## **Doctoral thesis summary**

## MANAGING THE IMPLEMENTATION IN SCHOOLS OF ICT AND ITS INFLUENCE ON THE PERFORMANCE OF SCHOOL STUDENTS

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The study deals with the Information and Communication Technology (ICT) management and its effect on student performance in Arab schools in the north and south of Israel and explores the differences between these two groups. The research aims to promote effective ICT management in high schools, with a special focus on the Arab sector and its unique needs in terms of culture and infrastructure.

The first part of the thesis provides a brief introduction to the research and offers a short overview, through which the reader can understand the essence of digital integration in schools. It also generally reviews recent studies conducted on digital integration and its incorporation into learning and teaching processes in schools. Additionally, the introduction briefly demonstrates the research methodology, the research process, the research population, and the main research question.

The first and second chapter of the study address the critical literature review, which includes studies that examine the research variables both in Israel and internationally. The first section of the review chapter is about the ICT management in educational organizations including several key variables: leadership, organization, communication, controlling, and planning. These variables are the cornerstones for a successful integration of digital tools, and their effect on the learning and teaching processes. In this literature review, I focus on ICT management in aspects of the management components.

The researcher examined various leadership styles and their impact on educational institutions. For example, strategic leadership focuses on long-term planning, resource management, and continuous organizational change, while cultural leadership aims to create a multicultural environment by integrating cultural values into the educational institution. In contrast, instructional leadership focuses on guiding and mentoring the pedagogical staff to improve learning outcomes. The focus of transformational leadership is on creating positive changes and empowering teams, while the focus of transactional leadership is on rewarding and punishing people to achieve immediate results.

Leadership styles that combine transformational and transactional approaches can be particularly effective at improving performance and sustaining long-term commitments. In addition, distributed leadership fosters collaboration, knowledge sharing, improved communication, and a stronger sense of belonging by sharing responsibility and authority among members of the organization. Technology integration and overcoming resistance to change are leadership challenges in this area. Additionally, hybrid leadership, that combines various leadership styles, is

particularly suitable for addressing technological and cultural challenges in Israel, especially those faced by the Israeli Arab and Bedouin communities. These sectors require leadership that is adapted to the cultural and social characteristics of the local communities.

Moreover, it was also discussed how the COVID-19 pandemic affected managing changes in education, especially in using technology. The quick switch to online learning and dealing with sudden resistance to changes showed the importance of hybrid leadership, which mixes remote and in-person management. This type of leadership was key in overcoming resistance, avoiding setbacks, and helping everyone involved in the education system. It played a big role in successfully using technology and keeping the education system steady during uncertain times.

Furthermore, was examined how technology (ICT) is being used in education around the world, discussing both the challenges and successes. ICT tools like computers, the internet, and multimedia are used to make teaching and learning better. These tools support online learning, help students and teachers work together, and make learning more engaging with quick feedback and interactive activities (Badarne, 2019a; Díaz & Cano, 2019). One major benefit of ICT is that it helps overcome distance and location barriers, giving everyone equal access to education. However, problems like not having enough equipment or proper training still exist (Eyles, 2018).

It was also examined what affects the successful use of technology (ICT) in schools, such as the attitudes of teachers and principals, and how open they are to using new technology. School leadership support is shown to be very important for making this process work well (Eickelmann, 2011). Studies have found that a lack of proper training for teachers is one of the biggest challenges to effectively using ICT in education (Goldstein & Ropo, 2021). Comprehensive training is needed to get the most out of technology, improving students' academic performance, encouraging independent learning, and boosting student motivation (Díaz & Cano, 2019). The review includes research showing that technology can provide better learning materials, allow flexible learning schedules, and help students who face physical or distance challenges. However, success depends on factors like teacher training, positive attitudes toward technology, and having the right resources available (Avidav-Ungar & Porcush Baruch, 2016).

Furthermore, this chapter reviews several studies from recent decades, showing that simply using technology (ICT) in teaching doesn't always lead to better student performance. Instead, success depends on the quality of teaching and how well teachers guide students (Díaz & Cano, 2019). For example, a study in Saudi Arabian universities (Basri, Alandejani & Almadani, 2018) found a positive link between ICT use and academic success, especially for female students, though grades or study areas didn't affect this link. Another study from northern Israel emphasized the importance of proper teacher training for effective ICT use (Ghalib, 2021). In this study, the group that received specific training in using technology improved their scores by 15%, while the group without training showed no improvement. However, studies based on the 2015 PISA tests revealed a complex relationship between ICT skills and academic performance. One study found that using technology for entertainment at home was linked to better academic success, while general ICT

use at home had a negative impact (Hu et al., 2018a). In addition, and as it is demonstrated in another study (Park & Weng, 2020) cultural and economic factors also affect the connection between ICT and student achievement.

