



Smart Planning in Education: A Path to Sustainable Development

Dr. Sonia Abdulfattah Ibrahim Shehadeh ^{1*}, Dr. Khaled Ahmad Ateyeh Alhassanat ²

¹ Academic Staff Member, Head of Diploma in Administrative and Financial Business Department, and head of Bachelor of Accounting and Auditing Department, Palestine Technical University Kadoorie, Ramallah Branch, Palestine

² Amal riut technology high school, Beersheba, Palestine

* Corresponding Author: **Dr. Sonia Abdulfattah Ibrahim Shehadeh**

Article Info

ISSN (online): 2583-8261

Volume: 04

Issue: 05

Sept-October 2025

Received: 21-10-2025

Accepted: 22-10-2025

Published: 25-10-2025

Page No: 112-121

Abstract

This study aimed to explore the role of smart planning in education as an innovative approach to achieving sustainable development in higher education institutions. The research focused on understanding how digital transformation, innovative planning strategies, and the integration of smart technologies contribute to improving institutional efficiency and long-term sustainability. The research relied on a descriptive-analytical approach, and data were collected from a sample of 40 faculty members at Palestine Technical University - Kadoorie (Ramallah Branch). The instrument used was a structured questionnaire of (25) Items, the results indicated that the overall level of smart planning implementation was high, no statistically significant differences were found regarding to gender, College, scientific qualification, Nature of work, and years of experience. The findings highlight the importance of fostering innovation, improving faculty training, and enhancing digital infrastructure to support sustainable educational development. The study concludes with a recommendation to integrate smart planning principles into institutional strategies to promote innovation, sustainability, and academic excellence.

Keywords: Smart Planning, Education, Path, Sustainable Development

Introduction

Education in recent years has undergone significant transformations due to the integration of smart technologies in planning and management. As Badshah *et al.* (2023)^[1] noted, “IoT-based smart education systems have the potential to reshape learning environments by providing adaptive and efficient solutions” (p. 5). Similarly, Çaylı and Yılmaz (2025)^[3] highlighted that “AI-driven scheduling and multi-objective decision support improve institutional efficiency in allocating resources” (p. 97). These findings show that smart planning in education aligns closely with the goals of sustainable development.

Beyond education, research on smart cities provides insights into how data-driven planning fosters resilience and inclusivity. Boulanger (2022)^[2] argued that “the roadmap to smart cities after COVID-19 emphasizes innovation and adaptive strategies” (p. 3). Likewise, Hossin *et al.* (2023)^[11] found that “big data-driven governance transforms public decision-making toward more transparent and sustainable practices” (p. 4). These lessons are valuable for education, where similar approaches can enhance sustainability and equity.

Smart education also depends on systems that can personalize learning experiences. Embarak (2022)^[7] demonstrated that “IoT-based AI models create opportunities for personalized smart education systems” (p. 105). Similarly, Haderer and Ciolacu (2022)^[8] explained that “AI-assisted task and time planning increases efficiency and supports Education 4.0 practices” (p. 1330). These examples stress the need for strategic planning that integrates technology with pedagogical goals.

Financial and administrative planning play a central role in smart education as well. Harahap and Santosa (2024)^[9] showed that “effective management of education funds through smart tactics significantly improves school quality” (p. 168).

In addition, Hassan *et al.* (2024) ^[10] emphasized that “integrating ERP, blockchain, IoT, and cloud computing provides a comprehensive MIS for smarter decision-making” (p. 460). Thus, smart planning must include not only advanced technologies but also efficient resource management.

National and institutional policies are also essential for scaling smart education initiatives. Yang *et al.* (2024) ^[24] argued that “national smart education policies provide a strategic framework to guide global trends in digital transformation” (p. 7). In a similar vein, Makinde *et al.* (2024) ^[16] stated that “smart learning is a transformative paradigm for achieving the SDGs in education” (p. 215). These studies confirm that political and strategic support is a key driver of successful smart educational planning.

Taken together, the literature demonstrates that smart educational planning represents both a technological innovation and a strategic tool for sustainable development. As Krstevska and Bajrami (2023) ^[14] concluded, “strategic planning ensures the long-term success of education by aligning goals and resources” (p. 94). Likewise, Riekkki and Mämmelä (2021) ^[20] observed that “research and education must go hand in hand toward building a smart and sustainable world” (p. 53160). Smart educational planning therefore contributes not only to improving current practices but also to building sustainable and equitable learning systems.

Another critical aspect of smart educational planning is the integration of inclusive and green initiatives. Kim and Choi (2023) ^[13] demonstrated through their action research on the Green Smart Initiative that “spatial planning in schools can align with broader educational and environmental objectives” (p. 474). Similarly, Kameni and Koumetio (2023) ^[12] emphasized the role of “inclusive educational technologies in transforming African cities into inclusive smart cities” (p. 3). These studies show how sustainability and equity can be embedded in smart education through thoughtful design and planning.

