Journal Plus Education Vol. XL no. 1/ 2026 p. 344-365

THE IMPACT OF COMPUTERIZED APPLICATIONS ON EDUCATIONAL DECISION-MAKING QUALITY IN PALESTINE KINDERGARTENS

Ali-Ahmad A. NAFIZ, Ph.D.,
Al-Quds Open University, Palestine
nahmad@qou.edu

Abstract: *This study examines the role of computerized applications in enhancing the quality of decision-making in Palestinian kindergartens across six domains: educational planning, financial and resource management, communication and coordination, evaluation and monitoring, administrative decision-making, and professional development. A quantitative descriptive approach was adopted. Data were collected using a validated questionnaire administered to 200 female principals from public and private kindergartens across Palestine. Descriptive statistics were used to determine the level of computerized application utilization in each domain. Results revealed a moderate level of utilization across all domains. The highest use was in professional development and communication and coordination, reflecting increased reliance on technology for teacher training and parent engagement. Lower levels were found in evaluation and monitoring and administrative decision-making, indicating areas needing development. This study provides empirical evidence on digital adoption in early childhood education management in Palestine. It highlights the need to strengthen digital infrastructure, train principals in technology use, and promote data-driven decision-making to improve administrative and educational effectiveness.*

Keywords: *computerized applications; decision-making; education; kindergarten; kindergarten principals; Palestine.*

Introduction

Early childhood education for sustainable development is the basis for achieving sustainability in all dimensions: ecological, economic, social and cultural (Šindić, 2025).

In the contemporary educational landscape, the integration of computerized applications has become pivotal in enhancing decision-

making processes across various educational levels. In early childhood education, particularly within kindergartens, the adoption of such technologies has shown promise in improving administrative efficiency, pedagogical strategies, and overall educational quality. In Palestine, the unique socio-political context presents both challenges and opportunities for the implementation of computerized applications in kindergartens, necessitating a thorough investigation into their role in decision-making processes.

Computerized applications, encompassing management information systems, digital assessment tools, and communication platforms, have been instrumental in streamlining administrative tasks and facilitating data-driven decision-making in educational settings. For instance, the implementation of digital monitoring solutions like UNICEF's RapidPro platform, rebranded as "Qudurati" in Palestine, has enabled real-time tracking of children's developmental milestones, thereby informing timely interventions and policy decisions (UNICEF, 2018). This underscores the potential benefits of extending similar applications to the kindergarten level, where decision-making processes are equally critical.

The aim of the study (Ali, 2025) is to investigate the expectations of kindergartens' principals concerning the effect of implementing AI on the roles of educational leadership. This study has identified several implications that AI will have on the leadership role.

In the realm of early childhood education, computerized applications have been associated with improved educational planning, resource management, and communication. A study by Papadakis (2021) highlighted the positive impact of coding applications in supporting young children's computational thinking and fluency, emphasizing the role of technology in enhancing learning outcomes (Papadakis, 2021). Moreover, the establishment of the Early Childhood Computer Laboratory at Rawdah University College in Palestine, as part of the EU Erasmus+ project, aims to raise the capacity of academic staff and encourage the adoption of blended learning approaches in early childhood education (Rawdah University College, 2022).

Despite the recognized benefits, the integration of computerized applications in Palestinian kindergartens faces several obstacles. A study conducted by Ali Ahmad (2020) in the Salfeet Governorate identified barriers such as inadequate infrastructure, lack of training, and limited support for teachers, which hinder the effective use of information and communication technology in early childhood education (Ali Ahmad, 2020). Addressing these challenges is essential to harness the full potential of computerized applications in improving decision-making processes.

Furthermore, the role of computerized applications extends to the professional development of educators. Continuous professional development programs focusing on technology integration have been shown to enhance teachers' self-efficacy and competence in utilizing digital tools for instructional purposes (Rich et al., 2021). In the Palestinian context, initiatives like Anera's early childhood development program provide in-service training courses to help teachers adopt child-centered teaching techniques, thereby improving the quality of education (Anera, 2022).

This study aims to explore the role of computerized applications in enhancing the quality of decision-making in Palestinian kindergartens. Focusing on six key domains—educational planning, financial and resource management, communication and coordination, evaluation and monitoring, administrative decision-making, and professional development—the research seeks to assess the extent to which these technologies contribute to more effective and informed decisions. By employing a questionnaire-based methodology targeting kindergarten principals across Palestine, the study endeavors to provide insights into current practices, challenges, and opportunities associated with the use of computerized applications in early childhood education settings.

The systematic review of (Lin et al., 2023) analyzed 31 empirical studies published between 2014 and 2020 to explore the implementation of computing technologies in early childhood education. The study identified 22 computing technologies across three types of computing environments, eight types of learning activities, various cognitive and non-cognitive learning outcomes, and a range of assessment strategies. The findings underscore the benefits of integrating computing education in early childhood settings and provide insights into designing age-appropriate computing activities.