In chapter 2 Literature review chapter explains three main theories about how people accept and use technology: the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), and the Unified Theory of Acceptance and Use of Technology (UTAUT). The TAM model, introduced by Davis (1986), says that people's attitudes towards using technology are influenced by how useful and easy they think it is, which affects their actual use. The TPB, created by Ajzen (1991), explains how intentions and behaviour are connected, focusing on the influence of attitudes and beliefs formed over a lifetime. The UTAUT theory (Venkatesh et al., 2003) combines both models and adds factors like performance expectations, effort, social influence, and conditions that make technology use easier. The chapter ends by showing that the conditions that support technology use are the most important factor in whether people accept learning technologies (Abdelrahman & Salhi, 2020).

This chapter also analyses how using technology (ICT) in schools is related to students' academic performance. Some studies suggest that ICT helps improve teaching methods, instruction, and school management (Nikolić et al., 2019). However, its effect on academic performance is still unclear and being researched (Basri, Alandejani & Almadani, 2018). The chapter also discusses how academic achievements are measured, not just through better grades (GPA), but also by personal factors like motivation and teamwork. It points out the challenge of understanding ICT's impact on academic success because technology changes so quickly, which is why changes in learning behaviour are also studied (Díaz & Cano, 2019).

Also, this chapter 2 looks at how teachers, parents, and students feel about using technology in education. It stresses the importance of training and professional development to help teachers use technology better in the classroom. Research shows that the success of using technology in teaching depends a lot on how skilled teachers are with it and how willing they are to deal with challenges. Teachers who are good with technology tend to use it more effectively, while more experienced teachers might hesitate to use it because they lack confidence (Feiman-Nemser, Tamir & Hammerness, 2014). There is also a "technology paradox," where teachers use tech tools but stick to traditional teaching methods without making real changes (Fourkosh-Baruch, Meudoser & Nehemias, 2012).

Parents' views on their children's use of technology highlight their role in guiding proper and educational use of digital devices. Studies show that parents who are good with technology can positively influence their children's online behaviour, and their support can reduce internet risks while boosting learning opportunities (Noborimoto & Takahashi, 2021). However, many parents worry about the negative effects of technology, such as how it affects their children's social lives and health, especially in terms of reducing physical activity (Mikelic-Preradivic, et al., 2016).

The review also looks at how students feel about using digital technologies. At first, they are excited about using laptops for learning, but this excitement fades as it becomes a normal part of their routine (Zheng, et al, 2014). There is also a big digital gap between different groups in Israel, especially between Jewish and Arab communities. In Arab society, especially among the Bedouins, there is less access to the internet and advanced technology, leading to differences in how they communicate and use digital services (Abu-Kashq & Mandels, 2020).

The eighth section of the literature review chapter talks about why it's important to include technology (ICT) in education and how it affects student performance. Studies using randomized controlled trials (RCT) show that when ICT is fully included in the curriculum, students' performance improves significantly. However, if technology is not fully integrated, its impact is limited and mostly helps stronger students (Bai et al., 2016). The chapter also mentions that digital skills are linked to better academic results, especially for students from lower-income backgrounds. It highlights that there are big differences in digital resources and skills between the Arab and Jewish communities in Israel.

The nineth section of the literature review chapter discussion about these gaps that make it harder for Arab students to participate in remote learning and technological development (Tehawkho et al., 2020), widening the education and job opportunity gaps between the communities. Additionally, teachers' views on using technology affect how well it is integrated into teaching. Teachers who prefer traditional methods are more likely to resist using technology, while those with more innovative approaches are more successful at integrating it (Abu-Kaf et al., 2019).

In chapter 3, the researcher describes the research approach, which used both quantitative and qualitative methods. The quantitative part was a survey, and the qualitative part involved in-depth interviews with teachers and parents to study how technology (ICT) is implemented in schools. The focus was on how different management roles affect student learning outcomes. The research included teachers and parents from 11 high schools in the Arab community in northern and southern Israel. The survey asked teachers about their views on using ICT in teaching, while the interviews with teachers and parents helped understand how technology affects learning and students' exam results.

