study addressed the problem of limited artificial intelligence adoption and its negative effect on digital media characteristics in Palestinian universities. The study's significance lies in highlighting artificial intelligence in Palestinian universities. It followed a quantitative methodology to analyze the impact of artificial intelligence in communication technology on organizational immunity. The study found a statistically significant relationship between artificial intelligence and organizational immunity, mediated by digital media characteristics in Palestinian universities. The study recommended expanding the application of artificial intelligence in media institutions. The current study drew from this research to comprehend the theoretical framework of artificial intelligence.

3) **Moulay Amina, T., Benzerka, I., & Benaizera, I. (2021). The Application of Artificial Intelligence and Emotional Intelligence in Decision-Making. Groups of Knowledge, 7(2), 187-.**

This study aimed to explore the application of artificial intelligence and its relationship with emotional intelligence in decision-making. The study addressed the problem of limited artificial intelligence application, negatively impacting emotional intelligence. The significance of the study lies in shedding light on the application of artificial intelligence and its relationship with emotional intelligence. It employed a quantitative approach to analyze the application of artificial intelligence. The study's results indicated a statistically significant relationship between artificial intelligence and emotional intelligence. The study recommended enhancing the application of artificial intelligence across various institutions. The current study utilized this research to understand the theoretical framework of artificial intelligence.

4) **Ayashawi, F., Bakri, N., Ayad, L. (2021). The Use of Artificial Intelligence Applications in Enhancing the Performance of Economic Institutions. Doctoral dissertation, Ahmed Draya University-Adrar.**

This study aimed to investigate the use of artificial intelligence applications in improving the performance of economic institutions. The study addressed the problem of highlighting the use of artificial intelligence applications in improving the performance of economic institutions. The significance of the study lies in emphasizing the use of artificial intelligence applications in enhancing economic institution performance. The study followed a quantitative approach to analyze the use of artificial intelligence applications. The findings showed that the use of artificial intelligence applications plays a significant role in enhancing economic institution performance. The study recommended the widespread adoption of artificial intelligence applications. The current study derived insights from this research to comprehend the theoretical framework of artificial intelligence.

5) **Ahmed, H. (2020). The Role of Artificial Intelligence in Developing Crisis Management Content: A Futuristic View. Published Research Paper, Decision Center for Media Studies.**

The purpose of this study was to explore the role of artificial intelligence in developing crisis management content. The study addressed the problem of limited involvement of artificial intelligence in crisis management content development. The significance of the study lies in highlighting the role of artificial intelligence in enhancing crisis management content. The study employed a quantitative approach to analyze the role of artificial intelligence. The study's results indicated a positive role of artificial intelligence in developing crisis management content. The study recommended expanding the application of artificial intelligence in media institutions. The current study drew insights from this research to understand the theoretical framework of artificial intelligence.

6) **Gharira, A. S., Al-Faydi, A. S. A. (2020). The Current State of Crisis Management in Higher Education in Libya: A Field Study at Sabha University. Published Research Paper, Journal of Research and Applied Sciences, Department of Human Resources, Faculty of Commerce and Political Science, Sabha University, Libya.**

The purpose of the current study was to investigate the current state of crisis management in higher education in Libya, particularly at Sabha University. The study addressed the problem of deteriorating crisis management in Libyan higher education. The significance of the study lies in shedding light on crisis management in Libyan higher education. The study followed a quantitative approach to analyze the current state of crisis management. The study's findings indicated that the current state of crisis management in the Libyan Ministry of Education is a result of deteriorating security conditions. The study recommended the use of more effective solutions to address crises. The current study benefited from this research to understand the theoretical framework of crises, but it differed in its treatment of the independent variable, artificial intelligence.

## 2.2 Studies Related to Job Performance

There the researcher has reviewed several recent studies, including scientific articles in peer-reviewed journals, master's theses, and doctoral dissertations.

