AVE Trends in Intelligent Techno Learning

The Role of Secondary School Teachers and Principals in Leading Technological Change and Professional Development

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Abstract: This paper proposes a model for leading technological change. The researcher focuses on teachers and principals, who are the constant support of the education system in East Jerusalem. Thus, technological change is expected to help them increase their capacity to achieve educational goals. The scope of the research is limited to the private secondary schools operating in the East Jerusalem area. Three research questions and objectives focus on the need to implement technological change and the professional development of teachers in private schools in East Jerusalem. The research followed quantitative methods and simple random sampling. Participants are teachers working in East Jerusalem Private Secondary Schools, and the sample size is 402. Data analysis is conducted using SPSS. Findings of the research paper define the high value of significance, i.e., 0.7, which means that the role of leaders in technological change and professional development cannot be ignored. Future research may investigate longitudinal studies to study the long-term impact of principals' leadership in technological change on professional development and students' outcomes.

Keywords: Technological Change; Private Secondary Schools; Technological Development; Educational Leadership; Change Management; Resistance and Professional Development.

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1. Introduction

Changes in the world field are becoming crucial to understand, as they would have a direct impact on the overall business landscape. The implementation of technology is expected to transform various factors, including political, social, and technological ones. Within societies, the use of technology is considered a factor in success because it enables researchers to implement change. Technology in the educational sector is predominantly a tool for improving students' learning and efficiency, and thus, teachers should be well aware of using various tools during their teaching sessions [8]. In terms of technology, the concept of change is also equally valid, as it is presumed that technological change should be implemented when needed; otherwise, it would not be possible to achieve the growth and learning targets. Teachers and principals in the education system must be fully familiar with technological change and the factors to be considered when implementing it.

In general, technological change is expected to negatively affect overall work efficiency and individual motivation. If technological change and its implementation are ignored in the education sector, it would become impossible for teachers and

principals to achieve their learning goals, as outdated teaching practices and reduced instructional effectiveness result [9]. Learning about the implementation and use of technology is also part of professional development, but teachers' and principals' resistance to change is often observed. It is expected that teachers and principals may feel over-pressured by their knowledge of new technology, which may be an issue. Having a limited focus on adapting to the ever-changing external environment will affect the overall professional development of teachers and principals. It has been presumed that in the education sector, the need for professional development is usually ignored by teachers and principals. In the education sector, multiple developments require teachers and principals to coordinate using modern technological advances [1]. But from the perspective of technological change and its implementation in the education sector, the institutions are facing unprecedented issues related to political, technological, and social impacts [20]. There are no explicit policies for implementing cultural and technological development in the education sector, making it difficult for teachers and principals to advance their professional careers. Another significant issue in the educational sector is resistance to change, as implementing change is expected to make it more difficult to manage daily operational goals. For example, the fear of the unknown regarding the implementation of new technology will be an issue for teachers and principals. It is also argued that it is the responsibility of principals to ensure they focus on implementing technological change alongside professional development [4].

1.1. Research Objectives and Questions

The research objectives of the researcher are as follows:

- To identify the role of principals in leading technological change.
- To understand ways in which adopting technological change can improve teaching quality, learning outcomes, and overall efficiency in the education sector.
- To assess ways through which professional development among East Jerusalem School principals will help in managing the technological implementation.

The research questions based on the above objectives are as follows:

- What is the role of principals in leading technological change?
- How can technological change be beneficial in the education sector?
- How will professional development among East Jerusalem School principals help in managing the technological implementation?

1.2. Significance and Contribution of the Study

The significance of this research lies in understanding the need to implement technological change and professional development, specifically within the educational sector, which is often ignored. For most employees, especially teachers at East Jerusalem School, there is often no chance to implement and embrace technological change [33]. The implementation and need for technology in the education sector are often ignored. Still, this research will examine the role of principals as leaders in fostering teachers' embrace of technological change [10]. The findings of this research will be useful to principals as well, clarifying how they can play an active role in implementing technological change. This research will also benefit from understanding how principals and teachers are expected to contribute to the growth of the education sector [28].

2. Literature Review

2.1. Leadership Concept

According to Arar et al. [14], leadership is defined as the concepts, principles, styles, and traits expected to help individuals reach their desired goals. It is presumed that the presence of appropriate leadership traits will make leaders capable of bringing positive change to the organisation. Arar and Taysum [12] also noted that the concept of leadership reflects the ability of individuals to inspire and direct others towards accomplishing business goals [31]. Baumann [7] defines leadership as the ability to guide, influence, and align people toward achieving organisational goals. It has been observed that leaders can work in the organisation's best interests. Leaders confirm they are making a positive impact on employees, enabling them to work toward fulfilling organisational goals.

In a similar study by Arar et al. [13], the importance of leaders in the educational sector is highlighted, and it is observed that educational institutions are in urgent need of leaders. As a result educational leaders will drive institution progress by motivating both teachers and principals ensuring that they provide students with the best quality of education Within the research, a problem statement was raised regarding the need for implementing leadership in the educational sector and it was highlighted that the

traits of leaders will help in developing progressive relationships between teachers and principals towards fulfillment of the educational goals.