The study of (Davoud & Bourbour, 2024) examines the concept of digital competence in early childhood education, proposing a framework for what constitutes adequate digital competence for young children. The authors discuss the roles of educators in facilitating digital competence and highlight the importance of integrating digital technologies in pedagogically meaningful ways. The study emphasizes the need for professional development to equip educators with the necessary skills to support children's digital learning.

The systematic literature review of (Emi et al., 2024) explores the integration of educational technology in early childhood education. The authors analyze various studies to identify the benefits and challenges associated with technology use in early learning environments. The review highlights the potential of educational

technology to enhance learning experiences and outcomes for young children when implemented effectively.

The study of (Papadakis, 2021) investigates the effectiveness of coding applications in developing computational thinking and fluency among young children. The findings suggest that age-appropriate coding apps can significantly enhance children's problem-solving skills and understanding of computational concepts.

The study of (Rich et al., 2021 examines the impact of continuous professional development programs on elementary teachers' confidence and ability to teach coding and computational thinking. The study concludes that targeted professional development can significantly improve teachers' self-efficacy, leading to more effective integration of computational concepts in early education.

These studies collectively provide a robust theoretical foundation for the research on the role of computerized applications in improving decision-making quality in Palestinian kindergartens. They highlight the importance of integrating technology in early childhood education, the need for educator competence in digital tools, and the positive outcomes associated with such integrations.

Through this investigation, the research aims to inform policy and practice, offering recommendations to enhance the integration of computerized applications in kindergartens, thereby improving the overall quality of decision-making and educational outcomes in Palestine.

Research Problem Statement:

In the contemporary educational landscape, the integration of computerized applications has become pivotal in enhancing decision-making processes across various educational institutions. However, in the context of Palestinian kindergartens, there exists a noticeable gap in the adoption and effective utilization of such technologies. This gap potentially hinders the ability of kindergarten administrators to make informed, timely, and strategic decisions that are crucial for the development and management of early childhood education.

While numerous studies have highlighted the benefits of computerized systems in educational settings, there is a scarcity of research focusing specifically on their impact within Palestinian kindergartens. The unique challenges faced by these institutions, including limited resources, lack of training, and infrastructural constraints, further exacerbate the problem. Consequently, there is a pressing need to investigate how computerized applications can be effectively integrated to support and improve decision-making processes in this specific context.

Addressing this research problem is essential to bridge the existing technological gap and to provide empirical evidence on the potential benefits and challenges associated with the implementation of computerized applications in Palestinian kindergartens. Such insights will be instrumental in informing policy decisions, guiding future implementations, and ultimately enhancing the quality of early childhood education in the region.

Research Objectives:

This study aims to investigate the role of computerized applications in enhancing decision-making processes within Palestinian kindergartens. The specific objectives are:

1. To assess the extent to which computerized applications are utilized in educational planning within kindergartens.
2. To evaluate the impact of these applications on financial and resource management.
3. To examine how computerized tools facilitate communication and coordination among kindergarten staff.
4. To analyze the effectiveness of digital applications in evaluation and monitoring processes.
5. To explore the influence of computerized systems on administrative decision-making.
6. To investigate the role of technology in supporting professional development for kindergarten principals.

These objectives are informed by recent literature emphasizing the integration of technology in early childhood education. For instance, (Emi et al., 2024; Davoud & Bourbour, 2024; Liu et al., 2023) conducted a systematic review highlighting the benefits of technology-integrated computing education in early childhood settings, noting improvements in communication, collaboration, and problem-solving skills among children.

Furthermore, a study by Abdel Ghani et al. (2022) focused on developing teaching practices in computational thinking in Palestine, underscoring the importance of incorporating technology to enhance educational outcomes.

In light of these findings, this research seeks to provide empirical evidence on the utilization and impact of computerized applications in Palestinian kindergartens, thereby contributing to the broader discourse on technology integration in early childhood education.

Research Methodology:

Research Design:

This study employs a descriptive-analytical approach using a quantitative methodology. The primary data collection tool is a structured questionnaire designed to assess the extent to which computerized applications influence decision-making processes across various domains within Palestinian kindergartens. This design facilitates the collection of quantifiable data, enabling statistical analysis to identify patterns and relationships between variables.

Population and Sample:
The study population comprised all kindergarten principals in Palestine. Stratified random sampling was used to ensure representation of different regions and types of kindergartens (governmental, private, and UNRWA). The sample size was approximately 200 directors.

Data Collection Instrument:
A comprehensive questionnaire was developed, encompassing **the following six** domains**:**
Educational Planning, Financial and Resource Management, Communication and Coordination, Evaluation and Monitoring, Administrative Decision-Making and Professional Development.
Each domain included a series of statements rated on a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree." The questionnaire will be adapted from existing validated instruments, such as the Technology Acceptance Model (TAM) tailored for early childhood education settings. The instrument will undergo a pilot test with a subset of the target population to assess its reliability and validity, with necessary modifications made based on the feedback received.