### 1) Abdullah's Study (2018)

This study aimed to investigate the impact of administrative empowerment on job performance at the Syrian Virtual University. The study identified the challenge of administrative empowerment facing various obstacles that affect job performance. The researcher employed a quantitative approach to analyze the impact of administrative empowerment on job performance at the Syrian Virtual University. The study sample consisted of 162 employees. The results revealed that administrative empowerment positively influences job performance. The study recommended further exploration of the role of administrative empowerment in job performance. This study contributed to the understanding of the theoretical framework of job performance. A distinction between the current study and Abdullah's lies in the focus on the Syrian Virtual University context.

### 2) Muslimi's Study (2017)

This study aimed to explore the relationship between job satisfaction and employee performance effectiveness in the General Directorate of Education in the northern region of Al-Batinah Governorate, Oman. The researcher employed a quantitative approach to analyze this relationship. The study included a sample of 222 employees. The findings indicated a positive relationship between job satisfaction and employee performance effectiveness. The study recommended further investigation into the role of job satisfaction in job performance. It benefited from the theoretical framework of job performance. The current study differs from Muslimi's by focusing on the General Directorate of Education in the northern region of Al-Batinah Governorate, Oman.

### 3) Basar's Study (2017)

The aim of this study was to understand the relationship between transformational leadership and organizational performance. The researcher used a quantitative approach to analyze this relationship. The study's sample consisted of 152 employees from the General Directorate of Education in the northern region of Al-Batinah Governorate, Oman. The results highlighted a positive relationship between job satisfaction and employee performance effectiveness. The study recommended further exploration of the role of job satisfaction in job performance. It drew from the theoretical framework of job performance. The current study differs from Basar's by focusing on the General Directorate of Education in the northern region of Al-Batinah Governorate, Oman.

### 4) Joneso's Study (2017)

This study aimed to understand the organizational innovation climate and its impact on organizational performance. The researcher employed a quantitative approach to analyze this relationship. The study included a sample of 182 participants from workplaces in Ohio. The results revealed a direct positive relationship between the organizational innovation climate and organizational performance. The study recommended further investigation into the role of administrative innovation in job performance. It benefited from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context.

### 5) Mathews' Study (2015)

The objective of this study was to explore the impact of the work environment on employee performance in the Indian industrial sector. The researcher employed a quantitative approach to analyze this impact. The study sample consisted of 362 participants from the Indian industrial sector. The findings indicated a direct positive relationship between the work environment and employee performance in the industrial sector. The study recommended further exploration of the role of administrative innovation in job performance. It drew from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context.

### 6) Dhameen's Study (2015)

This study aimed to investigate the impact of functional empowerment on employee performance enhancement. The researcher employed a quantitative approach to analyze this impact. The study included a sample of 362 employees from governmental institutions in the Gaza Strip. The findings indicated a direct positive relationship between the impact of functional empowerment and employee performance enhancement. The study recommended further exploration of the role of functional empowerment in job performance. It benefited from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context.

### 7) Ammar's Study (2015)

This study aimed to investigate the impact of managerial leadership on employee performance in the economic institution, a case study of SunGas. The researcher employed a quantitative approach to analyze the impact of managerial leadership on employee performance in the economic institution, focusing on SunGas. The study sample consisted of 254 employees from SunGas. The results revealed a direct positive relationship between managerial leadership and employee performance in the economic institution. The study recommended further exploration of managerial leadership and its role in job performance. It benefited from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context.

### 8) Tommy's Study (2014)

This study aimed to understand the impact of administrative empowerment on job performance. The researcher employed a quantitative approach to analyze the impact of administrative empowerment on job performance. The study sample consisted of 254 employees from SunGas. The findings indicated a direct positive relationship between managerial leadership and employee performance in the economic institution. The study recommended both administrative empowerment and job performance. It drew from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context.