Finally, international perspectives highlight that smart education must be understood as part of a global transformation. Tran and Tran (2022) ^[23] concluded from the Vietnam case that “effective application of smart education requires adapting lessons learned to local contexts” (p. 237). In parallel, Mazza (2021) ^[17] noted that “the goals of Agenda 2030 are central to linking education and smart city development” (p. 26). Such findings indicate that while smart educational planning benefits from global frameworks, its success ultimately depends on how strategies are localized to meet community needs and sustainable development priorities.

2. Background of the Study

In the twenty-first century, education has been increasingly shaped by rapid technological change and the global pursuit of sustainable development. The growing demand for quality, equity, and adaptability in education has motivated researchers and policymakers to adopt smart solutions that can transform traditional practices. As Badshah *et al.* (2023) ^[1] observed, the integration of the Internet of Things in education “reshapes learning environments by providing adaptive and efficient solutions” (p. 5). This signals a shift from conventional approaches toward intelligent systems that respond to learners’ and institutions’ diverse needs. Smart educational planning is not limited to classroom

instruction but extends to the strategic management of resources, time, and infrastructure. Studies on AI-based scheduling systems confirm that smart planning enhances institutional efficiency while supporting better learning outcomes (Çaylı & Yılmaz, 2025) ^[3]. Similarly, Embarak (2022) ^[7] highlighted the potential of personalized learning systems, where “IoB-based AI models create opportunities for adaptive education tailored to student behavior” (p. 105). Such findings emphasize that the success of smart education depends not only on technology but on how planning integrates these innovations into sustainable strategies.

The broader context of smart cities offers further insight into how intelligent planning can support resilience and sustainability. Boulanger (2022) ^[2] showed that post-pandemic smart city strategies prioritize data-driven solutions to enhance adaptability, while Hossin *et al.* (2023) ^[11] argued that “big data-driven governance transforms public decision-making toward more transparent and sustainable practices” (p. 4). Drawing on these lessons, education can similarly benefit from innovative planning frameworks that combine technological tools with long-term sustainability goals.

Financial and managerial aspects of smart planning are equally critical. Harahap and Santosa (2024) ^[9] demonstrated that the intelligent management of educational funds can directly improve school quality, while Hassan *et al.* (2024) ^[10] showed that comprehensive systems integrating ERP, blockchain, IoT, and cloud computing enable smarter decision-making processes. These studies underline the fact that smart educational planning must combine digital transformation with effective governance and financial accountability to ensure meaningful and lasting impact.

National and institutional policies play a decisive role in scaling smart educational practices. Yang *et al.* (2024) ^[24] argued that “national smart education policies provide a strategic framework to guide global trends in digital transformation” (p. 7). Similarly, Makinde *et al.* (2024) ^[16] stressed that smart learning serves as “a transformative paradigm for achieving the SDGs in education” (p. 215). These contributions suggest that while local initiatives are important, supportive policies are necessary to embed smart planning into broader educational systems and align them with sustainable development objectives.

Despite these advancements, several challenges remain. Research highlights gaps in inclusive design, contextual adaptation, and equity in access to smart education systems (Kameni & Koumetio, 2023; Tran & Tran, 2022) ^[12, 23]. As Mazza (2021) ^[17] emphasized, the goals of Agenda 2030 link education directly to sustainable urban and social development, yet the practical realization of these goals varies widely. This study, therefore, seeks to address the gap by exploring smart educational planning not only as a technological innovation but as an innovative approach that can meaningfully contribute to achieving sustainable development in education.

Another important dimension of smart educational planning is the incorporation of inclusive and environmentally conscious strategies. Kim and Choi (2023) ^[13] demonstrated that “spatial planning in schools aligned with green initiatives supports broader educational and environmental objectives” (p. 474). Likewise, Kameni and Koumetio (2023) ^[12] highlighted that “inclusive educational technologies can transform cities into smart, equitable, and sustainable

learning environments” (p. 3). These findings indicate that smart planning should consider both ecological sustainability and accessibility, ensuring that technological innovations benefit all learners.

Finally, the global perspective emphasizes that smart educational planning must adapt to diverse local contexts while adhering to international frameworks. Tran and Tran (2022)^[23] noted that “effective application of smart education requires lessons learned to be contextualized for local needs” (p. 237). Similarly, Mazza (2021)^[17] argued that “Agenda 2030 provides a crucial link between education and sustainable urban development” (p. 26). This underscores that while global standards guide the direction of smart education, successful implementation depends on tailoring strategies to community-specific challenges and opportunities.

3. Theoretical Framework

Smart educational planning is grounded in the principle that effective learning environments require both strategic foresight and technological integration. According to Demir (2021)^[6], a “smart education framework provides a structured approach for integrating digital tools and pedagogical strategies” (p. 29). This framework emphasizes planning as a central mechanism for aligning institutional objectives with the needs of learners and the broader goals of sustainable development.

