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Evaluating Technical Education in Palestinian Universities Through the Lens of Total Quality Management

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Abstract. This study evaluates the role of technical education in Palestinian universities using a Total Quality Management (TQM) framework, with particular attention to implementation challenges. Recognizing the strategic importance of technical education to national development and labor market alignment, the research explores faculty perceptions regarding its value and the systemic barriers affecting its effectiveness. Data were collected through a structured questionnaire administered to a stratified random sample of academic staff from Qalandiya Training College, Women's Community College – Al-Tira, and Palestine Technical University – Kadoorie. Out of an intended sample of 110 participants, 84 faculty members responded from a broader population of 1,440 across 18 technical and vocational institutions in the West Bank. The results indicate strong faculty consensus on the significance of technical education, alongside notable concerns regarding infrastructure, institutional support, and the implementation of TQM principles. These insights contribute to policy and curriculum reform efforts aimed at enhancing educational quality and promoting sustainable development in conflict-affected educational systems.

Keywords: Technical Education; Total Quality Management; Higher Education; Palestine

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1. Introduction

1.1 Background and Context

The last two decades have witnessed a global transformation in higher education, marked by a shift toward learner-centered, competency-based models, driven by rapid digitalization and market-oriented reforms. In this evolving educational landscape, technical and vocational education and training (TVET) has emerged as a critical pillar for equipping graduates with skills aligned to labor market needs, particularly in structurally disadvantaged and conflict-affected economies (UNESCO, 2023; García-Peñalvo et al., 2022). Countries that have institutionalized robust TVET systems report higher youth employability and economic resilience. However, in Palestine a context marked by protracted occupation, constrained sovereignty, and institutional fragility technical education continues to face deep structural and cultural challenges.

The Palestinian higher education sector, particularly its technical branches, is characterized by limited financial resources, outdated infrastructure, and high graduate unemployment. Despite a rising number of graduates, there is a persistent skills mismatch, reflecting a misalignment between academic training and the realities of the labor market (El Talla et al., 2018; Obied & Hijazi, 2024). Further compounding this issue is the societal devaluation of technical education, often regarded as inferior to traditional academic tracks.

1.2 Research Problem

The current Palestinian educational environment reveals an urgent need for reform that is both systemic and responsive to the dual pressures of political instability and economic stagnation. Ongoing occupation and geopolitical volatility exacerbate institutional dysfunction and public disillusionment with higher education outcomes (Al-Hroub, 2023). Within this context, technical education has the potential to serve as a viable response to workforce demands and development challenges, yet it remains marginalized due to curriculum obsolescence, weak governance, and limited industry partnerships.

Total Quality Management (TQM) has gained international recognition as a framework capable of enhancing educational effectiveness, institutional accountability, and stakeholder satisfaction. However, in Palestine, the adoption of TQM remains fragmented, with minimal integration into technical education policies and practices. The lack of context-adapted quality assurance systems undermines institutional responsiveness to both internal inefficiencies and external socioeconomic demands (Jiang, 2024; Al-Zoubi et al., 2020).

1.3 Research Gap and Rationale

Contemporary scholarship on TQM in higher education has primarily focused on well-resourced, politically stable systems in the Global North (Garcia et al., 2024; Tarisayi, 2024). There is limited empirical research exploring how TQM can be localized and effectively operationalized in fragile, resource-limited environments like Palestine. This oversight is significant given the rising demand for quality-driven, equitable education models that respond to the unique structural and contextual challenges in conflict-affected regions.

Accordingly, this study fills a critical gap by investigating faculty perceptions of the importance of technical education and the barriers to implementing TQM within Palestinian universities. By examining these perspectives, the study seeks to inform the design of context-sensitive quality assurance strategies that align educational delivery with national development goals and labor market needs. In doing so, it contributes to both the theoretical literature on TQM adaptation in fragile contexts and the practical discourse on institutional reform in Palestinian technical education.

1.4 Research Objectives

This study aims to:

1. Investigate faculty perceptions regarding the importance of technical education in Palestine.

2. Identify critical institutional and contextual challenges hindering the implementation of Total Quality Management (TQM) within technical education programs.

3. Examine how demographic variables gender, academic qualification, and professional experience influence faculty perceptions of technical education and TQM-related challenges.

4. Propose evidence-based policy and institutional strategies to enhance the quality and relevance of technical education in Palestine through the application of TQM frameworks.

1.5 Research Questions

This study was guided by the following research questions:

1. How do faculty members perceive the significance and effectiveness of technical education in Palestinian universities?

2. What are the major institutional and systemic challenges limiting the effective implementation of Total Quality Management (TQM) in technical education institutions?