The survey asked questions about important aspects of managing technology (ICT) in schools, like planning, organization, leadership, motivation, control, and communication. It also looked at teachers' views on using technology, the quality of the tech resources in schools, and how well teachers and students can use these technologies. The in-depth interviews provided a deeper look into the opinions, challenges, and benefits that teachers and parents experienced from using technology in schools.

The methodology chapter also included a table listing the schools involved in the research, along with detailed information about student data and the overall school environment. This was done to give a clearer and more detailed view of what is happening in these schools. Another table showed

the scores and average values for each school across all variables. Each school was given a number to ensure the research remained ethically sound.

This chapter also included a table that explained the variables and how each question related to them. Additionally, Figure 1 showed the research model, illustrating how the variables are connected based on the research hypotheses introduced in the methodology chapter.

In chapter 4 are presented the results of the research. Three types of results were shared: survey results from teachers, interview results from teachers, and interview results from parents. Each type of result offers different views on how using technology (ICT) in schools affects student achievement and how teachers and parents feel about it. Pseudonyms were used for the research participants to keep the data handling ethical and confidential.

In the quantitative part of the survey, were tested at differences based on factors like location (North vs. South) and how teachers' training and attitudes toward technology (ICT) affect students' performance in math and English. We found a small positive link between the quality of ICT resources and students' math achievements, and between teacher training and the use of ICT with students' performance in both subjects. There was also a positive link between teachers' attitudes toward ICT and students' English achievements, but not in math.

The chapter on quantitative research findings showed how ICT resources and teacher training in technology relate to students' achievements in math and English. Correlation analysis (r) and statistical significance tests (p) revealed a small but meaningful link between ICT resources and math achievements, but not for English. There was a positive correlation between teacher training in ICT and student achievements in both subjects, though the link was weaker for English. The study also found that teachers' positive attitudes toward ICT were linked to better student performance in English, but not in math. Additionally, managing the ICT implementation process was connected to students' English achievements, while planning was linked to math achievements. The chapter also checked the reliability of the questionnaires used, using Cronbach's Alpha to measure internal consistency.

The findings also highlighted teachers' views and experiences with using ICT technologies in the classroom. Many teachers said they need more thorough training in ICT tools because they feel they don't have the skills needed. The results showed that better training would help teachers use technology more effectively in their teaching, which could improve students' achievements, especially in math and English.

The findings showed mixed opinions about how well technology (ICT) helps with student achievements. Some teachers said that poor infrastructure in schools made it hard to use technology effectively. On the other hand, other teachers observed that when the infrastructure was good and they had access to the right tools, students' achievements improved, especially in math. The effect on English was not as clear.

The findings also stressed the importance of good management in using ICT in schools. Teachers said that strong leadership and good administrative support can significantly affect how well technology is used. Teachers who found the management process to be effective saw better student achievements. For English, the success was mostly due to good management, while for math, careful planning was the main factor.

In the interviews with parents, they showed interest in being involved in their children's technology-based learning and were eager to learn how to use school management software and join training programs. However, many parents were worried about their children's health from spending too much time on computers and the economic gaps that limit equal access to technology for all kids. They also stressed the need to blend technology with traditional teaching and keep strong personal connections between teachers and students.

Chapter 5 Discussion of the results of the research is divided into three parts: the first part covers the quantitative results, the second looks at the qualitative results from teacher interviews, and the third covers the qualitative results from parent interviews.

In the discussion of the quantitative findings, we compared the results to the original hypotheses, showing the level of correlation and significance. We also connected these findings to similar studies to better understand the relationships and draw conclusions. The discussion focused on how ICT infrastructure affects students' academic performance, looking at factors like teacher training, attitudes, and ICT management. The results support the idea that better ICT infrastructure is linked to better math achievements, though the link is weak. There was no strong connection for English, suggesting that ICT's impact might vary by subject (Basri et al., 2018; Blau & Shamir-Inbal, 2017; Shamir-Inbal & Blau, 2016a). Additionally, there were significant geographical differences, with students in the north, where infrastructure is better, performing better than those in the south (Arar & Abu Nasra, 2020a; Abu-Asbah, 2017).