Central to this framework is the role of artificial intelligence and IoT in enhancing decision-making processes. Badshah *et al.* (2023)^[1] highlighted that IoT-based systems allow educators to monitor and adapt learning experiences in real-time, creating a more responsive and efficient environment (p. 8). Similarly, Embarak (2022)^[7] demonstrated that AI-driven personalization supports individualized learning pathways, which strengthens student engagement and academic outcomes.

Education 4.0 theories complement smart planning by emphasizing digital literacy, adaptive learning, and automation. Haderer and Ciolacu (2022)^[8] argued that “AI-assisted task and time planning systems enable students and institutions to optimize workflows and improve learning efficiency” (p. 1329). This approach situates technological tools not as replacements for educators but as enablers of more strategic and evidence-based planning.

Strategic planning models in education stress the importance of aligning resources, policies, and organizational structures with institutional goals. Krstevska and Bajrami (2023)^[14] noted that “strategic planning ensures the long-term success of education by linking objectives with available resources” (p. 94). By integrating these models, smart educational planning bridges the gap between high-level policy frameworks and operational execution.

The inclusion of sustainability principles is essential in connecting smart education with global development agendas. Makinde *et al.* (2024)^[16] argued that “smart learning is a transformative paradigm for accomplishing SDGs in education” (p. 215). Similarly, Yang *et al.* (2024)^[24] emphasized that national smart education policies provide a guiding structure for integrating sustainable development goals into the educational process (p. 7).

Inclusive design and equity are also fundamental theoretical considerations. Kameni and Koumetio (2023)^[12] highlighted that “inclusive educational technologies can transform

African cities into equitable smart cities” (p. 3). This perspective underscores that smart planning must not only focus on efficiency and innovation but also ensure access and fairness for all learners.

Practical applications of smart planning theories involve financial, administrative, and infrastructural dimensions. Harahap and Santosa (2024)^[9] found that “effective management of education funds through smart tactics significantly improves school quality” (p. 168), while Hassan *et al.* (2024)^[10] demonstrated that integrating ERP, blockchain, IoT, and cloud computing enables comprehensive management information systems. These applications exemplify how theory translates into actionable strategies that enhance both operational and educational outcomes.

Finally, global and contextual considerations highlight the adaptability of smart educational planning. Tran and Tran (2022)^[23] noted that “effective application of smart education requires adapting lessons learned to local contexts” (p. 237). In parallel, Mazza (2021)^[17] emphasized that “Agenda 2030 links education with sustainable urban development” (p. 26). Together, these insights suggest that theoretical models of smart educational planning must balance technological innovation, strategic alignment, inclusivity, and sustainability while remaining flexible to diverse local and global contexts.

Gaps in the Literature

Despite significant advances in smart education research, several gaps remain that justify this study. While conceptual models and theoretical frameworks have been widely discussed (Badshah *et al.*, 2023; Demir, 2021)^[1, 6], there is limited empirical evidence on their real-world implementation in educational institutions. Understanding the practical challenges and benefits of smart education systems is crucial to bridge the gap between theory and practice.

Additionally, although the potential of smart education to contribute to Sustainable Development Goals has been highlighted (Makinde *et al.*, 2024; Yang *et al.*, 2024)^[16, 24], there is insufficient research on how sustainability can be operationalized effectively within educational settings. Integrating sustainability into actionable strategies remains a critical need for ensuring long-term relevance and impact.

Existing studies often examine individual technologies such as AI, IoT, or big data in isolation (Embarak, 2022; Haderer & Ciolacu, 2022)^[7, 8], without considering their integration with educational management practices like strategic planning, resource allocation, and performance evaluation. Addressing this gap can unlock the full potential of smart education systems.

Inclusivity is another underexplored area. Although some research emphasizes the importance of inclusive technologies (Kameni & Koumetio, 2023)^[12], systematic approaches to reduce educational disparities and ensure equitable access are still limited. Investigating how smart education can support diverse learners is essential for fostering inclusive learning environments.

Policy-related aspects also require attention. While national strategies have been proposed (Yang *et al.*, 2024)^[24], there is a lack of studies evaluating how local policies influence the practical implementation of smart education, particularly in rural or under-resourced contexts. Understanding these

policy dynamics is critical for context-sensitive solutions. Finally, human and organizational factors are often overlooked. The success of smart education depends not only on technology but also on teacher readiness, professional training, and organizational support (Hossin *et al.*, 2023; Harahap & Santosa, 2024)^[11, 9]. Addressing these factors is essential for achieving effective adoption and sustainable impact.

Collectively, these gaps underline the need for comprehensive research that combines theoretical, technological, managerial, and human dimensions, providing actionable insights to advance smart, inclusive, and sustainable education.

The Originality of the Present Study

This study is original because it addresses several gaps that remain unexamined in the field of smart education. Unlike previous research that often focuses on individual technologies or theoretical frameworks in isolation (Badshah *et al.*, 2023; Embarak, 2022)^[1, 7], this study adopts an integrated approach, combining AI, IoT, and strategic educational management practices to provide a holistic understanding of smart education implementation.