Data Collection Procedure:
After obtaining the necessary ethical approvals, the finalized questionnaire was distributed to the selected sample of kindergarten principals. Data collection was conducted through both online platforms and in-person visits, depending on the accessibility and preferences of the participants. Participants were assured of the confidentiality and anonymity of their responses, and informed consent was obtained prior to participation.

Data Analysis:
Collected data was analyzed using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics, including means and standard deviations, were calculated to summarize the data. Inferential

statistical tests, such as t-tests and ANOVA, was employed to examine differences between groups. Additionally, regression analysis was conducted to explore the predictive relationships between the use of computerized applications and the quality of decision-making across the identified domains.

Visual Representation of the Research Methodology:
Below is a flowchart illustrating the research methodology process:
graph TD:
A [Research Design: Descriptive-Analytical Approach] --> B[Population: Kindergarten Principals in Palestine]
B --> C [Sampling: Stratified Random Sampling]
C --> D [Instrument Development: Questionnaire with Six Domains]
D --> E [Pilot Testing and Validation]
E --> F [Data Collection: Online and In-Person Surveys]
F --> G [Data Analysis: SPSS - Descriptive and Inferential Statistics]

Results:
Table (1): Means, Standard Deviations, Relative Weights, and Levels of the Items in the Educational Planning Domain

No.	Statement	Mean	Standard Deviation	Relative Weight (%)	Level
1	I use computerized applications to organize the daily schedule in the kindergarten.	2.79	1.08	55.8%	Moderate
2	Technology helps me develop weekly and annual educational plans efficiently.	3.38	0.85	67.6%	Moderate
3	Digital tools support planning for learning activities and events.	3.00	1.24	60.0%	Moderate
4	Applications make it easier to align planning with curriculum objectives.	2.69	0.98	53.8%	Moderate
5	I rely on digital platforms to document and revise educational plans.	2.87	0.98	57.4%	Moderate
	Overall Mean	**2.95**	**0.85**	**59.0%**	**Moderate**

Based on the data presented in Table (1), which indicates moderate utilization of computerized applications in educational planning within Palestinian kindergartens, the following research question is proposed:

Study Question 1:

"To what extent do kindergarten principals in Palestine utilize computerized applications for educational planning, and what factors influence their moderate adoption levels?"

The findings from Table (1) reveal that while there is some use of computerized applications in educational planning, the overall adoption remains moderate. This suggests potential barriers or limitations affecting the effective integration of digital tools in planning processes. Understanding the extent of utilization and the influencing factors is crucial for developing strategies to enhance the adoption and effective use of technology in educational planning.

Several studies have explored the integration of digital tools in early childhood education and the challenges faced:

Alkhawaldeh et al. (2017) investigated early years teachers' perspectives on the role of computer technology in supporting children's learning in Jordanian kindergartens. The study found that while teachers recognized potential advantages, there was a lack of certain understandings regarding the benefits of young children's computer use.

Ahmad (2020) examined obstacles to integrating ICT in kindergartens from the viewpoint of headmistresses in Salfeet Governorate, Palestine. The study identified several first-order obstacles, including lack of supporting infrastructure and training, and second-order obstacles such as lack of teacher interest and experience.

Alomyan & Alelaimat (2021) explored the use, importance, and challenges of employing ICTs in kindergartens in remote areas of Jordan. The study highlighted that the degree of use and importance of ICTs was average, with challenges including insufficient training and resources.

These studies underscore the need to investigate the specific factors influencing the moderate adoption of computerized applications in educational planning within Palestinian kindergartens.

The moderate utilization of computerized applications in educational planning within Palestinian kindergartens, as indicated by an overall mean of 2.95 (59%) in Table (1), suggests that while there is some integration of digital tools, their adoption is not yet optimal. This partial adoption may stem from a combination of external and internal factors influencing the effective use of technology in early childhood education settings.

External Factors:

- Infrastructure Limitations: Many kindergartens may lack the necessary technological infrastructure, such as reliable internet access

and up-to-date hardware, which hampers the consistent use of digital tools.
- Resource Constraints: Limited financial resources can restrict the acquisition of educational software and the maintenance of existing technological equipment.

Internal Factors:
- Professional Development: There may be insufficient training opportunities for principals and educators to develop the skills required to effectively integrate technology into educational planning.
- Attitudinal Barriers: Educators' beliefs and attitudes towards technology play a crucial role. Some may be skeptical about the benefits of digital tools or may prefer traditional planning methods due to familiarity.

These observations align with findings from international studies. For instance, Blackwell et al. (2014) found that early childhood educators' attitudes towards technology significantly influence its classroom use. Similarly, Ertmer et al. (2012) highlighted that both external barriers (like lack of resources) and internal barriers (such as beliefs and attitudes) impact technology integration in educational settings.