3. What key barriers are perceived by faculty members regarding the delivery and development of technical education in Palestinian universities?

4. To what extent are faculty perceptions of technical education and TQM-related challenges influenced by demographic factors such as gender, academic qualification, and years of experience?

1.6 Research Hypotheses

The following null hypotheses were formulated for empirical testing at the 0.05 significance level:

H_{01}: There are no statistically significant differences in faculty perceptions regarding the importance of technical education and TQM-related challenges based on gender.

H_{02}: There are no statistically significant differences in faculty perceptions regarding the importance of technical education and TQM-related challenges based on years of professional experience.

H_{03}: There are no statistically significant differences in faculty perceptions regarding the importance of technical education and TQM-related challenges based on academic qualification.

1.7 Significance of the Study

1.7.1 Theoretical Significance

This study contributes to the limited body of literature on the implementation of Total Quality Management (TQM) in higher education systems operating within fragile, resource-constrained, and conflict-affected environments. By contextualizing TQM within Palestinian technical education institutions, the research advances theoretical understanding of how systemic reforms can be localized and adapted for institutional resilience, particularly in post-colonial and unstable settings.

1.7.2 Practical Significance

Practically, the study provides policymakers, curriculum designers, and institutional leaders with data-driven insights to improve the structure, relevance, and delivery of technical education in Palestine. By documenting faculty experiences and highlighting perceptions of both strengths and systemic barriers, the study supports reform initiatives that bridge the gap between educational provision and labor market demands. Moreover, it contributes to Sustainable Development Goal 4 (Quality Education) by promoting inclusive, equitable, and skill-oriented education conducive to lifelong learning and economic empowerment in a fragile national context.

2. Literature Review

2.1 Technical Education and Labor Market Alignment

In recent years, the strategic alignment of technical education with labor market demands has become a focal point in global educational reform agendas, especially in developing and post-conflict settings. For example, Al-Shahrani and Al-Shahrani (2022) examined Saudi Arabia's Vision 2030 and noted a positive institutional shift toward technical education reform. Despite this momentum, they identified challenges such as inadequate faculty training and heterogeneous institutional readiness. Notably, the early-career faculty reported greater difficulty implementing reform-aligned practices.

Similarly, El Talla et al. (2018) investigated technical education in Gaza and documented faculty consensus on institutional weaknesses, graduate skill mismatches, and limited employer linkages. However, their analysis was largely descriptive, lacking cross-regional comparative insight, particularly in relation to the distinct administrative and political environment of the West Bank.

Recent studies extend this dialogue. For instance, Chinomona and Maziriri (2021) found that in Zimbabwe, technical graduates faced barriers to employment due

to outdated curricula and weak public-private collaboration an issue mirrored in Palestine's economic stagnation. Likewise, Olaniran et al. (2023) highlighted structural misalignments in Nigerian technical colleges, calling for labor market-responsive curriculum reforms. These parallels reinforce the urgency of reform in Palestine, where similar structural gaps persist amid sociopolitical fragility.

Khasawneh and Abu Karaki (2022) examined TVET in Jordan and emphasized that graduate employability improved significantly when industry-aligned curriculum design and performance-based assessment systems were implemented. This regional proximity offers valuable insights, underscoring the feasibility of reforms in similarly constrained environments. Nevertheless, few of these studies capture the faculty's evaluative role a critical gap addressed by the present study.

2.2 Total Quality Management in Higher Education

Total Quality Management (TQM) is increasingly positioned as a strategic framework for improving institutional performance and stakeholder satisfaction in higher education. In Gaza, Msallam et al. (2020) reported gender-based variations in TQM engagement, with male faculty showing greater familiarity with TQM principles. In contrast, Nazzal & Ahmed (2024) identified procedural misalignments and stressed the role of multi-stakeholder collaboration in ensuring effective quality outcomes.

More recently, García et al. (2024) emphasized that TQM enhances institutional responsiveness and accountability, particularly when aligned with Sustainable Development Goal 4. Their findings, however, focus primarily on policy-driven systems in Latin America and do not account for the political constraints in conflict-affected contexts. Jiang (2024) conducted a cross-regional analysis and recommended that TQM frameworks be adapted for low-resource environments through simplified quality indicators, decentralized leadership, and continuous capacity-building elements directly relevant to Palestinian universities.

Additional work by Woldemariam and Habtu (2022) in Ethiopia underscores that TQM's effectiveness in fragile systems depends heavily on localized adaptation, participatory planning, and faculty ownership. These findings reinforce the study's rationale to investigate how Palestinian faculty, operating under institutional stress, perceive the practicality of TQM. While the theoretical foundation of TQM is robust, empirical research on its implementation in Palestine's technical higher education remains sparse.