Furthermore, it emphasizes the operationalization of sustainability and inclusivity within smart educational systems, areas that have received limited empirical attention despite their recognized importance for achieving the Sustainable Development Goals (Makinde *et al.*, 2024; Kameni & Koumetio, 2023)^[16, 12].

Another original aspect is the consideration of human and organizational factors, including teacher readiness, professional development, and institutional support, which are often overlooked in prior studies (Hossin *et al.*, 2023; Harahap & Santosa, 2024)^[11, 9]. By integrating technological, managerial, and human dimensions, this research offers a more comprehensive, actionable framework that can guide effective adoption of smart education practices in diverse contexts.

Finally, this study contributes to contextualized knowledge by examining the interplay between national and local policy frameworks and practical implementation, providing insights that are relevant for both policymakers and educational institutions.

Aim of the Study

The Aim of the study is to examine the role of Smart Planning in Education as a Path to Sustainable Development, to acknowledge if there are statistical differences due to Gender, College, Scientific qualification, Nature of work, Years of Experience.

Research Questions

1. What is the role of Smart Planning in Education as a Path to Sustainable Development
2. Are there statistically significant differences at the level of $\alpha \leq 0.05$ between the study sample members' related

to the role of Smart Planning in Education as a Path to Sustainable Development attributable to the following variables: gender, College, scientific qualification, Nature of work, and years of experience?

Hypotheses

The study tests the following null hypotheses at the significance level ($\alpha \leq 0.05$):

H1: There are no statistically significant differences in Smart Planning in Education as A Path to Sustainable Development due to gender.

H2: There are no statistically significant differences in Smart Planning in Education as A Path to Sustainable Development due to College.

H3: There are no statistically significant differences in Smart Planning in Education as A Path to Sustainable Development due to scientific qualification.

H4: There are no statistically significant differences in Smart Planning in Education as A Path to Sustainable Development due to Nature of work.

H5: There are no statistically significant differences in Smart Planning in Education as A Path to Sustainable Development due to Years of Experience.

4. Methodology

4.1. Research Design

This study employs a **descriptive-correlational design** to explore the role of smart planning in education as a creative tool for achieving sustainable development. By combining descriptive and correlational approaches, the study aims to both document current practices and examine potential relationships between the implementation of smart educational strategies and their outcomes on educational quality and sustainability.

4.2. Population and Sample

The study population consisted of all academic staff at Palestine Technical University – Kadoorie during the academic year 2024/2025, totaling 40 members. Using a stratified random sampling technique, all 40 members were selected to ensure representation across gender, college disciplines (Scientific, Arts and Humanities), scientific qualification (Instructor to Professor), nature of work (Lecturer, Head of Department), and years of experience (less than 10 years, 10–15 years, more than 15 years). As the population is small ($N=40$), surveying the entire population (a census) is appropriate and statistically robust, eliminating sampling error and providing full generalizability of the findings within the institution (Krejcie & Morgan, 1970). Table (1) presents the distribution of the study variables among the sample:

Table 1: Sample descriptive & distribution by demographic variables

Demographic Variables		Frequency
Gender	Male	15
	Female	25
	Total	40
Collage	Scientific	18
	Arts and Humanities	22
	Total	40
Scientific Qualification	Instructor	3
	Lecturer	6
	Assistant Professor	27
	Associate Professor	3
	Professor	1
	Total	40
Nature of Work	Lecturer	35
	Head of Department	5
	Total	40
Years of Experience	Less than 10 years	2
	10 – 15 years	13
	More than 15 years	25
	Total	40

4.3. Research Instrument

Data collected using a structured questionnaire designed to measure participants' perceptions, practices, and challenges regarding smart education and its role in sustainable development. The questionnaire includes Likert-scale items for quantitative analysis, along with a few open-ended questions to capture qualitative insights. Items are adapted from previous studies on smart education, AI-driven classroom optimization, and sustainable educational frameworks.

4.4. Validity and Reliability

To ensure content validity, the questionnaire is reviewed by three experts in educational planning and sustainable development. Construct validity is addressed by aligning items with theoretical frameworks and previous validated instruments. Reliability is assessed through a pilot test with 10 participants, using Cronbach's alpha to confirm internal consistency, with a target value of 0.70 or higher.

4.5. Data Collection and Ethical Considerations

Data collection will occur through electronically distributed questionnaires to ensure convenience and timely responses. Participation is voluntary, and all respondents are informed about the purpose of the study, confidentiality, and anonymity. Ethical approval will be obtained from the institution's research ethics committee before data collection begins.

4.6. Data Analysis

Quantitative data will be analyzed using descriptive statistics (means, standard deviations, frequencies) to summarize the current practices and perceptions. Correlation analysis will examine relationships between smart planning strategies and outcomes related to educational quality and sustainability goals. Qualitative responses from open-ended questions will undergo thematic analysis to identify recurring themes, patterns, and insights.