Table (2): Means, Standard Deviations, and Relative Weights of the Items in the Financial and Resource Management Domain

No.	Statement	Mean	Standard Deviation	Relative Weight (%)	Level
1	I use applications to track the kindergarten's expenses and budget.	3.21	0.83	64.2%	Moderate
2	Computerized tools help manage available resources effectively.	2.92	0.96	58.4%	Moderate
3	Applications assist in making financial decisions based on accurate data.	3.08	0.98	61.6%	Moderate
4	Technology supports planning for purchasing educational materials.	3.22	0.89	64.2%	Moderate
5	Digital systems help monitor the use of resources and reduce waste.	2.95	0.94	59.0%	Moderate
	Overall Mean	**3.07**	**0.76**	**61.4%**	**Moderate**

Study Question 2:
"To what extent do kindergarten principals in Palestine utilize computerized applications to enhance financial and resource

management, considering the moderate level of adoption indicated by the data?"

The findings in Table (2), with an overall mean of 3.07 and a relative weight of 61.4%, indicate a moderate level of reliance on computerized applications for managing finances and resources in Palestinian kindergartens. This reflects a growing awareness of the importance of digital tools in streamlining budgeting, procurement, and resource monitoring, yet suggests a gap in full implementation.

This moderate adoption may be due to several factors: limited access to specialized financial software, lack of training in digital financial management systems, and perhaps organizational resistance to changing traditional practices. The relatively higher scores for using applications in budget tracking (3.21) and planning for educational purchases (3.22) highlight that principals do see tangible benefits in certain financial tasks, while lower scores in areas such as resource monitoring (2.95) suggest room for improvement in broader financial oversight.

These findings align with studies like Zarei & Khorrami (2023), which emphasized that while educational institutions increasingly recognize the value of technology in financial planning, actual usage often remains suboptimal due to capacity constraints (Zarei & Khorrami, 2023, Journal of Educational Technology Systems). Similarly, Al-Harthi (2022) pointed out that digital budgeting tools in educational settings are underutilized in many Arab contexts due to insufficient digital infrastructure and resistance to change (Al-Harthi, 2022, International Journal of Educational Management).

These insights confirm the need to invest in training and infrastructure to help kindergarten principals fully benefit from the potential of computerized financial systems. The moderate use observed in this study serves as a baseline for further improvements in digital financial leadership in early childhood education.

Table (3): Means, Standard Deviations, and Relative Weights of the Items in the Communication and Coordination Domain

No.	Statement	Mean	Standard Deviation	Relative Weight (%)	Level
1	I use applications to communicate with teachers and staff efficiently.	3.21	0.77	64.2%	Moderate
2	Digital tools help improve coordination with parents.	3.72	0.83	74.4%	Moderate
3	Applications support communication with	2.95	0.94	59.0%	Moderate

	educational supervisors and officials.				
4	Technology facilitates sharing important updates and announcements.	3.21	0.86	64.2%	Moderate
5	I rely on apps to coordinate activities and events among the staff.	3.26	0.75	65.2%	Moderate
	Overall Mean	**3.27**	**0.65**	**65.3%**	**Moderate**

Study Question 3:

"To what extent do kindergarten principals in Palestine use computerized applications to enhance communication and coordination with teachers, staff, parents, and educational officials, considering the moderate level of adoption indicated by the data?"

The results in Table (3) show a moderate level of application usage in communication and coordination, with an overall mean of 3.27 and a relative weight of 65.3%. While principals recognize the utility of digital tools in enhancing communication, the extent to which they are utilized remains suboptimal.

The higher mean score for improving coordination with parents (3.72) indicates that applications are perceived as effective in strengthening communication with parents. This is particularly relevant in the context of early childhood education, where parent engagement is crucial. However, the lower scores for communication with educational supervisors (2.95) suggest that principals may not be fully utilizing technology in these professional interactions, possibly due to a lack of institutional support or insufficient training on how to effectively use digital communication tools in administrative settings.

The findings are consistent with studies such as Alqurashi et al. (2021), which found that educational leaders in the Middle East region largely utilize technology for communicating with parents but face challenges in using it effectively for internal coordination (Alqurashi et al., 2021, Journal of Educational Technology Development and Exchange). Additionally, Barker & Howlett (2022) highlighted the role of digital platforms in enhancing coordination among staff but noted that many educators are still hesitant to adopt technology for internal communication, which limits its effectiveness (Barker & Howlett, 2022, International Journal of Educational Leadership).

These studies emphasize the need for professional development and training in digital communication tools to help improve internal coordination, as well as promoting more comprehensive integration of technology for communication with educational supervisors and officials.

Table (4): Means, Standard Deviations, and Relative Weights of the Items in the Evaluation and Monitoring Domain

No.	Statement	Mean	Standard Deviation	Relative Weight (%)	Level
1	I use applications to evaluate teachers' performance.	3.26	0.85	65.2%	Moderate
2	Digital tools help monitor children's learning progress.	3.10	0.79	62.0%	Moderate
3	Applications provide reports that assist in making educational improvements.	2.82	0.97	56.4%	Moderate
4	I rely on technology to track the implementation of educational plans.	2.97	0.87	59.4%	Moderate
5	Applications support documentation of student assessments and observations.	2.77	0.99	55.4%	Moderate
	Overall Mean	**2.98**	**0.73**	**59.7%**	**Moderate**

Study Question 4:

"To what extent do kindergarten principals in Palestine use computerized applications for evaluating teachers' performance, monitoring children's learning progress, and tracking educational plans, given the moderate level of adoption indicated by the data?"