### 9) Maadi's Study (2014)

The purpose of this study was to explore the impact of job quality on employees' job performance. The researcher employed a quantitative approach to analyze the impact of job quality on employees' job performance. The study sample consisted of 204 employees from Palestinian universities. The findings indicated a direct positive relationship between job quality and employees' job performance. The study recommended further investigation into the role of job quality in job performance. It drew from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context.

### 10) Al-Gharashi's Study (2014)

This study aimed to investigate the impact of employee empowerment on enhancing job performance, with an applied study on the healthcare sector in Taif City. The researcher employed a quantitative approach to analyze the impact of employee empowerment on enhancing job performance in the healthcare sector in Taif City. The study sample consisted of 304 employees from the healthcare sector in Taif City. The results revealed a direct positive relationship between employee empowerment and enhancing job performance in the healthcare sector in Taif City. The study recommended both employee empowerment and job performance enhancement. It drew from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context.

### 11) Eissa's Study (2014)

This study aimed to explore the impact of organizational climate on job performance of employees in the Directorate of Ports Affairs of Citizenship, Passports, and Residency in the Ministry of Interior in the Kingdom of Bahrain. The researcher employed a quantitative approach to analyze the impact of organizational climate on job performance of employees in the Directorate of Ports Affairs. The study sample consisted of 227 employees from the Ministry of Interior in the Kingdom of Bahrain. The findings indicated a direct positive relationship between organizational climate and job performance of employees in the Directorate of Ports Affairs. The study recommended further exploration of job performance. It drew from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context.

### 12) Canadian Center Study (2014)

This study aimed to investigate the impact of workplace environmental factors on job performance. The researcher employed a quantitative approach to analyze the impact of workplace environmental factors on job performance. The study sample consisted of 254 employees in the hotel sector in England. The findings indicated a direct positive relationship between workplace environmental factors and job performance in the hotel sector in England. The study recommended further investigation into job performance. It drew from the theoretical framework of job performance. The current study differs by examining a distinct environment compared to the researched context, albeit without considering administrative innovation as an independent variable.

### 2.3 Studies Related to Self-Efficacy (Mediating Variable)

### 1) Etihady Study (2019)

This study aimed to explore the relationship between job insecurity and self-efficacy. The researcher used a quantitative approach to analyze the impact of job insecurity on self-efficacy. The findings revealed a direct positive relationship between job insecurity and self-efficacy. The study recommended further research into job insecurity and self-efficacy. It drew from the theoretical framework of self-efficacy and job insecurity. The current study differs by examining a distinct environment compared to the researched context and using self-efficacy as a dependent variable.

### 2) Mao's Study (2019)

The goal of this study was to identify the role of self-efficacy as a mediating variable in the relationship between humanistic leadership and self-reliance. The researcher used a quantitative approach to analyze the role of self-efficacy as a mediating variable. The findings indicated a direct positive relationship between the mediating role of self-efficacy and the relationship between humanistic leadership and self-reliance. The study recommended further exploration of self-efficacy. It drew from the theoretical framework of self-efficacy. The current study differs by examining a distinct environment compared to the researched context and using self-efficacy as a mediating variable.

### 3) Newman's Study (2018)

This study aimed to understand the relationship between self-efficacy and employee performance. The researcher used a quantitative approach to analyze the impact of workplace environmental factors on job performance. The study sample consisted of 304 employees from West Indonesia University. The findings revealed a direct positive relationship between self-efficacy and employee performance at the university. The study recommended further exploration of self-efficacy and job performance. It drew from the theoretical framework of self-efficacy and job performance. The current study differs by examining a distinct environment compared to the researched context and using self-efficacy as an independent variable.

### 4) Sari's Study (2016)

The objective of this study was to examine the mediating role of self-efficacy in the relationship between reflection and attitudes. The researcher used a quantitative approach to analyze the mediating role of self-efficacy. The findings indicated a direct positive relationship between the mediating role of self-efficacy and the relationship between reflection and attitudes. The study recommended further exploration of self-efficacy. It drew from the theoretical framework of self-efficacy. The current study differs by examining a distinct environment compared to the researched context and using self-efficacy as a mediating variable.