5. Results and Discussion

To determine the role of Smart Planning in Education as a Path to Sustainable Development, and to interpret the results, the following arithmetic means and percentages were used:

A mean of (1.8–2.59) (or 36–51.9%) indicates a low reality.

A mean of (2.60–3.39) (or 52–67.9%) indicates an average reality.

A mean of (3.40–4.19) (or 68–83.9%) indicates a high reality.

Results of the first question

What is the role of Smart Planning in Education as a Path to Sustainable Development?

To answer this question, the researcher calculated the arithmetic means and standard deviations of the study sample members' estimates of the role of Smart Planning in Education as a Path to Sustainable Development for each item of the questionnaire and for the total score. Table 2 illustrates this.

Table 2: Means, Std. Dev. and degrees of the items of the questionnaire.

#	Item	Mean	Std. Dev.	reality
4	I believe smart classrooms can improve the quality of teaching and learning.	4.05	0.90	High
24	Data-driven decisions improve teaching effectiveness.	3.93	0.69	High
3	I am familiar with the role of digital tools in enhancing student engagement.	3.90	0.87	High
23	Smart planning helps achieve measurable academic outcomes.	3.73	0.75	High
12	I am confident in using AI-based tools for classroom management.	3.68	0.94	High
19	Professional development programs include modules on sustainability in education.	3.68	0.83	High
11	I use digital platforms to facilitate teaching and learning activities.	3.65	0.89	High
13	IoT devices in classrooms help monitor and enhance learning processes.	3.65	0.89	High
8	Smart scheduling and resource optimization are effectively applied in my institution.	3.63	1.00	High
2	I understand how AI and IoT technologies can support smart education systems.	3.60	1.19	High
22	Technology-supported learning increases student motivation and engagement.	3.60	0.78	High
25	Smart education contributes to long-term institutional development and sustainability.	3.60	0.87	High
7	I feel that integrating smart technologies in curriculum planning improves learning outcomes.	3.58	0.98	High
9	The administration supports the use of digital planning tools for academic purposes.	3.58	1.20	High
6	Educational institutions in my environment practice strategic planning for smart education.	3.55	0.99	High
14	Digital communication tools improve interactions with students.	3.55	1.04	High
5	I know how smart education contributes to sustainable development goals.	3.50	0.85	High
10	Smart planning enhances collaboration among faculty and students.	3.50	0.85	High
18	Smart education systems offer adequate technical support to faculty members.	3.48	1.01	High
17	I feel prepared to implement smart education practices in my courses.	3.43	1.08	High
20	Continuous learning on smart technologies is encouraged in my institution.	3.38	0.93	Moderate
16	The institution provides training for faculty on smart education tools.	3.35	0.95	Moderate
21	Smart education tools improve students' critical thinking and problem-solving skills.	3.35	0.92	Moderate
1	I am aware of the concept of smart education and its benefits in modern learning environments.	3.13	0.97	Moderate
15	I regularly update my knowledge about emerging smart education technologies.	3.13	0.97	Moderate
	Total	3.85	0.98	High

The result in table (2) shows that the role of Smart Planning in Education as a Path to Sustainable Development was at a high level, as the arithmetic mean of the total score was (3.85) over/out of (5) with a standard deviation of (0.98).

Results of the Second Question

Are there statistically significant differences at the level of $\alpha \leq 0.05$ between the study sample members' related to the role of Smart Planning in Education as a Path to Sustainable Development attributable to the following variables: gender, College, scientific qualification, Nature of work, and years of experience?

To answer the second question, the researcher examined the resulting null hypotheses, as follows:

Results of the first hypothesis

There are no statistically significant differences in Smart Planning in Education as A Path to Sustainable Development due to gender.

To test the first null hypothesis, the researcher used an independent samples t-test to find differences between the average estimates of the study sample members for the role of Smart Planning in Education as a Path to Sustainable Development attributable to the gender variable. Table (3) illustrates this.

Table 3: Results of the independent t-test for gender variable.

gender	Mean	Std. Dev.	T- State	Sig.
male	3.46	0.56	0.85	0.39
female	3.63	0.59		

The results in table (3) show that the level of significance for the differences in participant's responses related to the role of Smart Planning in Education as a Path to Sustainable

Development due to gender is (0.39) this means that there are no statistically significant differences at ($\alpha < 0.05$), Thus, the hypothesis is accepted.

Results related to the second Hypothesis:

There are no statistically significant differences in Smart Planning in Education as A Path to Sustainable Development due to College.

To test this hypothesis, the researcher used one-way ANOVA- test, table (4) shows: The results of one-way ANOVA- test for the differences in participant's responses related to the role of Smart Planning in Education as a Path to Sustainable Development due to College.

Table 4: The results of ANOVA- test for College variable.

College	Mean	Std. Dev.	T- State	Sig.
Scientific	3.57	0.66	0.09	0.92
Arts and Humanities	3.55	0.52		

The results in this table (4) show that the level of significance for the differences in the participant's responses related to the role of Smart Planning in Education as a Path to Sustainable Development due to College is (0.92) this means that there are no statistically significance differences at ($\alpha < 0.05$). Thus, the hypothesis accepted.