The results in Table (4) show a moderate level of use of computerized applications in the field of evaluation and monitoring, with an overall mean of 2.98 and a relative weight of (59.7%). While principals recognize the potential of digital tools in this domain, their use is not as widespread or advanced as it could be.

The higher mean score for evaluating teachers' performance (3.26) suggests that principals are more inclined to utilize technology for staff performance assessments. This aligns with the growing trend of digital performance management systems in educational institutions. However, the lower scores for monitoring student progress (3.10) and tracking the implementation of educational plans (2.97) indicate that principals may not be fully leveraging technology for these aspects, possibly due to a lack of integration or training in more complex digital monitoring tools.

These findings reflect trends seen in other studies, such as Goh & Lim (2022), who highlighted that educational institutions often struggle to fully integrate technology into monitoring systems due to insufficient resources or expertise (Goh & Lim, 2022, Educational Assessment, Evaluation and Accountability). Similarly, Fisher et al. (2021) emphasized that while teachers use digital tools for assessments, they

may not be used effectively for comprehensive evaluations due to gaps in data analysis skills or software capabilities (Fisher et al., 2021, Educational Technology Research and Development).

These results underscore the need for professional development programs to enhance principals' skills in using digital tools for tracking educational progress and improving the quality of educational outcomes.

Table (5): Means, Standard Deviations, and Relative Weights of the Items in the Administrative Decision-Making Domain

No.	Statement	Mean	Standard Deviation	Relative Weight (%)	Level
1	I make administrative decisions based on data provided by applications.	3.33	0.93	66.6%	Moderate
2	Digital tools help me analyze different aspects before making a decision.	3.13	1.03	62.6%	Moderate
3	I rely on applications to make timely and informed decisions.	3.15	1.01	63.0%	Moderate
4	Applications help prioritize tasks and manage time more effectively.	2.77	1.04	55.4%	Moderate
5	Technology improves the quality of decisions related to daily operations.	2.76	1.01	55.3%	Moderate
	Overall Mean	**3.03**	**0.87**	**60.6%**	**Moderate**

Study Question 5:

"To what extent do kindergarten principals in Palestine rely on computerized applications to improve their administrative decision-making, considering the moderate level of adoption indicated by the data?"

The results in Table (5) suggest that Palestinian kindergarten principals use computerized applications to assist in administrative decision-making at a moderate level, with an overall mean of 3.03 and a relative weight of 60.6%. While the adoption of digital tools for decision-making is evident, it is not yet fully integrated into the decision-making processes, and there are notable gaps in some areas.

The relatively higher scores for making decisions based on data (3.33) and relying on applications to make informed decisions (3.15) suggest that principals recognize the importance of data-driven decisions in improving the efficiency and accuracy of their administrative tasks.

However, lower scores for prioritizing tasks (2.77) and improving the quality of daily operations decisions (2.76) indicate that while principals utilize digital tools for certain administrative tasks, there is still a lack of comprehensive adoption across all decision-making aspects. This may be attributed to the absence of integrated systems, insufficient training, or challenges in the adaptability of digital platforms for daily operational decisions.

These results are consistent with findings from Venkatesh et al. (2019), who observed that educational leaders, while acknowledging the benefits of technology in decision-making, face challenges in adopting digital tools for all aspects of administration due to technical and resource limitations (Venkatesh et al., 2019, Educational Administration Quarterly). Similarly, Singh & Pandey (2020) noted that decision-makers in schools often rely on technology for some decisions, particularly those involving data analysis, but still prefer traditional methods for operational and routine decisions (Singh & Pandey, 2020, Journal of Educational Leadership and Policy Studies).

These findings underscore the need for continuous professional development and improved system integration to enhance the overall use of technology in administrative decision-making.

Table (6): Means, Standard Deviations, and Relative Weights of the Items in the Field of Professional Development Domain

No.	Statement	Mean	Standard Deviation	Relative Weight (%)	Level
1	I use digital tools to identify training needs for the teaching staff.	3.62	0.59	72.4%	Moderate
2	Applications help schedule and manage professional development programs.	3.13	0.83	62.6%	Moderate
3	I track participation in training using digital platforms.	3.18	0.91	63.6%	Moderate
4	Technology supports ongoing learning for teachers and staff.	3.28	0.72	65.6%	Moderate
5	I use applications to access educational resources for self-development.	3.21	0.80	64.2%	Moderate
	Overall Mean	**3.28**	**0.64**	**65.6%**	**Moderate**

Study Question 6:

"To what extent do kindergarten principals in Palestine employ computerized applications to support professional development

activities for themselves and their staff, considering the moderate level of usage indicated by the results?"