2.3 Gender Dynamics in Technical and Vocational Education

Gender continues to be a critical lens in analyzing access and participation in technical education. Prieto et al. (2020) found negligible gender differences in ICT competencies among vocational educators, suggesting growing parity in digital engagement. In contrast, Tshabalala and Ncube (2014) reported that female faculty in rural Zimbabwe perceived higher levels of professional marginalization in TVET institutions.

In Palestine, Msallam et al. (2020) observed greater TQM participation among male faculty, while Nazzal & Ahmed (2024) linked perceptual differences to academic qualification possibly an indirect proxy for gendered educational pathways. Hashweh (2022) further highlights sociocultural norms in Palestine that deter female participation in technical education, citing familial expectations, limited geographic mobility, and institutional bias.

These inconsistencies underscore the importance of incorporating gender-sensitive lenses into TVET reform discourse. Faculty perceptions shaped by both structural barriers and cultural dynamics require further exploration to inform inclusive policy design.

2.4 Methodological Trends and Research Gaps

Most reviewed studies employed descriptive or cross-sectional methodologies using SPSS for analysis. While they offer valuable empirical insights, few engage with theory or provide longitudinal assessments. Moreover, TQM and technical education are often treated as discrete areas of inquiry, without examining the synergy between them from the perspective of faculty, the primary agents of institutional change.

While work from Gaza such as that by El Talla et al. (2018) and Msallam et al. (2020) offers important context, it lacks generalizability to the unique sociopolitical and economic structure of the West Bank. No comprehensive study to date has systematically examined faculty perceptions of TQM as a mechanism to address institutional challenges in technical education across Palestinian universities.

2.5 Synthesis and Contribution of the Present Study

This review reveals four primary gaps: (1) limited empirical investigation of TQM frameworks in fragile and resource-constrained higher education systems; (2) underrepresentation of gender-sensitive analyses in technical education; (3) insufficient attention to faculty perspectives as catalysts of institutional change; and (4) a lack of contextual research in the West Bank as distinct from Gaza.

The present study addresses these gaps by empirically analyzing how faculty members in Palestinian universities perceive the value of technical education and the challenges of applying TQM within that context. It extends the literature by localizing global quality management frameworks to a politically fragile setting and offering evidence-based guidance for institutional reform, thereby supporting policy alignment with SDG 4 goals.

3. Methodology

The researchers employed a quantitative descriptive methodology for the study. This design was chosen as it is particularly suitable for capturing faculty members' perceptions and attitudes, which aligns with the study's objective of evaluating the realities and challenges of technical education through the lens of Total Quality Management (TQM). Quantitative descriptive research allows for

systematic, objective collection and analysis of data that reflect prevailing practices and viewpoints within the targeted educational institutions.

3.1 Study Context and Population

Technical and vocational education in Palestine is primarily delivered through a network of specialized universities and colleges that aim to bridge the skills gap in local labor markets by providing practical, employment-oriented training. These institutions are either public or affiliated with community-based development organizations. The study population includes full-time faculty members working in all 18 accredited technical and vocational universities and colleges located in the West Bank governorates. According to the statistical directory of the Ministry of Higher Education, this population comprises 1,440 individuals.

3.2 Study Sample

A stratified random sampling method was used to ensure representation from different institutions and academic departments, thereby enhancing the generalizability of findings. Stratification was based on institutional affiliation and academic department to reflect proportional distribution across the technical education sector.

Although the intended sample size was 110 faculty members, only 84 completed questionnaires were returned. This shortfall resulted from logistical challenges during data collection, including overlapping exam periods and limited participant availability in some institutions. Nevertheless, the final sample retained sufficient diversity across demographic and institutional variables, as presented in Table 1. The study included only full-time faculty with a minimum of one year of experience. Part-time or adjunct faculty members were excluded due to their limited engagement in curriculum development and quality assurance processes.