2.2. Leadership Requirements and Elements

Bellibas and Liu [23] noted that multiple characteristics should be present among leaders, given their role in motivating stakeholders to fulfil organisational goals. The leadership also demonstrates that an individual is capable of bringing change or showing creative commitment in accomplishing tasks. If leaders focus on developing their traits, they can better prevent risks or challenges from arising in the education sector. They are also expected to be able to prevent issues using their personal abilities. Daniëls et al. [5] noted that in the educational sector, administrative leadership is widely observed. This leadership style is based on several basic elements, but its only focus is on fulfilling operational goals. The first aspect of administrative leadership is ensuring a team is in place, with a focus on achieving business goals. The presence of a leader in administrative leadership is considered crucial, as they exert a strong influence over administrative thinking and decision-making, thereby shaping group behaviour. For the leader, it is required that the group's behaviour be altered so that they all work towards the common goal.

Research by Sterrett and Richardson [34] also indicated that administrative leadership comprises five basic elements, with the leader among the top factors. It is mentioned that the leader is the most important element in the leadership process, because they are responsible for managing and leading the group. The success and failure of the project are mired in the leader's positive influence on the group. Leadership roles can range from teacher-advisor, judge, and speaker, who ensure followers understand the need to perform tasks to achieve their targets. Groups are based on subordinates or members who can work under a leader's command. A clear, well-defined goal is also a factor required for succeeding as a leader, because it provides direction for decision-making and team alignment. Kwan [26] stated that leaders should be able to influence the group toward fulfilling a common goal by following a specific framework. It is also noted that circumstances cannot be ignored. A leader's success and failure are determined by their ability to make decisions based on circumstances. A common argument about the influence element is that a leader should be able to influence their followers; otherwise, success will be minimal. In conclusion, a leader's success is directly linked to their influence and the effectiveness of their decision-making within administrative leadership.

2.3. Characteristics of the Educational Leadership

As per Leithwood and Sun [15], educational leadership is considered a human process comparable to other leadership styles such as transformational, democratic, or autocratic leadership. The concept of educational leadership means that the teachers. Students and parents are motivated to achieve their educational goals. It is also an important concept within the educational system because it can positively impact students' learning experiences. Principals in educational leadership are considered leaders and are expected to motivate teachers to provide the best academic excellence and learning opportunities to students. It is expected that educational leadership will promote inclusivity and foster innovation, both essential elements for success in today's environments.

Leadership is considered a collective, collaborative process that pushes educational institutions to develop a mutual understanding of the importance and implementation of leadership styles to achieve educational goals. If educational leadership is present within institutions, adopting and implementing technological change will not be an issue. Technology and innovation are highly in demand within the educational Institute, and thus principals, as leaders, are expected to focus on their implementation. O'Connor et al. [17] stated that many characteristics of educational leadership work collaboratively to meet the needs of educational institutions. The most prominent skills of educational leaders are communication, collaboration, and vision, as these help them achieve their educational goals. Payes [30] noted that communication between leaders and teachers enables leaders to help teachers understand the need to implement technological change.

If communication is ineffective, it would be highly difficult for principals to make teachers understand the need to implement new technology and use it to fulfil their roles and responsibilities. For communication, active listening techniques are equally important for principals, as teachers may feel some distress while learning the new technology. Shlomo [25] noted that, in the context of the East Jerusalem educational system, a lack of communication between principals and teachers is observed because leaders are unable to easily transmit information that could help motivate teachers to adopt technology. It is also observed that a lack of collaboration is common among schools, as principals believe that listening to their staff's different perspectives will not contribute to fulfilling educational goals. In terms of collaboration, leaders must encourage their team members to work together to build consensus and accomplish a common goal. For the principals in the educational sector in East Jerusalem, the lack of collaboration is also due to limited access to new ideas and technology. Research by Young et al. [21] also found that collaboration between underdeveloped countries and education systems is often not adopted by leaders due to resource constraints. Arar and Taysum [12] have mentioned that leaders' vision for adopting change is the last characteristic to be considered. For leaders, it is expected to have a clear vision of educational goals so they can be communicated to teachers.

Only visionary leaders and principles can inspire and empower others to accomplish the vision. In the case of educational institutions, this vision depends on adopting new technologies and using them to fulfil students' learning objectives. Forchers, it is imperative to implement new ones.

2.4. Educational Leadership Standards

Kwan [26] noted that there are specifications and conditions within educational leadership that must be fulfilled. These standards help principals in East Jerusalem schools adopt and apply modern learning techniques. The first standard is cognitive, personal, and social competencies. It is expected that the school administration should be able to implement modern teaching methods grounded in students' psychological education. Personal and social competence also means that principals should develop a cordial relationship with teachers to help teachers identify and address educational gaps that could hinder the achievement of expected learning outcomes. Strategy planning criteria is another factor in the educational leadership standard, focusing on strategic planning for principals and teachers. Leithwood et al. [16] argued for strategic planning in educational institutions but concluded that, without it, even the most well-intentioned institutions will not be able to fulfil their goals. Leaders such as principals are expected to have clear performance indicators that can improve teachers' outcomes. Bellibas and Liu [23] noted that standards for the administrative organisation of schools must also be continually monitored. Within schools, a clear organisational structure is required so that teachers understand their reporting lines.