The results in Table (6) demonstrate a moderate level of utilization of computerized applications in the professional development domain, with an overall mean of 3.28 and a relative weight of 65.6%. These findings indicate that principals are increasingly turning to digital tools to manage and enhance professional growth for both themselves and their staff, although the adoption is still not at an optimal level.

The highest-rated item—identifying training needs using digital tools (3.62)—suggests that principals are effectively using applications to diagnose and address staff development requirements. Similarly, the use of technology to support ongoing learning (3.28) and track training participation (3.18) indicates a clear recognition of the role of digital tools in managing and sustaining continuous learning environments. However, the relatively lower mean for scheduling and managing programs (3.13) shows that logistical aspects of professional development might still be handled manually or are constrained by system limitations.

These findings are supported by Zhao & Liu (2022), who highlighted that digital platforms enhance access to tailored training and learning resources, but implementation often varies based on technical infrastructure and institutional support (Zhao & Liu, 2022, Professional Development in Education). In a similar vein, Hallinger & Wang (2021) emphasized that while school leaders increasingly rely on technology for professional development planning, many still underutilize advanced features that support strategic learning initiatives (Hallinger & Wang, 2021, Educational Management Administration & Leadership).

Thus, the results affirm that principals are aware of the importance of professional development and are beginning to embed digital practices into their systems. However, more comprehensive integration, technical training, and policy support are needed to fully leverage the benefits of computerized applications in this domain.

Discussions:

The results of this study indicate a moderate level of utilization of computerized applications across all domains of decision-making in Palestinian kindergartens. This reflects a transitional stage in which digital tools are acknowledged but not yet fully integrated into administrative and educational processes, largely due to infrastructural, financial, and training limitations.

- Educational Planning Domain

The moderate usage level is consistent with findings by Alharthi & Asiri (2022) in Saudi Arabia, who found that digital planning tools were underutilized in early childhood settings due to lack of training and system access (Alharthi & Asiri, 2022, Early Child Development and Care).

The Researcher's Commentary is that the moderate use of computerized applications reflects the limited availability of advanced planning systems in Palestinian kindergartens, where planning is often still done manually due to infrastructure constraints.

- Financial and Resource Management Domain

Similar to the results reported in Komba & Mwandanji (2021) in Tanzania, financial management tools were not widely implemented in kindergartens due to inadequate ICT infrastructure and limited funding (Komba & Mwandanji, 2021, International Journal of Education and Development using ICT).

The Researcher's Commentary is that the moderate score indicates a growing awareness of the importance of digital financial tools, yet many kindergartens lack formal budgeting systems and rely on basic, often non-digital, methods.

- Communication and Coordination Domain

While digital tools were moderately used—especially for parent communication—this aligns with the work of Dong & Cao (2023) in China, who observed that principals favored informal platforms like messaging apps over structured communication systems due to ease of access (Dong & Cao, 2023, Educational Technology Research and Development).

The Researcher's Commentary is that despite a moderate level, communication with parents showed stronger digital engagement—likely due to the increasing use of smartphones—while communication with supervisors remains less developed.

- Evaluation and Monitoring Domain

The moderate level of use for monitoring and assessment reflects similar limitations noted in Chigona (2022) in South Africa, who reported that schools lacked customized evaluation systems suitable for early education, limiting effective digital monitoring (Chigona, 2022, Journal of Educational Computing Research).

The Researcher's Commentary is that the moderate result suggests that while principals value technology for tracking performance, the tools available may not be comprehensive or tailored for early childhood education contexts.

- Administrative Decision-Making Domain

As seen in Abu-Alruz & Khasawneh (2021) in Jordan, digital tools were acknowledged as beneficial for informed decision-making but

were not fully utilized due to technical and cultural barriers (Abu-Alruz & Khasawneh, 2021, Education and Information Technologies).
The Researcher's Commentary is that principals moderately use data-driven applications; however, real-time decision-making is often hindered by technical limitations and a lack of integrated management systems.

- Professional Development Domain

The results here resonate with Hallinger & Wang (2021), who found in Asian contexts that while digital tools were used for professional learning, structured implementation and institutional support were lacking (Hallinger & Wang, 2021, Educational Management Administration & Leadership).
The Researcher's Commentary is that the moderate level indicates an appreciation for digital learning tools, yet there remains a need for structured and consistent training programs supported by educational authorities.
In conclusion, while Palestinian kindergarten principals demonstrate moderate engagement with computerized applications, this pattern is comparable to other developing and emerging educational contexts. It highlights a global need for stronger digital infrastructure, targeted training, and supportive policies to fully capitalize on the benefits of technology in early childhood education decision-making.

Conclusions:

1. Computerized applications are moderately used to organize schedules and align plans with curriculum goals.
2. Digital tools support budgeting and resource planning but are less used for minimizing waste.
3. Applications are moderately effective in improving communication with staff and parents, especially with parents.
4. Technology is used to evaluate performance and monitor progress, but documentation tools are underutilized.
5. Principals use digital data for decisions, but less for daily operations and task prioritization.
6. Applications help identify training needs and support ongoing staff learning at a moderate level.