Results related to the third Hypothesis:

There are no statistically significant differences at ($\alpha \leq 0.05$) for the role of Smart Planning in Education as a Path to Sustainable Development due to scientific qualification.

To test this hypothesis, the researcher used one-way ANOVA- test, table (6) shows: The results of one-way ANOVA- test for the differences in participant's responses related to the role of Smart Planning in Education as a Path to Sustainable Development due to scientific qualification.

Table 6: The results of ANOVA- test for scientific qualification variable.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.81	4	0.45	1.38	0.26
Within Groups	11.48	35	0.32		
Total	13.30	39			

The results in this table (6) show that the level of significance for the differences in the participant's responses related to related to The role of Smart Planning in Education as a Path to Sustainable Development due to scientific qualification is (0.26) this means that there are no statistically significance differences at ($\alpha < 0.05$). Thus, the hypothesis accepted.

Results related to the fourth hypothesis:

There are no statistically significant differences at ($\alpha \leq 0.05$) for the role of Smart Planning in Education as a Path to Sustainable Development due to Nature of work.

To test this hypothesis, the researcher used independent t-test as table (5) shows: The results of independent t-test for the differences in participant's responses related to The role of Smart Planning in Education as a Path to Sustainable Development due to Nature of work.

Table 5: Results of the independent t-test for Nature of work variable.

Nature of work	Mean	Std. Dev.	t-state	Sig.
Lecturer	3.59	0.613	0.68	0.54
Head of Department	3.40	0.30		

The results in table (5) show that the level of significance for the differences in participant's responses related to The role of Smart Planning in Education as a Path to Sustainable Development due to Nature of work is (0.54) this means that there are no statistically significant differences at ($\alpha < 0.05$) Thus, the hypothesis is accepted.

Results related to the fifth hypothesis:

There are no statistically significant differences at ($\alpha \leq 0.05$) for the role of Smart Planning in Education as a Path to Sustainable Development due to Years of Experience.

To test this hypothesis, the researcher used one-way ANOVA- test, table (8) shows: The results of one-way ANOVA- test for the differences in participant's responses related to the role of Smart Planning in Education as a Path to Sustainable Development due to Years of Experience.

Table 6: The results of ANOVA- test for Years of Experience variable.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.85	2	0.42	1.27	0.29
Within Groups	12.44	37	0.33		
Total	13.304	39			

The Results in table (8) show that the level of significance for the differences in responses related to related to The role of Smart Planning in Education as a Path to Sustainable Development due to Years of Experience (0.29) this means that there are statistically significance differences at ($\alpha < 0.05$). Thus, the hypothesis accepted.

Conclusion

The study results showed that the role of Smart Planning in Education as a Path to Sustainable Development was high, with a mean of 3.85 over/out of (5). The result also revealed that there were no statistically significant differences due to gender, College, scientific qualification, Nature of work, and years of experience.

Dissection of the Results

The researcher attributed The High role of Smart Planning in Education as a Path to Sustainable Development to the following:

- Technology Integration:** Smart planning enables the effective use of modern technologies, such as artificial intelligence, the Internet of Things, and data analytics, to improve decision-making and learning management systems.
- Resource Optimization:** Through smart scheduling and data-driven strategies, educational institutions can optimize the use of human, physical, and digital resources to enhance efficiency and reduce waste.
- Quality Improvement:** Smart planning contributes to improving the quality of teaching and student learning outcomes by aligning educational objectives with innovative approaches and digital tools.
- Sustainability Orientation:** By integrating sustainability principles into educational strategies, smart planning supports the long-term development of institutions and promotes environmentally responsible practices.
- Collaborative Governance:** Smart planning enhances coordination among administrators, faculty, and students, encouraging participatory decision-making that leads to more inclusive and effective educational policies.
- Continuous Professional Development:** Emphasizes the importance of ongoing training for faculty members, ensuring their readiness to implement digital planning systems effectively.
- Data-driven policymaking:** Using reliable data enables institutions to make evidence-based decisions, improving strategic performance and supporting sustainable educational progress.

The researcher attributed that there were no statistically significant differences with the role of Smart Planning in Education as a Path to Sustainable Development due to gender variable to the following:

- Equal Opportunities and Roles:** Male and female faculty members share similar academic responsibilities and administrative roles, reducing gender disparities in planning and decision-making.
- Equal Access to Digital Resources:** The University provides equal access to smart technologies, digital platforms, and planning tools for all faculty members, regardless of gender.
- Institutional Policies that Promote Equality:** Institutional frameworks emphasize gender equality and inclusivity in professional development, ensuring balanced participation in smart planning initiatives.

4. **Consistent Levels of Technological Proficiency:** Male and female participants demonstrate similar levels of digital literacy and familiarity with smart planning tools.
5. **Collaborative Work Environment:** The collaborative and interdisciplinary nature of academic work reduces gender disparities in the perceptions or implementation of smart educational planning.