This also means that the principals will be able to make teachers understand the lead for new technology and can implement it without facing any resistance. Developing standards for employees and the evolution of performance are equally important, whether in educational leadership. For the principals, it is required to have teachers who accept the adoption of new technology and its implications for increased learning. These teachers also ensure they focus on their professional development and understand its importance in fulfilling educational goals. O'Connor et al. [17] conclude that prioritising teacher professional development has positive implications for student learning. Developing standards for classroom teaching processes is also part of education leadership. But these standards should not be limited solely to student development; they should also support teacher development. The principal is expected to master teaching processes by integrating technology, enabling teachers to pass on knowledge and become innovative and creative thinkers. Standards for developing the learning and educational environment are used to make attractive school environments. Teachers will be motivated to take initiatives that can improve their ability to provide high-quality learning and education to students.

2.5. Leadership Styles and Qualities of an Educational Leader

Research by Arar et al. [14] noted that leadership styles include autocratic, democratic, and transformational. In an autocratic leadership style, the principal makes decisions based on their own ideas; leaders usually don't listen to their team, and decision-making is individual. In the democratic style, it's participative leadership: all employees participate in decision-making. The use of transformational leadership is highly valued because it encourages, inspires, and motivates employees to take action to create meaningful change in institutions. In these leadership styles, the acceptance of technological change is a factor that needs to be closely monitored. Daniëls et al. [5] have identified several qualities of educational leaders, including ability and competence, academic and cognitive excellence, ethical and moral responsiveness, professional maturity, and innovation. On the contrary, Young et al. [21] stated that the leader is expected to possess technical, organisational, and intellectual skills to easily implement change within the organisation. In educational organisations, these changes primarily involve adopting modern technology.

2.6. Change Management

According to Daniëls et al. [5], change is the act of altering policies or principles within modern institutions so that accomplishing goals is no longer an issue. In educational institutions, change is often implemented by leaders, benefiting both teachers and students. The reason for implementing change management processes in educational institutions is to ensure that institutions provide high-quality services. Another significant factor is the satisfaction of citizens and society with the activities adopted by institutes, which can increase students' educational capabilities.

2.7. Types of Change and their use in Educational Institutions

For organisations, Payes [30] identified three types of change: gradual, phased, and radical. Within educational institutions, the adoption of appropriate educational leadership styles means that individuals will make decisions that can help both teachers and students progress. There is a need for change across institutions, including culture, organisational structure, technology, and tasks. Baumann [7] noted that adopting change practices related to technological change is more relevant. Technological changes are essential to implement because they will help increase students' learning abilities. Incremental or gradual changes are often considered essential because they can make a positive impact on teachers' lives.

2.8. Theoretical Models for Change

The Lewin and Kotter models were selected because they provide structured, widely recognised frameworks for understanding how educational leaders can effectively implement technological change. They directly connect to this study's focus on principals guiding schools through transitions by emphasising stakeholder involvement, reducing resistance, and sustaining improvement.

2.8.1. Lewin Kurt Model

Lewin's Kurt model is based on three-stage processes that help organisations implement change without negatively impacting followers (Figure 1). The model and its stages are as follows:

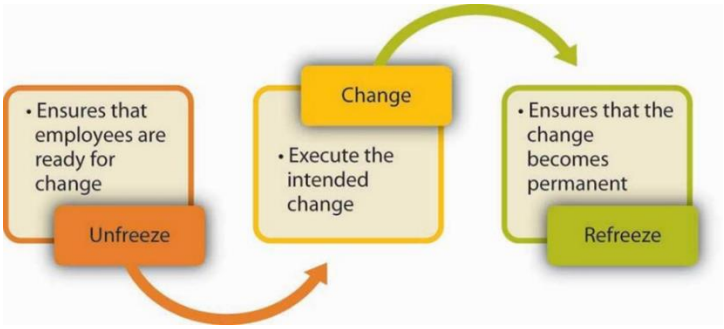

Figure 1: Lewin Kurt model [24]

2.8.2. Kotter Model

The Kotter model is based on an 8-step change process, meaning the steps should be followed to implement change (Figure 2). Within the model, employment involvement is widely accepted, and the eight steps are as follows:

Figure 2: Kotter's change model [24]

2.9. Education System and Types of Schools in East Jerusalem

The education system in East Jerusalem is part of the Arab education system, which comprises various educational umbrellas. This diversity in the education system also means there are multiple curricula. The schools' affiliation with the Ministry of Islamic Endowments and Palestinian Curricula is taught because it covers all aspects of working in the Arab education sector. Palestinian Jerusalemites have faced significant difficulties in implementing technological change, as there is less focus on learning to use technology, and this is not well understood by the Ministry of Education [18]. In East Jerusalem, private schools are expected to primarily focus on implementing modern technology and, along with this, on teachers' professional development.

3. Methodology and Procedures

3.1. Research Methodology

The researcher used a quantitative research method to enrich understanding by providing measurable evidence about the role of principals in leading technological change and professional development in East Jerusalem Schools. Both teachers' and principals' perspectives will be considered and evaluated using a statistical model to ensure clarity and high validity [11].