The second hypothesis, which looked at teachers' ICT training, found that more training was linked to better student performance in both math and English, with a stronger link in math (Venkatesh & Davis, 2000). In the northern region, where teacher training was more frequent and higher quality, students performed better than those in the south (Arar & Abu Nasra, 2020; Abu-Kaf et al., 2019). This highlights the importance of good professional development to help teachers use ICT effectively (Alper & Hoffman, 2021). The study also showed that positive attitudes toward ICT were linked to better student achievements in English, but not in math. This suggests that teachers' attitudes are especially important for subjects that use interactive tools, while math might be influenced by other factors (Blau & Shamir-Inbal, 2017; Abu-Kaf et al., 2019). Supportive leadership and good management of ICT also help with successful technology integration in schools (Arar & Abu Nasra, 2020a). The research also found that principals were more positive about ICT than teachers, likely because of their role in encouraging innovation (Blau & Shamir-Inbal, 2017). There were no significant gender differences between male and female views ICT,

though other research suggests classroom ICT use might differ by gender (Avidav-Ungar & Porcush-Baruch, 2016).

In the qualitative discussion of teacher interviews, data was organized by teacher pseudonyms, school numbers, and regions (north or south Israel). Several common themes emerged, providing a deeper understanding of what affects ICT integration in the Arab education sector. These themes helped explain the quantitative results and highlighted factors that can help or hinder ICT integration in high schools. The discussion also looked at how leadership and administrative staff impact the success of using technology in school management, teaching, and learning.

In the teacher interviews, a key theme was the need for careful planning and organization when integrating technology (ICT) into classrooms. Teachers said that successful use of technology requires long-term planning and the right digital tools for each subject, especially math and English. Teachers in the south faced challenges due to poor infrastructure, like limited internet access and insufficient training. These issues match with existing research, which stresses the importance of systematic planning for using digital tools (Blau & Shamir-Inbal, 2017). Without proper planning and adaptation, especially in math, student performance was negatively affected.

Another important theme was the role of leadership and support for ICT integration. Leadership has been identified to be instrumental in the enhancement of ICT integration, as can be seen from the experiences of the teachers in the northern and southern regions of Israel. Leadership makes a big difference in the extent of ICT use as well as the level of encouragement given to teachers, which in some ways controls the result of technology usage in teaching and learning.

It was found that proactive schools that provided clear visions for ICT use and inspired the teachers to try the new digital tools had strong leadership (Arar & Abu Nasra, 2020a) In the north, for instance, school leaders were more involved and supportive, which helped teachers use technology more effectively. Good leadership was seen as crucial for successful ICT integration (Arar & Abu Nasra, 2020). In the south, a lack of support from school leaders created gaps in technology use and teaching outcomes. Research shows that strong leadership significantly boosts teachers' motivation and ability to use ICT (Al Shobaki & Abu-Naser, 2017).

Monitoring and evaluating ICT processes was also a major theme. Teachers pointed out the need for regular checks and assessments of how ICT is being used. In the north, these processes were well-organized, while in the south, they were less structured. Ongoing monitoring and data-driven evaluation are important for improving technology use and aligning it with teaching goals (Basri et al., 2018). School administrators need to realize that it is impossible to find out whether ICT tools are properly applied or not and where changes need to be made without assessments. A useful way to assess the effectiveness of the ICT processes could be to use platforms which record the usage of the technologies by the students and the teachers. This means that through using data, schools would be in a position to understand the various trends of ICT use and thus work on it to enhance its efficiency. However, assessment should not only be restricted to the utilization of ICT

but also to the instructional results. This is because school leaders must identify the extent to which the available digital tools support the education objectives and contribute to the improvement of student achievement. School leaders need to assess how well digital tools align with educational goals and whether they are enhancing student learning.

A fourth theme of the interviews with teachers was bout ICT's Impact on teaching and learning. ICT has the ability to improve the teaching and learning process, increasing learners' motivation, participation and achievement. The data collected from teachers from the northern and southern regions of Israel are more nuanced and depict both the positive aspects of using ICT and the barriers that hinder its implementation. In the northern region for instance, the use of ICT tools like digital platforms, interactive lessons and other multimedia resources has greatly enhanced students' motivation especially in subjects like English. This led to the use of additional or rather interactive content in lessons to make the process more interesting and less monotonous compared to traditional forms of learning. To this end, ICT integration has to be done with consideration to each subject for the tools used have to be in line with the curriculum and assessment (Cohen, 2019). Lack of such alignment, therefore, means that the benefits of ICT are rather symbolic, enhancing student participation but not their performance.