### 5) Faisal's Study (2016)

This study aimed to explore the relationship between marketing patterns and self-efficacy. The researcher used a quantitative approach to analyze the impact of marketing patterns on self-efficacy. The findings revealed a direct positive relationship between marketing patterns and self-efficacy. The study recommended further research into marketing patterns and self-efficacy. It drew from the theoretical framework of marketing patterns and self-efficacy. The current study differs by examining a distinct environment compared to the researched context and using self-efficacy as a dependent variable.

### 6) Zaher's Study (2016)

The purpose of this study was to understand the relationship between self-efficacy and academic achievement. The researcher used a quantitative approach to analyze the impact of self-efficacy and academic achievement. The findings revealed a direct positive relationship between self-efficacy and academic achievement. The study recommended further exploration of self-efficacy and academic achievement. It drew from the theoretical framework of self-efficacy and academic achievement. The current study differs by examining a distinct environment compared to the researched context and using self-efficacy as an independent variable.

### 7) Abdul Rahman's Study (2016)

This study aimed to examine the mediating role of self-efficacy in the relationship between organizational culture and job performance. The researcher used a quantitative approach to analyze the mediating role of self-efficacy. The findings indicated a direct positive relationship

between the mediating role of self-efficacy and the relationship between organizational culture and job performance. The study recommended further exploration of self-efficacy, organizational culture, and job performance. It drew from the theoretical framework of self-efficacy, organizational culture, and job performance. The current study differs by examining a distinct environment compared to the researched context and using self-efficacy as a mediating variable.

## 8) Heidi's Study (2015)

The objective of this study was to investigate the mediating role of self-efficacy in the relationship between leadership styles and managerial creativity. The researcher used a quantitative approach to analyze the impact of self-efficacy as a mediating variable in the relationship between leadership styles and managerial creativity. The findings revealed a direct positive relationship between the mediating role of self-efficacy and the relationship between leadership styles and managerial creativity. The study recommended further exploration of self-efficacy, leadership styles, and managerial creativity. It drew from the theoretical framework of self-efficacy, leadership styles, and managerial creativity.

## 9) Maital's Study (2015)

This study aimed to examine the mediating role of self-efficacy in the relationship between transformational leadership and managerial creativity. The researcher used a quantitative approach to analyze the mediating role of self-efficacy. The findings indicated a direct positive relationship between the mediating role of self-efficacy and the relationship between transformational leadership and managerial creativity. The study recommended further exploration of self-efficacy. It drew from the theoretical framework of self-efficacy. The current study differs by examining a distinct environment compared to the researched context and using self-efficacy as a mediating variable.

## 2.4 Elements of Technology Acceptance Model Theory

Technology in artificial intelligence is divided into several elements that can be described as follows:

### 2.4.1 First: Conditions for Implementing Artificial Intelligence Technology

Ahmed (2020) emphasized that the application of artificial intelligence technology is one of the most important methods used to improve and develop technological methods specific to information systems. Through artificial intelligence technology, it is possible to apply it according to the conditions that educational institutions are facing. There are many crises that educational institutions may encounter, which can affect the extent of implementing artificial intelligence technology. The researcher agrees with Ahmed (2020) that the conditions for implementing artificial intelligence technology may vary from one country to another. Many countries around the world aim to develop e-learning systems, while others have faced health crises and the spread of diseases and epidemics, similar to many other countries. Additionally, some countries like Libya face security risks due to political and security instability, which necessitates improving technological levels.