3.2. Study Community and Sample

The study's community (participants) are teachers and principals working in private secondary schools affiliated with the Jerusalem Municipality and the Palestinian Ministry of Education in East Jerusalem. The study included participants from 48 schools, with male and female participants categorised separately based on data collected during the 2021-22 academic year. The sample for this research is 402, and the job holders in educational secondary schools in Jerusalem are the targeted population. The sample method used is simple random sampling, in which the sample is selected at random, thereby facilitating efficient data analysis [11].

3.3. Demographic Explanation

The characteristics of the study sample based on participants are mentioned in Table 1 below:

Table 1: Study sample characteristics

Variables	Number	Percentage
Gender		
Male	116	28.9%
Female	286	71.1%
The Age		
Under 30 years old	46	11.4%
30-40 years old	138	34.3%
More than 40 years	218	54.2%
Academic Qualification		
Bachelor's	66	16.4%
Bachelor's + Diploma in Education	160	39.8%
Master's degree or higher	176	43.8%
Years of Experience		
Less than 5 years	49	12.2%
5-10 years	94	23.4%
More than 10 years	259	64.4%
Job Title		
Boss	68	16.9%
Teacher	334	83.1%
School Type		
Jerusalem Municipality	264	65.7%
Especially	80	19.9%

3.4. Variable Analysis/Data Analysis

The variables and data analysis for the research are conducted using SPSS, including statistical analyses to examine the role of secondary school principals in leading technological change and professional development. The role of principals as leaders will be assessed using the tool, and tests such as regression, ANOVA, and correlation will be used to develop an understanding of the relationships among the research variables. Content reliability and validity are also ensured during data analysis, and only consistent responses within the questionnaires will be considered as the sample [11].

4. Data Analysis and Findings

4.1. Introduction

The data analysis and findings from the study of private secondary school principals' leadership in driving technological change and professional development in East Jerusalem schools. The statistical methods employed, namely descriptive statistics, correlation analysis, and regression analysis, are used to measure the effects of the following factors on technological leadership and professional development, i.e., gender, age, academic qualification, years of experience, job title, and type of school. The results are described in detail, and the factors that significantly and non-significantly influence principals' technological change leadership effectiveness are identified.

4.2. Demographics

From the Gender Table 2, it is noted that of the total 402 respondents, 45.8% are male and 54.2% are female.

Table 2: Gender-wise distribution of respondents

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	184	45.8	45.8	45.8
	Female	218	54.2	54.2	100.0
	Total	402	100.0	100.0	

The data suggest a slightly higher proportion of females in the sample (Figure 3).

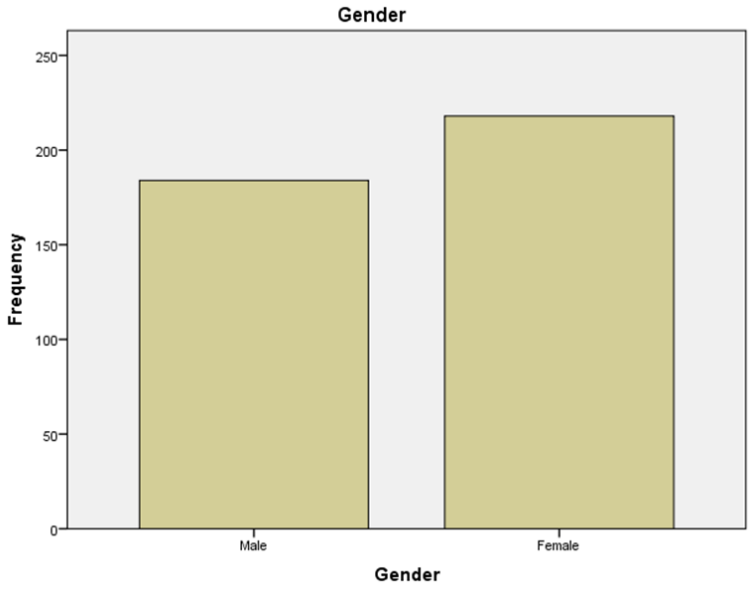

Figure 3: Gender-wise frequency distribution of respondents

The Results from the Age Table 3 indicate that the largest age group (27.6%) is the 22-25 group, followed by the 55+ group (24.9%), with the remaining age groups evenly distributed, totalling 402 individuals.

Table 3: Age-wise distribution of respondents

Ages		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	22-25	111	27.6	27.6	27.6
	26-40	108	26.9	26.9	54.5
	41-55	83	20.6	20.6	75.1
	55+	100	24.9	24.9	100.0
	Total	402	100.0	100.0	

Most respondents are distributed across different age ranges, suggesting an even distribution (Figure 4).