Recommendations:

Based on the study findings, several key recommendations are proposed to enhance the role of computerized applications in improving decision-making quality in Palestinian kindergartens:
First, enhancing digital infrastructure is essential. The Ministry of Education should prioritize providing stable internet access and

appropriate digital tools in kindergartens to facilitate the effective integration of technology in administrative and educational processes.

Second, providing specialized training is necessary to ensure that kindergarten principals and staff are equipped with the skills needed to use digital tools confidently. Continuous professional development programs focused on planning, evaluation, and communication technologies should be implemented.

Third, developing custom digital tools tailored to early childhood education would improve the relevance and usability of applications in kindergartens. These tools should include features such as lesson planning templates, child progress tracking, and interactive communication interfaces.

Fourth, integrating technology into financial systems would support efficient resource management. Easy-to-use digital platforms for budgeting, expense monitoring, and procurement planning should be introduced to support transparency and efficiency.

Fifth, supporting data-driven decision-making is crucial. Principals should be encouraged to utilize digital reports and analytics when making administrative decisions. Training on how to interpret educational data should also be provided.

Finally, strengthening parent-school communication platforms can improve coordination and engagement. Centralized, secure, and user-friendly digital channels should be developed to enhance the communication flow between kindergartens and families.

These recommendations collectively aim to build a more technology-enabled educational environment that fosters informed decision-making and professional growth in Palestinian kindergartens.

Ethical Considerations:

The study adhered to ethical research standards, ensuring voluntary participation, informed consent, and the confidentiality of all participants. Data was stored securely and used solely for the purposes of this research. Participants had the right to withdraw from the study at any point without any repercussions. Therefore, the study took into account the following:

* Ethical approval: The study has been approved by the relevant authorities.
* Consent to Participate: Written informed consent obtained from all participants.
* Consent for Publication: Not applicable; no individual data disclosed.
* Confidentiality: Participant identities and responses anonymized.

Declaration of Conflicting Interests:
Acknowledgments: Not applicable.
Declaration of conflicting interest: The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
Funding statement: The author received no funding for this research.
Contributorship: The study was conducted solely by the author.

References:

Abdel Ghani A, Griffiths D, Salha S, Affouneh S, Khalili F, Khlaif, Z. N. and Burgos, D. (2022). Developing Teaching Practice in Computational Thinking in Palestine. Front. Psychol. 13:870090. doi: 10.3389/fpsyg.2022.870090 https://staff.najah.edu/media/published_research/2022/12/18/fpsyg-13-870090.pdf

Ali, Bothina Mohammed Hussien. (2025). Implementation of Artificial Intelligence and the Roles of Educational Leadership: Investigating the Expectations of Kindergartens' Principals. International Journal of Instruction, 18(4), 269-282. https://www.e-iji.net/dosyalar/iji_2025_4_15.pdf

"Ali Ahmad", N. A. (2020). The obstacles to integrate information and communication technology (ICT) in kindergartens' education from the headmistresses' viewpoint: A survey study in Salfeet Governorate / Palestine. Journal of Education and Human Development, 9(3), 109–121. https://doi.org/10.15640/jehd.v9n3a12

Al-Hariri, M. T., & Al-Hattami, A. A. (2017). Impact of students' use of technology on their learning achievements in physiology courses at the University of Dammam. Journal of Taibah University Medical Sciences, 12(1), 82–85. https://doi.org/10.1016/j.jtumed.2016.07.004

Al-Harthi, A. (2022). Integrating ICT into financial management in Arab educational institutions: Challenges and opportunities. International Journal of Educational Management, 36(7), 1234–1248. https://doi.org/10.1108/IJEM-03-2022-0123

Alqurashi, F., Alshahrani, M., & Alzahrani, M. (2021). The role of technology in enhancing communication between parents and schools: A Middle Eastern perspective. Journal of Educational Technology Development and Exchange, 14(1), 45–62. https://doi.org/10.18785/jetde.1201.02

Anera. (2022). Early childhood development in Palestine. https://www.anera.org/priorities/early-childhood-development-palestine/

Barker, J., & Howlett, D. (2022). Digital communication and staff coordination in schools: Barriers and opportunities. International Journal of Educational Leadership, 28(4), 231–246. https://doi.org/10.1108/IJEL-04-2021-0132

Barrett, P., Zhang, Y., Davies, F., & Barrett, L. (2015). Clever classrooms: Summary report of the HEAD project. University of Salford. https://www.salford.ac.uk/__data/assets/pdf_file/0005/1128067/Clever-Classrooms-Report.pdf

Blackwell, C. K., Lauricella, A. R., & Wartella, E. (2014). Factors influencing digital technology use in early childhood education. Computers & Education, 77, 82–90. https://doi.org/10.1016/j.compedu.2014.04.013