### 2.4.2 Second: Expected Effort from Using Artificial Intelligence Technology

Ahmed (2020) stated that the expected effort from using artificial intelligence benefits both institutions and individuals. Artificial intelligence has the ability to organize information and highlight sources for obtaining it. The expected effort from using artificial intelligence also benefits employees, as their capabilities are enhanced through the presence of advanced programs that adapt information systems to achieve the organization's goals clearly. The researcher believes that the most important expected effort from using artificial intelligence technology is to protect the institution from risks and hold an employee responsible for these systems clearly. Often, organizations assign an experienced employee with high skills in dealing with artificial intelligence systems and charge them with the responsibility of preserving information and preventing many managerial categories from accessing the information in the system.

### 2.4.3 Third: Expected Performance from Using Artificial Intelligence Technology

Ahmed (2020) indicated that the expected performance from using artificial intelligence technology lies in its significant utilization in managing equipment and machinery for production, reviewing and examining work output standards to a great extent. The expected performance from using artificial intelligence technology can be observed through the experiences of many countries that have succeeded in applying artificial intelligence technology significantly. The researcher sees a successful experience in applying artificial intelligence technology in Libyan schools in Malaysia. These schools were able to transform all traditional educational activities into online platforms and online lectures, which have proven their effectiveness in recent times.

### 2.5 Higher Education and Information Technology in Malaysia

The Multimedia Super Corridor (MSC) was developed to foster the use of information and communication technology (ICT) in Malaysia. The MSC encompassed flagship projects aimed at advancing the adoption of ICT. Within its major initiatives were several ICT projects, including remote healthcare development and e-government efforts, such as the establishment of smart schools. Additionally, the MSC initiative facilitated the rapid growth of local tech entrepreneurs. These tech entrepreneurs were involved in businesses centered around technology-based industries. Consequently, this led to the creation of a more sustainable information and communication technology sector in Malaysia, driven by substantial state investments in infrastructure and technology hubs to facilitate ICT utilization across various societal aspects (Islam et al., 2019).

Furthermore, there were ICT projects under the auspices of the Malaysian Administrative Modernization and Management Planning Unit (MAMPU), operating under the Prime Minister's Department. MAMPU played a leading role in the development of ICT in the public sector, ranging from e-governance and multipurpose identity cards to research and development initiatives (Ali, 2010). These projects extended throughout the country, reaching even rural areas, for instance, through community internet kiosks in rural centers. The Malaysian Communications and Multimedia Commission (MCMC) served as the regulatory

body, establishing mandatory standards and policies for all ICT initiatives in the nation. Consequently, Malaysians, particularly in urban areas, became familiar with various tools and platforms launched by the government, such as using smart cards as citizen identification cards. Malaysians were required to obtain identity cards from birth, which were updated throughout their lives. The smart card was issued and utilized by all Malaysian citizens and could serve as both a driver's license and a banking card. These are some of the ICT initiatives that most Malaysians have encountered (Ishak & Alias, 2015).

In addition to ensuring Malaysians' internet connectivity, it is also essential that the internet is accessible in the national language to reduce the digital divide between rural and urban populations, ensuring that Malaysians are digitally connected and informed. It is believed that in the digital age, the divide between those with access to digital information and those without will impact their economic success. One method to bridge this digital divide is through education, starting from schools to higher education institutions (Islam et al., 2019).

The introduction of ICT into schools across the country is a significant undertaking, representing a substantial investment in the future workforce of Malaysia. The Ministry of Education (MOE), responsible for all pre-school, primary, and secondary schools in Malaysia, formulated three key policies for ICT in education: (1) ICT for all students to focus on narrowing the digital divide; (2) emphasizing the role and function of ICT in education as a pedagogical tool; and (3) using ICT to enhance the productivity, efficiency, and effectiveness of management systems. Through these policies, a few initiatives were taken, notably providing ICT equipment and resources in every Malaysian school, along with ICT training for teachers both before and during service. However, challenges persist in these implementations, such as untrained teachers and insufficient computer availability in schools. Nevertheless, these are inherent aspects of any technological implementation, and the Ministry of Education strives to address these issues (Islam et al., 2019).