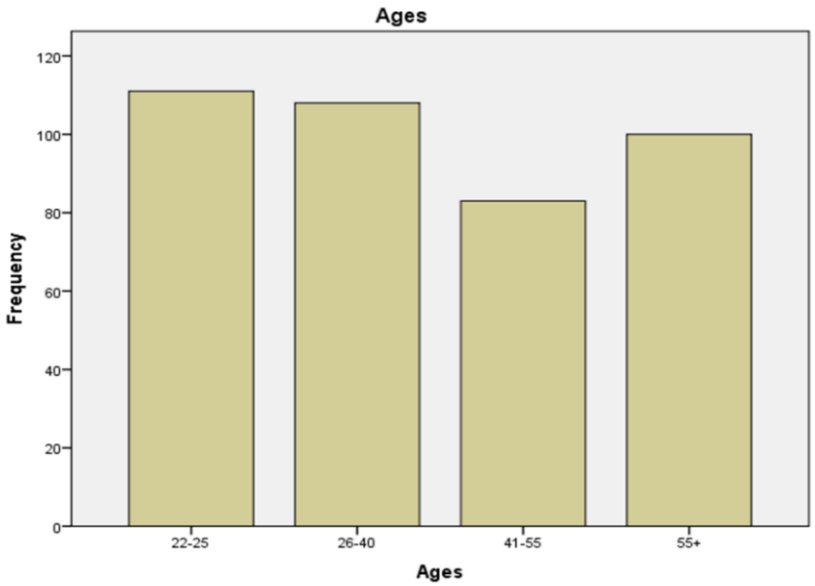

Figure 4: Age-wise frequency distribution of respondents

According to Qualification Table 4, the most respondents hold a PhD (35.3%), followed by a bachelor's degree (34.1%) and a master's degree (30.6%).

Table 4: Educational qualification-wise distribution of respondents

Qualification		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelors	137	34.1	34.1	34.1
	Masters	123	30.6	30.6	64.7
	PhD	142	35.3	35.3	100.0
	Total	402	100.0	100.0	

This indicates that a sample of well-educated individuals tends to hold higher academic qualifications (Figure 5).

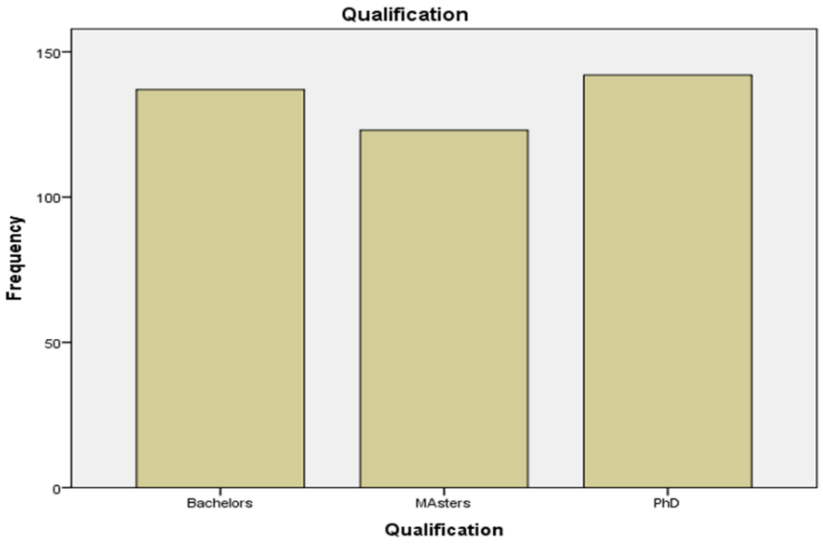

Figure 5: Educational qualification-wise frequency distribution of respondents

4.3. Descriptive Statistics

Table 5 presents descriptive statistics for the most important demographic and professional factors among the respondents. For all variables, there were 402 valid responses, with values ranging from 1.00 to 5.00, indicating that the responses were measured on a five-point scale. The mean scores across factors are moderate to high. The highest average values were for Technological Change Leadership and Professional Development (Mean = 3.67) and Job Title (Mean = 3.71). The mean scores for Age (Mean = 3.06) and Academic Qualification (Mean = 3.19) are lower than those for other variables. The standard deviation values indicate that responses varied moderately, with Years of Experience showing the greatest variation (SD = 0.95). This suggests that respondents had different levels of experience.

Table 5: Descriptive statistics of demographic and study variables

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
Gender Mean	402	1.00	5.00	3.1036	.98452
Age	402	1.00	5.00	3.0630	.76781
Academic Qualification	402	1.00	5.00	3.1940	1.00508
Years of Experience	402	1.00	5.00	3.4983	.95369
Job Title	402	1.00	5.00	3.7081	.93510
School Type	402	1.00	5.00	3.7081	.87383
Technological Change Leadership and Professional Development	402	1.00	5.00	3.6650	.93662
Valid N (listwise)	402				

4.3.1. Regression

The results are being tested using regression and hypothesis testing:

- **H1:** There are no statistically significant differences ($\alpha \leq 0.05$) in the impact of the role of secondary school principals in leading technological change on professional development from the perspective of teachers and principals of East Jerusalem schools, attributed to the variable Gender.
- **H2:** There are no statistically significant differences ($\alpha \leq 0.05$) in the impact of the role of secondary school principals in leading technological change on professional development from the perspective of teachers and principals of East Jerusalem schools, attributed to the variable Age.
- **H3:** There are no statistically significant differences ($\alpha \leq 0.05$) in the impact of the role of secondary school principals in leading technological change on professional development from the perspective of teachers and principals of East Jerusalem schools, attributed to the variable Academic qualification.
- **H4:** There are no statistically significant differences ($\alpha \leq 0.05$) in the impact of the role of secondary school principals in leading technological change on professional development from the perspective of teachers and principals of East Jerusalem schools, attributed to the variable Years of experience.
- **H5:** There are no statistically significant differences ($\alpha \leq 0.05$) in the impact of the role of secondary school principals in leading technological change on professional development from the perspective of teachers and principals of East Jerusalem schools, attributed to the variable Job title.
- **H6:** There are no statistically significant differences ($\alpha \leq 0.05$) in the impact of the role of secondary school principals in leading technological change on professional development from the perspective of teachers and principals of East Jerusalem schools, attributed to the variable School type (Table 6).