In the qualitative discussion of parent interviews, additional factors affecting the success of ICT integration were discussed, highlighting the need for parental involvement. Parents who supported ICT for learning also faced challenges, like their own lack of digital skills, which could hinder their ability to help their children. The digital divide was another concern, especially for families without reliable internet or devices.

Many parents wanted to work more closely with schools and requested training to help them support their children's technology use. Studies show that when schools provide training for parents, it benefits students by giving them better support at home and at school (Blau et al., 2019). Parents also worried that too much focus on technology might reduce personal interaction between students and teachers and disrupt traditional learning methods. Concerns about screen time were raised, with parents stressing the need for a balance between digital tools and traditional classroom activities (Avidav-Ungar & Porcush Baruch, 2016).

Parents also emphasized the importance of having a structured home environment for using technology effectively. They found it challenging to create a consistent study routine with digital tools. It was suggested that schools should help parents manage ICT use at home to support learning outside of school (Díaz & Cano, 2019). In addition, communication between parents and teachers was highlighted as crucial, with some parents appreciating regular updates through ICT, while others preferred more personal, face-to-face interactions.

An important concern that was reported by parents was the issue of digital divide especially in the homes that did not have many devices. Some of the parents stated that not all the students have devices or access to internet connection to enable them effectively use ICT at home as required

(Abu-Kashq Mandels, 2020). For instance, the digital divide can compound other forms of inequality because, while students from poor families cannot afford the tools and resources required for effective ICT use.

In chapter 6, conclusions and recommendations, were presented the study's main findings, focusing on the challenges and successes of adopting technology in Israeli education systems, especially among Arab and Bedouin communities. Several hypotheses regarding ICT integration in schools were examined, with the emphasis on organizational management, infrastructural support, teacher's attitudes towards technology and parent's perceptions as potential determinants of student performance. Research findings point to the conclusion that effective ICT management is the key factor leading to successful implementation of ICT in the school.

The researcher has formulated 8 hypotheses and 18 subhypothesis, of which 5 hypotheses were validated (H1, H2, H4, H5 and H7) and 11 subhypotheses (H3.1., H3.2., H.1., h5.2, H5.3., H5.4, H5.5, H5.6, H5.7, H5,8 and H5.9) were validated. Also, 1 hypothesis (h8) was rejected and 3 subhypotheses (H3.3, H3.4 and H4.4) were rejected.

ICT management processes are shown as key determinants affecting successful adoption of technology and supporting digital skill development across the school community- among teachers, students, and parents. Thus, by fostering teachers' digital skills, motivating parent engagement, and leading effective digital implementation strategies, ICT management has an indirect positive impact on student achievements. Importantly, findings show that in some cases, effective ICT management and digital leadership may offset the negative impacts of infrastructural and socio-economic inequalities on student achievements.

The research highlighted the benefits of using Information and Communication Technologies (ICT) in teaching and its positive impact on students' performance, particularly in science and math. However, there were also concerns about barriers like poor infrastructure, insufficient training, and lack of support.

In examining the influence of ICT infrastructure on student performance, results offered mixed results for different learning subjects, with positive correlation in Mathematics and weaker correlations in English. This implies that although infrastructural resources are a prerequisite of ICT integration, they are not enough to enhance student's academic achievement. This outcome underscores the fact that schools cannot simply furnish technology-based support. However, to achieve significant improvements in the students' academic performance, infrastructure needs to be complemented by effective ICT management and leadership, as well as additional ICT integration strategies such as strategic plans to integrate ICT across the school, developing subject-specific pedagogical programs, teacher training and student support.

The study revealed a clear geographical divide in the availability of ICT and its influence on student performance. Where schools have enhanced ICT equipment, especially in the northern provinces, students scored higher. Nonetheless in the southern Bedouin sector where the

infrastructures are relatively poor (3G internet as opposed to the 5G in the north), and access to technology is hindered, the gains by the learners attributable to ICT were not impressive. Cultural and societal factors also come into play Student achievements were higher in the Northern region, where cultural assimilation of technology in education is higher, and ICT integration in teaching was less effective in the Bedouin sector in the South which has been less embracing of technology.