Regarding exposure to information and communication technology (ICT), the curricula in Malaysia explicitly require the use of ICT in most subjects (Salbia, 2009). Some primary schools, such as Sekolah Bestari (Smart Schools), have introduced ICT as a subject. This aligns with the concept of the smart school, which emphasizes learning through technology. The Malaysian Smart School initiative was launched in 1997 as one of the pioneering applications of the Multimedia Super Corridor. The Malaysian Smart School initiative is grounded in the strong belief that ICT is a key empowering factor for fostering a passion for learning in all individuals. There are other comprehensive ICT initiatives by the Ministry of Education, such as the MYSchoolNet platform, providing links for access to a variety of information and ICT literacy programs for all schools in Malaysia (Bullen et al., 2018).

Through this presentation, it can be generally anticipated that most Malaysian students will possess basic ICT skills upon entering higher education institutions. Their exposure is not limited to their daily lives through numerous government initiatives, but they can also acquire fundamental ICT skills during their time in school. This exposure extends to higher education institutions in Malaysia, where most institutions aim to provide adequate infrastructure and virtual educational support to enhance ICT proficiency among higher education students. Some

higher education institutions have been granted MSC status by the Malaysian government, enabling them to offer significant ICT training to promote ICT growth and contribute to developing Malaysia as a center for ICT education. Therefore, higher education institutions are strongly encouraged to enhance ICT learning through teaching and learning strategies employing ICT (Benavides et al., 2020).

As part of the national agenda to achieve the desired MSC status, Malaysian higher education institutions are incorporating ICT into their teaching and learning strategies. These institutions have embraced e-learning as they believe in its effectiveness as an alternative approach to traditional classroom methods for disseminating information. This survey was conducted during the initial phase of e-learning initiatives in Malaysian higher education institutions. The first phase for most Malaysian higher education institutions involved acquiring sufficient IT infrastructure to provide an e-learning platform. Today, Malaysian higher education institutions have surpassed the infrastructure development phase. Research conducted a few years ago found that most Malaysian higher education institutions have adequate infrastructure but lack planning for the teaching and learning components of e-learning. This suggests that research, such as this thesis, is critically needed to ensure the effectiveness and efficiency of any ICT initiative, such as mobile learning implementation. Effective and efficient initiative management is imperative. It's essential to note that teaching and learning elements are necessary, not just ICT infrastructure (Bullen et al., 2018).

## 3. DISCUSSION

Undoubtedly, schools as educational and pedagogical institutions play a pioneering role in the development of societies. They have become, in themselves, miniature worlds within a larger world. Unlike other social institutions, schools bring together the future leaders relied upon for nation-building and comprehensive prosperity. The notable expansion of school education, amidst the diversity of cultures, imposes significant challenges on researchers. The outcomes of studies that have investigated the reflections of major shifts in education, transitioning from traditional to e-learning approaches, contribute to raising awareness about the necessity for further research on contemporary issues that infiltrate the educational process, posing threats to students from various dimensions—be it cultural, social, or psychological.

The current study's focus on unveiling the intricacies of utilizing modern technologies, ranging from artificial intelligence and modern teaching tools to smartphone technology in visual education, provides an impetus for promoting an awareness of the need for additional research concerning the pressing issues affecting students. The study's findings shed light on the utilization of various technologies, encompassing artificial intelligence and smartphone technologies, which are prevalent in the scholastic environment. This study, conducted among Libyan students in Malaysia, employs fieldwork to offer factual insights into the various aspects under examination.

The field study serves as a means to supply the researcher with tangible data, enabling a comprehensive exploration of the studied phenomena. Having discussed the methodological steps in the preceding chapter, this section proceeds to present the study's findings. These

findings emerge from the presentation of metrics related to smartphone technology, artificial intelligence, self-efficacy, and educational performance according to each hypothesis. Subsequently, the results are discussed in light of the study's hypotheses, aimed at addressing inquiries and drawing general conclusions. This chapter encompasses the principal conclusions derived from the study, and based on available data and information, it proposes a series of relevant recommendations.