Table 6: Model summary of multiple regression analysis

Model Summary				
Model	**R**	**R Square**	**Adjusted R-Square**	**Std. Error of the Estimate**
1	.976a	.952	.951	.20641
a. ***Predictors:*** *(Constant), School Type, Gunderman, Age, Years of Experience, Academic Qualification, Job Title.*				

4.3.2. Model Summary

Provides insight into the relationship between the independent and dependent variables. With R = 0.976, this implies a very strong positive correlation; hence, the independent variables (Gender, Age, Academic Qualification, Years of Experience, Job

Title, and School Type) are strongly related to the dependent variable (impact of technological change leadership on professional development). The R^2 value is 0.952, indicating that 95.2% of the variation in the dependent variable is explained by the independent variables, a very high proportion. These results indicate that the model can describe the data very well. R^2 is slightly better than the Adjusted R^2 of 0.951 because it is not adjusted for the number of predictors in the model. Now, there is an adjusted value for this: the model still explains the data well, even when researchers account for the complexity introduced by several indicators. Finally, its standard error of the estimate is 0.20641, i.e., the average error in the prediction is somewhat below 0.21. A lower value means the model's predictions are closer to the actual values, which is preferable for accurate predictions (Table 7).

Table 7: ANOVA results for the multiple regression model

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	334.948	6	55.825	1310.311	.000b
	Residual	16.829	395	.043		
	Total	351.777	401			
a. ***Dependent Variable:*** *Technological Change, Leadership and Professional Development.*						
b. ***Predictors:*** *(Constant), School Type, GenderMean, Age, Years of Experience, AcademicQualification, Job Title.*						

4.3.3. ANOVA Table

The overall significance of the regression model is tested by the ANOVA (Analysis of Variance) Table 8. The independent variables explained 334.948 of the Regression Sum of Squares. This is how much variation is still unexplained by the model: Residual sum of Squares = 16.829. Total Variation of the dependent variable (y) is denoted by Total Sum of Squares (TSS), which is 351.777. The F-value of 1310.311 tests the overall fit of the model. If the model fit is significantly better than that of a model with no predictors, a high F-value is indicated. The associated p-value of the F-value is 0.000, which is less than the significance level of 0.05. Because this is statistically significant, it implies that the regression model indeed impacts a significant amount of the dependent variable.

Table 8: Regression coefficients for the multiple regression model

Coefficients[a]						
		Model		**Unstandardized Coefficients**	**Standardized Coefficients**	**t**
		B	**Std. Error**	**Beta**		
1	(Constant)	-.065	.057		-1.138	.256
	Gender Mean	.027	.015	.029	1.816	.070
	Age	.008	.015	.007	.525	.600
	Academic Qualification	-.036	.016	-.039	-2.200	.028
	Years of Experience	-.053	.014	-.054	-3.778	.000
	Job Title	.714	.023	.713	31.585	.000
	School Type	.344	.024	.321	14.129	.000
a. Dependent Variable: *Technological Change, Leadership and Professional Development.*						

4.3.4. Coefficients Table

The Coefficients Table shows exactly how much each predictor in the regression model contributes to the final logistic regression model. The value of the constant (intercept) of -0.065 is the predicted value of the dependent variable when all independent variables are zero. Although the constant is not statistically significant since the p-value = 0.256 is greater than 0.05, the constant does not need to be excluded from the model. The coefficient of Gender for independent variables is 0.027, which suggests a positive association (slightly) of gender with professional development from the effect of technological change leadership. The p-value for gender is 0.070, which is greater than 0.05; therefore, the relationship is nonsignificant. Also, the coefficient for age is 0.008 ($p = 0.600$), indicating that age does not have a significant effect on professional development.

The strongest negative factor is the Academic Qualification coefficient (–0.036), indicating a negative association with professional development. These results suggest that while a high level of academic qualifications may be related to a small amelioration of the effect of technological change leadership, its extent does not outweigh its negative effect. For academic qualifications, we have $0.028 < 0.05$; hence, this effect is statistically significant. However, the coefficient for Years of Experience is -0.053, indicating that as a respondent's years of experience increase, the impact on professional development

decreases slightly. This means that, with a p-value of 0.000, years of experience have a significant influence on the dependent variable (Figure 6).