The researcher attributed that there were no statistically significant differences with the role of Smart Planning in Education as a Path to Sustainable Development due to College variable to the following:

1. **Unified Institutional Vision:** All university colleges operate under a unified strategic framework and institutional policies that focus on smart planning and sustainable development.
2. **Unified Access to Resources:** The colleges of science and humanities have equal access to technological resources, digital platforms, and planning systems that support smart educational practices.
3. **Collaboration between colleges:** The University encourages interdisciplinary collaboration and joint initiatives, promoting a consistent understanding and application of smart planning across all colleges.
4. **Consistent Administrative and Academic Procedures:** Educational planning processes, decision-making structures, and quality assurance mechanisms are standardized across all colleges.
5. **Shared Professional Development Opportunities:** Faculty members from different colleges participate in the same professional development and training programs related to smart education and sustainability.

The researcher attributed that there were statistically significant differences with the role of Smart Planning in Education as a Path to Sustainable Development due to scientific qualification variable to the following:

1. **Diversity of knowledge and experience:** Faculty members with higher academic qualifications (e.g., PhDs) tend to have deeper knowledge and broader experience in educational planning, innovation, and sustainability practices.
2. **Advanced research orientation:** Holders of higher degrees are often more involved in research activities related to smart education, digital transformation, and sustainable institutional development.
3. **Greater awareness of strategic objectives:** Academics with postgraduate qualifications are typically more familiar with the strategic objectives of smart planning and how it aligns with sustainable development frameworks.
4. **Increased participation in decision-making:** Senior faculty members, who typically hold higher qualifications, are more involved in academic and administrative decision-making related to planning and technology integration.
5. **Diversity of professional development opportunities:** Individuals with higher degrees often have greater access to specialized training, workshops, and international collaborations focused on smart planning and sustainability.

The researcher attributed that there were statistically significant differences with the role of Smart Planning in Education as a Path to Sustainable Development due to Nature of work variable to the following:

1. **Differing responsibilities and tasks:** Faculty members and administrators differ in their daily responsibilities, which affects their level of involvement in smart planning initiatives.
2. **Differing levels of technological engagement:** Faculty members tend to integrate smart technologies directly into teaching and research, while administrative faculty members focus more on digital management and institutional planning.
3. **Involvement in strategic decision-making:** Those in administrative positions often have greater direct involvement in implementing and monitoring institutional strategies related to sustainability and smart planning.
4. **Focus of professional activities:** Academics prioritize educational innovation, while administrators focus on organizational efficiency and policy development—both of which influence their perception of smart planning.
5. **Differing access to training and development opportunities:** The nature of work determines access to professional development programs, which impacts familiarity with smart planning tools and practices.

The researcher attributed that there were statistically significant differences with the role of Smart Planning in Education as a Path to Sustainable Development to years of experience variable to the following:

1. **Variation in Work Experience:** Individuals with more years of experience have deeper expertise in institutional planning processes and understand the long-term impact of smart strategies on educational sustainability.
2. **Adaptability to Technological Change:** Younger or less experienced participants tend to adapt more quickly to emerging technologies, while experienced employees may rely on traditional methods, leading to differing perspectives on smart planning.
3. **Professional Maturity and Decision-Making:** Experienced employees often assume decision-making roles that directly impact the implementation of smart planning initiatives.
4. **Understanding of Institutional Policies:** Employees with longer tenure are more familiar with the institution's sustainability goals and policies, which influences their perception of the value of smart planning.
5. **Learning Curve and Innovation Acceptance:** Differences in experience levels shape readiness to adopt new educational technologies and innovative planning practices.

Limitations of the study

The current study has the following limitations:

1. **Temporal Limit:** The study was conducted during the 2024-2025 academic year.
2. **Spatial Limit:** Palestine Technical University (PTUK), Ramallah pranche.
3. **Human Limit:** All faculty members at the university.

4. **Objective Limit:** This study analyzes the role of Smart Planning in Education as a Path to Sustainable Development.

Recommendations

In light of the results, the researcher recommended the following:

1. **Integrating smart planning into institutional strategies:** Educational institutions should integrate smart planning principles into their strategic plans to ensure long-term sustainability and effective resource management.
2. **Improve faculty training:** Continuing professional development programs should be organized to equip faculty members with the necessary skills in digital and strategic planning.
3. **Fostering a culture of innovation:** Universities should foster a creative culture that supports the adoption of smart technologies and data-driven decision-making in education.
4. **Developing smart infrastructure:** Institutions are encouraged to invest in digital platforms, smart scheduling systems, and Internet of Things-based tools that facilitate effective planning and sustainable practices.
5. **Promoting interdisciplinary collaboration:** Collaboration between academic, administrative, and technical departments should be enhanced to promote the integration of smart planning at all institutional levels.
6. **Focusing on sustainability goals:** Smart educational planning should be aligned with national and global sustainability goals, particularly those related to educational quality and innovation.
7. **Conducting further research:** Future studies are encouraged to explore the long-term impacts of smart planning on academic performance, institutional growth, and environmental sustainability.