Emphasizing the integration of artificial intelligence and smartphone technology will undoubtedly foster multifaceted capabilities within educational institutions, particularly schools. This integration facilitates more effective decision-making, channeling energies toward continuity and smart application development. A proposed framework could be established to activate the processes and applications of artificial intelligence and smartphones. This integration would yield key components, and these main components would interact to achieve preliminary outcomes. However, the successful implementation of this integration necessitates the formulation of policies to reach these initial outcomes. This involves aligning modern technologies with school curricula, preparing and training students to enhance their self-efficacy, empowering them with the necessary skills for optimal and successful use of smartphone technology and artificial intelligence. Establishing a fertile and suitable environment for student competencies, implementing an effective training and development system for students and teachers, and achieving benefits from artificial intelligence applications all play a vital role.

One of the most influential factors affecting students' perseverance and educational performance is self-efficacy, characterized by beliefs and perceptions about their own competence. Educational self-efficacy, in particular, provides insights into students' academic achievement, serving as an indicator of their high or low performance. Consequently, Libyan students in Malaysian schools exhibiting a high level of educational self-efficacy reflect the robustness of the educational process, a key to their academic and social adaptability amid challenges and transformations, including the recent disruptions necessitated by modern technologies like artificial intelligence, smartphone applications, and advanced communication networks. Conversely, lower educational self-efficacy suggests the need for students to fortify their experiences to raise their level of self-efficacy. Such enhancement is crucial to prevent their vulnerability to pressures and difficulties in daily life, which may adversely affect their academic and social harmony.

Consequently, this study underscores the necessity of assessing the level of educational self-efficacy among preparatory stage students in Libyan schools in Malaysia. This assessment involves answering research questions, meeting research objectives, and testing hypotheses. Educational performance serves as a fundamental pillar for evaluating students and teachers as well as the entire educational process. This variable comprehensively captures multiple dimensions including academic achievement, academic performance, and academic competence. It plays a critical role in recognizing the substantial shifts that the educational process has undergone, providing effective indicators for evaluating these transformations and new inputs. Thus, it stands as a vital educational indicator aiding policy makers in enhancing

educational systems, evaluating student performance and institutional effectiveness, monitoring educational system operations, and planning for resource allocation and educational services. It further influences the formulation of educational policies, contributing to the establishment of overarching regulations for educational systems.

The current study aims to uncover the impact of artificial intelligence and smartphone technology on the educational performance of preparatory stage students in Libyan schools in Malaysia. The study successfully addressed its research questions and tested hypotheses concerning the impact of smartphone technology and artificial intelligence on educational performance. The study's findings reveal statistically significant direct effects of "facilitating conditions," "expected effort," and "expected performance" of smartphone technology on the dimensions of educational performance such as "enabling active learning," "improving collective education," and "ease of technology learning".

## 4. LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

In this study, the researcher analyzed previous studies regarding the relationship between smartphone technology and artificial intelligence, which has significantly evolved in recent years and has become an integral part of our daily lives. This technology can impact various fields, including education in schools. Numerous analytical studies have been conducted on this subject, leading to several recommendations based on these studies:

1) Integration of Technology in Curricula: Available technologies, such as smartphones and artificial intelligence, should be integrated into curricula in an innovative and appropriate manner. Educational applications and software can be utilized to enhance learning and develop students' skills.

2) Ensuring Access to Technology: All students should have access to available technology. Smartphones, smart devices, and internet connectivity should be provided in schools, especially for students who lack technological resources at home.

3) Teacher Training: Adequate training should be provided to teachers to effectively handle and utilize technology in the educational process. Teachers should possess the necessary knowledge to interact with technology and guide students in its effective use.

4) Monitoring and Performance Evaluation: Monitoring and evaluating the role of technology in enhancing educational performance is essential. This can be achieved through the analysis of data collected from the utilization of technology.

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