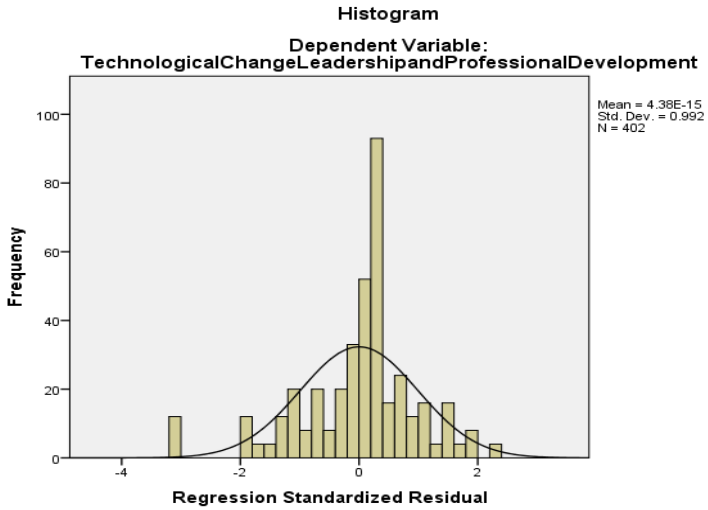

Figure 6: Histogram of standardised residuals for the regression model

The coefficient for Job Title is 0.714, indicating that professional development is strongly positively affected. This effect is statistically significant (p-value = 0.000), indicating that job title influences the effect of technological change leadership. Third, the coefficient for School Type is 0.344, indicating a weak positive relationship with professional development. The school type also has a p-value of 0.000, indicating it is a very significant factor in influencing the result (Figure 7).

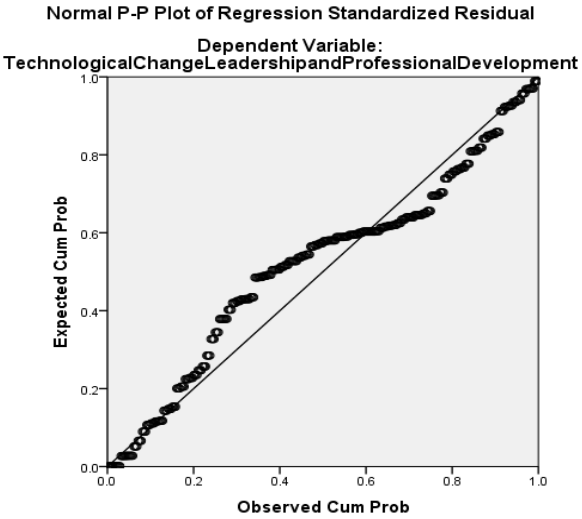

Figure 7: Normal P–P plot of regression standardised residuals

4.3.5. Hypothesis Testing

Considering the statistical results.

4.3.5.1. Gender

The gender p-value is 0.070, which is greater than 0.05; hence, researchers fail to reject the null hypothesis that there is no statistically significant difference in the effect of technological leadership on professional development by gender. Therefore, it is accepted that the hypothesis of no significant difference can be made.

4.3.5.2. Age

The p-value is 0.600 and is greater than 0.05; hence, age does not have a statistically significant effect on the dependent variable. Thus, the hypothesis of no significant age differences is accepted. The p-value of academic qualification is 0.028, which is less than <0.05, which is statistically significant, suggesting that there is a statistically significant difference. Therefore, the hypothesis that there are no significant differences in academic qualifications is rejected. The value p for years of experience is 0.000, indicating an effect on the development of professionals in the company. As such, the hypothesis of no significant difference by experience is rejected. The p-value for job title is highly significant (p-value = 0.000), indicating that job title significantly affects professional development. Thus, researchers are now ready to reject the hypothesis that there is no significant difference in ICL tokens by job title. School Type has a p-value of 0.000, indicating that school type is a significant predictor of the dependent variable. Thus, the hypothesis that there are no significant differences in the number of reading assignments across school types is rejected.

4.3.6. Discussion

4.3.6.1. Gender and Technological Leadership

The first hypothesis (H1) states that there is no statistically significant difference in the impact of secondary school principals' leadership on technological change by gender. In the regression analysis, the p-value for gender is 0.070, which is greater than 0.05; therefore, the gender hypothesis can be accepted. In line with these studies, Raman and Thannimalai [2] also indicated that gender did not have a significant effect on technology leadership and professional development. While gender is an important element across various aspects of social life, its significance in leadership in technology might be comparatively smaller, especially in areas where both male and female principals are expected to embrace related professional practices and competencies in change management. Rodriguez [31] also found no significant gender effect on digital integration, further supporting the idea that digital leadership primarily depends on a person's capabilities, irrespective of gender.

4.3.6.2. Age and Technological Leadership

Accordingly, Hypothesis H2 asserts that age does not influence the effects of technological leadership on professional development. Furthermore, the p-value for age is 0.600, which is greater than 0.05 (the threshold), and therefore this hypothesis is accepted. This result aligns with those of Jensen [27] and Sterrett and Richardson [34], who found that age has little or no effect on professional development for school leaders. Specifically, Jensen [27] stated that age alone is not the criterion; rather, school leaders will be more professionally developed if they learn continuously and adapt to changes. Kincaid and Feldner [32] noted that principals of both older and younger ages demonstrated similar abilities to integrate technology, with competence decreasing with age.