References

1. Badshah A, Ghani A, Daud A, Jalal A, Bilal M, Crowcroft J. Towards smart education through internet of things: a survey. *ACM Comput Surv.* 2023;56(2):1-33.
2. Boulanger SOM. The roadmap to smart cities: a bibliometric literature review on smart cities' trends before and after the COVID-19 pandemic. *Energies.* 2022;15(24):9326.
3. Çaylı O, Yılmaz A. Smart classroom scheduling and resource optimization for educational institutions: integrating AI and multi-objective decision support. *Eur J Res Dev.* 2025;5(1):95-112.
4. Chang SH, Chang CW, Chen HH, Wu MC. Measuring the importance of smart e-learning education system. In: *Proceedings of the 6th International Conference on Digital Technology in Education*; 2022 Sep; New York: ACM. p. 421-8.
5. Chang W, Zhao Y, Zheng Y. Employment challenges and opportunities in the construction of smart ports. *Res Transp Bus Manag.* 2025;62:101462.
6. Demir KA. Smart education framework. *Smart Learn Environ.* 2021;8(1):29.
7. Embarak OH. Internet of Behaviour (IoB)-based AI models for personalized smart education systems. *Procedia Comput Sci.* 2022;203:103-10.
8. Haderer B, Ciolacu M. Education 4.0: artificial intelligence assisted task- and time planning system. *Procedia Comput Sci.* 2022;200:1328-37.
9. Harahap AHH, Santosa S. Smart tactics to improve the education quality through the management of education funds at SD Muhammadiyah Karangharjo. *Manag Educ J Manaj Pendidik Islam.* 2024;10(2):164-72.
10. Hassan SA, Elakhdar BE, Saied WM, Hassan DG. Leveraging new technologies for building a comprehensive smart MIS: integrating ERP, blockchain, IoT, context-awareness, and cloud computing. In: *2024 6th International Conference on Computing and Informatics (ICCI)*; 2024 Mar; Piscataway: IEEE. p. 459-65.
11. Hossin MA, Du J, Mu L, Asante IO. Big data-driven public policy decisions: transformation toward smart governance. *Sage Open.* 2023;13(4):21582440231215123.
12. Kameni ED, Koumetio SCT. The role of inclusive educational technologies in transforming African cities into inclusive smart cities. *E3S Web Conf.* 2023;418:03003.
13. Kim S, Choi T. Implementing the green smart initiative: an action research on spatial planning in response to comprehensive educational objectives. *Asia-pac J Conver Res Interchange.* 2023;9(8):471-80.
14. Krstevska AB, Bajrami D. The role of strategic planning in ensuring the success of education. *SEEU Rev.* 2023;18(1):92-106.
15. Luo Y, Yang Y. Large language model and domain-specific model collaboration for smart education. *Front Inform Technol Electron Eng.* 2024;25(3):333-41.
16. Makinde SO, Ajani YA, Abdulrahman MR. Smart learning as transformative impact of technology: a paradigm for accomplishing sustainable development goals (SDGs) in education. *Indones J Educ Res Technol.* 2024;4(3):213-24.
17. Mazza P. Education & smart cities: the role of the goals of agenda 2030 for sustainable development of smart cities. *Int J Innov Stud Sociol Humanit.* 2021;6(2):24-31.
18. Nikitina I, Ishchenko T. Smart-systems in STEM education. In: *International Conference on Information and Communication Technologies in Education, Research, and Industrial Applications*; 2023 Sep; Cham: Springer. p. 325-35.
19. Poe LF, Brooks NG, Korzaan M, Hulshult AR, Woods DM. Promoting positive student outcomes: the use of reflection and planning activities with a growth-mindset focus and SMART goals. *Inf Syst Educ J.* 2021;19(4):13-22.
20. Riekkilä J, Mämmelä A. Research and education towards smart and sustainable world. *IEEE Access.* 2021;9:53156-77.
21. Singunoen K, Wannapiroon P, Nilsook P. Development of smart human resource planning system within Rajabhat University. *High Educ Stud.* 2021;11(2):139-46.
22. Terzieva V, Ilchev S, Todorova K. The role of Internet of Things in smart education. *IFAC Pap OnLine.* 2022;55(11):108-13.
23. Tran VT, Tran NH. A review of smart education and

- lessons learned for an effective application in Binh Duong Province, Vietnam. *Pegem J Educ Instr.* 2022;13(1):234-40.
24. Yang J, Sun Y, Lin R, Zhu H. Strategic framework and global trends of national smart education policies. *Humanit Soc Sci Commun.* 2024;11(1):1-13.
 25. Zhou S, Fu H, Tao S, Han Y, Mao M. Bridging the top-down and bottom-up approaches to smart urbanization? A reflection on Beijing's Shuangjing International Sustainable Development Community Pilot. *Int J Urban Sci.* 2023;27(sup1):101-23.