The study found that schools in the northern Arab sector saw notable improvements in student performance due to better technology integration, whereas southern Bedouin schools faced more difficulties. Northern schools benefited from better infrastructure, supportive leadership, and more community readiness, while Bedouin schools struggled with cultural and economic challenges, including a lack of resources and support.

Also, teacher training should emphasize implementation of various ICT tools and techniques in a manner that reflects the curricular objectives and facilitates students learning, especially in subjects, such as Mathematics and English, in which digital interactive media can significantly enhance discovery, understanding, and retention. Hence, teacher training is an essential factor in the effectiveness of ICT; however, it must be ongoing and focus on developing a broad range of digital skills that can be creatively integrated into various teaching activities to support curriculum needs The study concluded that teacher training programs should equip teachers with the necessary technical skills to operate digital tools, alongside developing their knowledge, insight and ability to apply interactive digital tools in ways that add value to students' learning

Importantly, the study revealed correlations between teacher's positive attitudes towards ICT, their ability to effectively deploy digital tools in teaching practices, and improved students' engagement and performance. On the other hand, teachers with negative attitudes towards technology and-or perceived technological self-efficacy may pose a negative influence on the intended goals of ICT integration in class. These findings reiterate the importance of ICT management in nurturing teacher's positive perceptions of technology, and teacher training to improve deployment of ICT in engaging learning experiences. For ICT to be embraced by educators in school, school management must facilitate digital integration through offering teachers the necessary leadership and vision, alongside infrastructural resources and technical support, professional development, and skills training.

This important finding is clearly demonstrated in the fourth and fifth hypotheses that tested how the various management processes required to implement ICT integration in the school affect student performance and teacher perceptions. The results provided clear evidence for both these hypotheses. Management processes such as organization, leadership, and effective communication were shown to play a central role in improving student outcomes. Data also revealed that ICT management processes, including planning, organizing, leading, controlling and communication processes, are the strongest determinant of attitudes among teachers. Among management processes and practices, leadership style has a significant impact. The study findings from interviews with the teachers and parents indicated that the leadership in the schools plays a significant part in the integration of ICT. The leadership characteristics that were more effective in promoting an environment for ICT uptake included both transformational and transactional leadership.

The research findings show that teacher's perceptions and attitudes towards ICT were positively impacted by the school's management provision of effective leadership, planning, vision and commitment, feedback and monitoring, measurement and control, incentives, technical support and professional training. This discovery has significant implications for existing literature, where teachers have been regarded so fast as the central players in ICT uptake. In contrast, the study concludes that effective organizational management is the most important component when it comes to the success of ICT endeavours as they foster the conditions which allow teachers, alongside other players in the school community, to make beneficial use of digital resources.

Findings show that schools that had positive, proactive, and decisive leadership had a better chance of nurturing a positive teacher attitude and effective use of ICT. This study found that a positive attitude towards ICT was more likely to be exhibited by teachers when they receive support from school management.

The findings established a link between effective ICT implementation management and students' achievement especially in English. This finding supports the notion that effective ICT integration in schools is based on effective management practices that implement comprehensive strategies across the organization.

Effective management of ICT implementation needs to set specific objectives for the use of ICT in teaching and learning, give feedback to teachers regularly and develop control mechanisms for measuring and assessing progress. Results showed that when school managers were actively engaged in managing ICT implementation, the students' performance was higher, especially in subject areas that require the use of interactive and digital resources.

A major implication of this study is that there is a need for school management to plan and implement ICT strategically. The findings also reveal that management has a crucial role in the effective utilization of ICT resources and proper support for the integration of ICT into the teaching-learning process. The relevance of these findings highlights that ICT integration cannot be a one-time event of installing infrastructure and holding one or two training sessions; it requires a strategic and broad ranged management process. Institutions that have clearly formulated ICT policies, and effective communication between administrators, teachers, and students, achieved improved academic results. This implies that ICT programs should be well planned and continually monitored, analysed, and improved to ensure that the programs were a success.

Teacher and parent interviews showed that effective leadership is crucial for successful ICT integration. The best leaders combined innovation with stable operations, but this approach was

not consistently applied in all schools, especially in the Bedouin sector, where there were significant challenges in managing change and new technologies integration.

The research also highlighted differences in ICT implementation across regions. Northern schools succeeded due to better conditions, while southern schools faced problems like poor infrastructure and outdated equipment. Teachers in the Bedouin sector reported a lack of training, making it harder to integrate ICT effectively.