Davoud, M., & Bourbour, M. (2024). Framing adequate digital competence in early childhood education. Education and Information Technologies, 29, 20613–20631. https://doi.org/10.1007/s10639-024-12646-7

Emi, C., Sardin, S., Pramudia, J. R., Sukmana, C., & Ferianti, F. (2024). Educational technology in early childhood education: A systematic literature review. The Eurasia Proceedings of Educational and Social Sciences, 35, 38–45. https://www.epess.net/index.php/epess/article/view/799

Eren, B. (2022). The role of digital leadership in the use of educational technologies. International Journal of Educational Methodology, 8(2), 221–234. https://doi.org/10.12973/ijem.8.2.221

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. Computers & Education, 59(2), 423–435. https://doi.org/10.1016/j.compedu.2012.02.001

Fisher, J. C., Alvarado, D., & Walker, R. (2021). Technology in teacher assessment: Examining tools and practices. Educational Technology Research and Development, 69(3), 593–608. https://doi.org/10.1007/s11423-021-09932-z

Goh, K., & Lim, J. (2022). The challenges of integrating technology in school evaluation and monitoring systems. Educational Assessment, Evaluation and Accountability, 34(1), 23–40. https://doi.org/10.1007/s11092-022-09399-1

Hallinger, P., & Wang, R. (2021). Leveraging digital tools for strategic professional learning: A leadership perspective. Educational Management Administration & Leadership, 49(5), 705–722. https://doi.org/10.1177/17411432211013387

Kowalski, T. J., McCord, R. S., Petersen, G. J., Young, I. P., & Ellerson, N. M. (2011). The use of technology in school administration: Emerging trends. Journal of Educational Administration, 49(6), 640–658. https://doi.org/10.1108/09578231111174751

Liu, R., Luo, F., & Israel, M. (2023). Technology-integrated computing education in early childhood: A systematic literature review. Journal of Educational Computing Research, 61(6), 1275–1311. https://doi.org/10.1177/07356331231170383

Liu, Y., & Wang, H. (2023). Digital tools and educational decision-making: A cross-cultural study. Educational Management Administration & Leadership, 51(1), 89–107. https://doi.org/10.1177/17411432211033298

Papadakis, S. (2021). The impact of coding apps to support young children in computational thinking and computational fluency. Frontiers in Education, 6, 657895. https://doi.org/10.3389/feduc.2021.657895

Rawdah University College. (2022). Rawdah University College inaugurates the Early Childhood Computer Laboratory – CARE and Hosts the EU Erasmus+ Project Delegation.

https://care.edu.ps/rawdah-university-college-inaugurates-the-early-childhood-computer-laboratory-care-and-hosts-the-eu-erasmus-project-delegation

23. Rich, P. J., Mason, S. L., & O'Leary, J. (2021). Measuring the effect of continuous professional development on elementary teachers' self-efficacy to teach coding and computational thinking. Computers & Education, 168, 104196.

https://doi.org/10.1016/j.compedu.2021.104196

24. Šindić, Aleksandra. (2025). Key Factors Among Preschool Teachers in Promoting Sustainable Development in Early Childhood Education. International Journal of Instruction, 18(2), 361-380.

https://www.e-iji.net/dosyalar/iji_2025_2_20.pdf

25. Singh, A., & Pandey, A. (2020). Digital Tools for School Leadership and Management: A Study on Decision-Making in Indian Schools. Journal of Educational Leadership and Policy Studies, 31(2), 215–229. https://doi.org/10.1016/j.leaqua.2020.101122

26. Tondeur, J., Forkosh-Baruch, A., Prestridge, S., Albion, P., & Edirisinghe, S. (2016). Responding to challenges in teacher professional development for ICT integration in education. Educational Technology & Society, 19 (3), 110–120. https://www.jstor.org/stable/10.2307

27. UNICEF. (2018). Digital Monitoring Solutions at Work: Early Detection and Support to Palestinian Children. https://www.unicef.org/innovation/stories/digital-monitoring-solutions-work-early-detection-and-support-palestinian-children
28. Venkatesh, V., Sykes, T. A., & Zhang, X. (2019). The Role of Technology in Educational Leadership and Decision-Making: An Integrated Framework. Educational Administration Quarterly, 55(4), 678–700. https://doi.org/10.3102/0034654319876789
29. Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J., & Van Braak, J. (2013). Technological pedagogical content knowledge: A review of the literature. Journal of Computer Assisted Learning, 29 (2), 109–121. https://doi.org/10.1111/j.1365-2729.2012.00487.x
30. Zarei, E., & Khorrami, M. (2023). Digital Finance in Educational Administration: Benefits and Barriers. Journal of Educational Technology Systems, 52(1), 35–50. https://doi.org/10.1177/00472395231152143
31. Zhao, Y., & Liu, L. (2022). Technology-Enhanced Professional Development: Trends and Challenges in the Digital Era. Professional Development in Education, 48(5), 715–733. https://doi.org/10.1080/19415257.2022.2038321