4.3.6.3. Academic Qualification and Technological Leadership

The opposite of the first two hypotheses, H3 hypothesises that technological change leadership does not lead to a significantly different impact across academic qualifications. The academic qualification variable has a p-value of 0.028, which is lower than the critical value of 0.05, so the Null Hypothesis is rejected, as it is evident that academic qualification significantly influences professional development in this case. In line with these arguments, Krasnova and Shurygin [19] reported that higher academic qualifications can lead to more effective ways of integrating technology into instruction. According to their study, academic qualifications played a significant role in how teachers used digital tools to enhance learning, suggesting that academically qualified leaders are more likely to drive positive technological change. Likewise, Tolwinska [3] found that academic qualifications affect the principal's leadership style in schools with integrated technological advancement.

4.3.6.4. Years of Experience and Technological Leadership

Hypothesis H4 states that there are no statistically significant differences attributable to years of experience in the relationship between technological leadership and professional development. The p-value for years of experience is 0.000, which is highly significant and therefore leads to rejecting the null hypothesis. In other words, years of experience do matter in the role of principals leading technological change. Additionally, Rodriguez [31] study draws similarities to this, indicating that experience became a major contributing factor in how principals helped teachers embrace new technologies. Likewise, Kincaid and Feldner [32] found that principals with more years of experience had stronger mentorship skills and were more effective at promoting technology in classrooms. This implies that skills and understanding for managing technological change in schools are acquired through experience.

4.3.6.5. Job Title and Technological Leadership

Specifically, hypothesis H5 proposes that researchers observe statistically significant differences in the impact of technological leadership across job titles. The p-value for job title is 0.0, indicating a statistically significant effect; therefore, the null hypothesis is rejected. It supports the result, as studies by Karacabey [22] and Stewart [29] found that principals' job titles indicate the extent of their influence in leading the school toward technological change. It is found that principals with superlative titles, such as headmaster or senior administrator, have greater resources, authority, and responsibility to effectively implement technological innovations. The extent to which job title plays a significant role in the relationship between technological leadership may be derived from the different degrees of autonomy and leadership power held by principals at varying levels of school administration and, as such, from how they can run professional development initiatives.

4.3.6.6. School Type and Technological Leadership

The last hypothesis, H6, is that there is no statistical difference in the influence of technological leadership on professional development across school types. The school type variable has a p-value of 0.000, which is significant; hence, researchers reject the null hypothesis. Our result is consistent with earlier studies, such as Raman and Thannimalai [2], which found that a type of school (e.g., public, private, urban, or rural) can lead a principal to implement technological change differently. Additionally, Prokopiadou [6] observed that the success in facilitating technological innovations varied across school types and was also determined by administrative practices regarding resource availability and access to technology. The principals in the well-resourced schools had the opportunity to use their positions to drive more holistic professional development programmes that led to better outcomes for teachers in incorporating technology.

5. Conclusion and Recommendations

5.1. Conclusion

This study aimed to explore the role of principals in leading technological change and instigating educators' professional development in secondary schools in East Jerusalem. These results indicated that, as far as leadership effectiveness is concerned, it varies across variables, although some demographic and professional factors predict this effectiveness in technological change. The analysis revealed that gender and age did not have a statistically significant impact on technological leadership and professional development, indicating that these factors do not strongly influence or drive change in the education sector compared to other variables such as academic qualifications, experience, job title, and school type. On the other hand, factors such as academic qualifications, years of experience, job title, and school type significantly influenced principals' success in leading technology change. Findings also suggest that principals with higher academic qualifications, more experience, authoritative job titles, and those working in a particular school type (e.g., well-resourced or private) had the preparatory resources to implement technological change and to successfully manage it to lead professional development. Regarding educational leadership in the context of technological change, it is concluded that providing such leadership requires a blend of professional and contextual capabilities. The presence of principals is vital for integrating technology and developing professionalism, both of which are essential to school growth and improvement.

5.2. Recommendations

Based on the findings, a few recommendations can be made to improve principals' leadership of technological change and the training of professionals. Since academic qualifications and years of experience play a major role in leading technological change, principals are advised to undertake continuous professional development programs. In addition to leadership development, these programs should also aim to foster familiarity with education technologies and industries, as well as change management strategies. Targeted Teacher Support: Principals should focus on specific teacher support to guarantee the successful implementation of the technological change. Professional development initiatives should address the specific needs of teachers based on their experience and familiarity with technology. Support tailored to overcome problems with resistance to change and establish a positive attitude towards using technology. The study found that job title and school type affect leadership effectiveness. Therefore, to leverage these factors, school boards and educational authorities should encourage principals who demonstrate leadership skills and a commitment to continuing learning. Furthermore, a school can foster an innovative, change-leadership culture that would benefit the entire school community.

5.3. Directions for Future Research

The scope of this study provides a useful foundation for understanding the role of principals in leading technological change in the schools of East Jerusalem. Nevertheless, these studies could be further elaborated in several ways. Future research may investigate longitudinal studies to study the long-term impact of principals' leadership in technological change on professional

development and students' outcomes. Presenting this data in line graphs would give a clearer picture of how these factors can evolve and leave a lasting imprint on educational practices. Given East Jerusalem's distinct political and cultural setting, it would be interesting to examine how cultural factors shape technology in the context of principals' leadership. The research could explore how cultural attitudes to technology and to change management influence the uptake of new practices in schools.

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