Cultural differences also affected the speed of technology adoption. The Arab sector in the north was more open to technology, while the Bedouin sector was more resistant, viewing technology as a threat to traditional teaching methods.

The impact of ICT on student outcomes was positive, with increased motivation and learning engagement, especially in interactive subjects like science and math. Schools with good infrastructure and strong managerial support saw improvements in student performance.

The conclusions section noted unresolved issues, particularly in the Bedouin sector, where infrastructure, training, and outdated technology were major obstacles. There is a need for better professional training programs for teachers, especially in marginalized communities.

The study also pointed out that it did not fully address how the COVID-19 pandemic affected ICT implementation. The pandemic revealed weaknesses in infrastructure and readiness for remote teaching, highlighting the need to explore the effectiveness of government programs aimed at reducing the digital divide and improving schools' preparedness for future crises.

Contributing to existing knowledge, the study demonstrates that effective management promotes positive perceptions and attitudes towards technology, thus furthering technology adoption, across the school community of teachers, students, and parents. Effective management processes, such as strategic planning, organization, measurement, and controls, facilitate successful implementation of ICT platforms across the school's operational and organizational structure, and specifically in the classroom's curriculum. Lastly, Strong and committed management can make strategic use of available infrastructures and assets to the benefit of students in underserved communities. All these factors have shown correlations to student performance.

One of the major insights arising from this study, looks beyond the centrality of the teacher's role in adoption of technology, to appreciate how the school's management can foster positive perceptions, set comprehensive goals, and coordinate communication and problem solving between teachers, students, and parents.

The researcher has formulated several recommendations of best practices for school principals and managers. The school manager's ICT strategy should define clear and measurable performance and usability goals for the school platform's users- management team, administrators, teachers, students, and parents- all the players that make up the entire school community. The school principal and managers need to provide personal example by showing their commitment to ongoing training and skill development of them and the teaching staff, and mostly by implementing and using digital practices and making data-informed decision making in their management activities. ICT implementation begins with the management team making the decision and next acting swiftly to effectively implement the plan to do it understanding that it is a major change which ripples across the entire school. A significant element of the school's ICT strategy should deal with implementing digital tools and data-informed practices in management's planning, monitoring, and decision-making processes. The controlling processes, monitoring and measurement should include reports on management's ITC implementation process performance,

Another recommendation is to include school principals and managers of the school in training programs, aiming to continually develop their managerial skills, knowledge, and best school management practices. Effective ICT integration requires also, according to the 7S model, that management creates an adequate strategy, supportive organizational structure with dedicated professional teams and clearly defined roles, tasks, and communication channels among the school stakeholders. Additionally, the ICT strategy should deal with integrating computation and data within the existing organizational and operational structure.

To facilitate ICT integration within the school, the recommendation for school principals is to consider creating dedicated work teams and roles such as: ICT subject coordinators, ICT monitoring and measurement teams, a dedicated team to develop continuous training and digital skills development for students, teachers, school staff and parents; parental engagement team. A critical element of the school's ICT strategy is to clearly set pedagogical objectives and subject-based ICT plans that aim deploy appropriate digital means within the classroom.

One of the most important contributions the school management can make towards successful ICT integration is nurturing teachers and students' motivation to utilize ICTs in their teaching and learning activities. This can be dome through playful competitions, honorary mentions, or various valuable incentives- material or otherwise

In the recommendations for future research, the focus was on examining ICT adoption in different regions and sectors, including long-term studies on the effects of technology on student achievements and teacher performance. Such research would give a better understanding of the way in which schools respond to changes, and particularly how technology contributes to managing emergencies such as the COVID-19 pandemic.

Schools should consider allocating dedicated space and hours for students to learn and practice digital skills and computer use. Further, schools can offer support by encouraging teachers and students to perform digital assignments together, as part of the curriculum. To bolster student's motivation, schools can incorporate digital skills performance as an integral part of the student's grades.

The researcher recommends that the school's ICT strategy and management activities devises specific programs, roles, and funds to encourage parent engagement. For example, the school can create a dedicated team, or allocate roles to existing teams and players, that act as the school's contact point with parents in regard to digital education.

As future research directions, the researcher recommended to explore new technologies like artificial intelligence and personalized learning systems, assessing their impact on teaching and learning, as well as the readiness of schools and teachers to use these technologies.

In conclusion, the research underscores the need to continue studying technology integration in education, considering rapid technological changes and future challenges.