Table 1: Description of the Study Sample According to Its Independent Variables

Variable	Classification	Frequency	Percentage (%)
Gender	Male	24	28.6
	Female	60	71.4
Educational Qualification	Diploma	9	10.7
	Bachelor's	37	44.0
	Master's	23	27.4
	PhD	15	17.9
Years of Experience	Less than 5 years	15	17.9
	5 to less than 10 years	21	25.0
	10 to less than 15 years	20	23.8
	15 years or more	28	33.3
Total		84	100%

3.3 Instrument Design

The researchers developed a structured questionnaire based on a comprehensive review of relevant literature on technical education and Total Quality Management, including foundational studies such as Uwaifo (2010) and Okoye &

Arimona (2016). The instrument comprised 31 items across three conceptual domains, each designed to probe specific dimensions of technical education and quality management. Items were formulated using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

Table 2: Distribution of Study Domains and the Number of Items

No.	Domains	Number of Items
1	Knowledge of the Importance of Technical Education in Palestinian Universities	6
2	Challenges of Implementing Total Quality Management in Palestinian Universities	16
3	Challenges of Implementing Technical Education in Palestinian Universities	9
Total		**31**

3.4 Instrument Validation

To ensure validity, the initial draft of 80 items was subjected to expert review by 25 specialists in technical and vocational education. Based on their feedback and subsequent exploratory factor analysis, 31 items were retained. The factor analysis followed standard statistical criteria, retaining items with factor loadings above 0.50.

The reliability of the scale was assessed using Cronbach's alpha, yielding a total reliability coefficient of 0.905, indicating excellent internal consistency. The Kaiser-Meyer-Olkin (KMO) value was 0.752, confirming the sample's adequacy for factor analysis. The retained 31 items explained 42.433% of the total variance across the three domains.

Table 3: Factor Validity of the Study Tool

Items	Components (Factors)	Variance	Item No.
Importance of Technical Education in Palestinian Universities:			
Technical education diversifies knowledge and information sources for faculty members.	0.667	6.478	q1
Technical education helps save time and effort.	0.626		q2
Technical education enhances participation in virtual discussions.	0.768		q3
Technical education provides educational opportunities for the less fortunate.	0.493		q4
Technical education strengthens partnerships between education and labor sectors.	0.448		q6
Technical education provides multiple skills for faculty members.	0.438		q8
Challenges of Implementing Total Quality Management in Palestinian Universities:			
Some academic leaders are not convinced of implementing TQM.	0.279	26.832	a1

There are no specific standards governing the implementation of TQM.	0.599		a7
Lack of clarity in strategies and policies for implementing TQM.	0.491		a9
Low relevance of educational programs to labor market needs.	0.451		a10
No organizational climate that encourages performance excellence.	0.477		a13
Few faculty members involved in technical education contribute to scientific research.	0.495		a14
Weak communication channels between university departments and administrations.	0.574		z1
Lack of material incentives.	0.529		z2
Lack of moral incentives.	0.553		z3
Limited professional development programs for faculty members.	0.664		z4
Absence of units for developing technical education curricula.	0.575		z5
Different bases used in formulating and preparing curricula.	0.706		z6
Mismatch between curricula and available materials.	0.535		z7
Structural strategy for vocational and technical education in Palestine.	0.652		z8
Weak relationship between universities and the labor market.	0.683		z9
Lack of updates related to labor market needs.	0.477		q5
Challenges of Implementing Technical Education in Palestinian Universities:			
Weak infrastructure supports technical education.	0.501	9.123	a2
Weak financial capacity of technical education institutions in Palestine.	0.408		a3
Failure to integrate students with special needs into technical education.	0.681		a4
Students' inability to reach technical education institutions due to the occupation.	0.698		a5
Economic problems faced by some students' families in technical education.	0.463		a6
Difficulty securing local job opportunities for some technical education students.	0.586		a11
Weak career counseling and guidance services for technical education students.	0.473		a12
Lack of training experts for modern technical specialties at the university.	0.539		a15
Disparity in student enrollment across various technical education specialties.	0.635		a16
Total		**42.433**	

3.5 Reliability of the Tool

The reliability of each domain was examined using Cronbach's Alpha, as summarized in Table 4. All values exceeded the accepted threshold of 0.70, confirming satisfactory internal consistency.

Table 4: Cronbach's Alpha Reliability Coefficients

Domain	Cronbach's Alpha (α)
Domain 1: Knowledge of the Importance of Technical Education in Palestinian Universities	0.733
Domain 2: Challenges of Implementing Total Quality Management in Palestinian Universities	0.877
Domain 3: Challenges of Implementing Technical Education in Palestinian Universities	0.823
Total	0.905

3.6 Ethical Considerations

Ethical approval for the study was obtained from the institutional review board of the principal researcher's home institution. Participation was voluntary, and informed consent was obtained electronically from all respondents. No personal identifiers were collected, and data confidentiality was strictly maintained.

3.7 Statistical Analysis

Data was analyzed using SPSS software. Descriptive statistics (frequencies, percentages, means, and standard deviations) were computed to summarize the sample characteristics and item responses. Inferential statistics included independent-samples t-tests for gender-based comparisons and one-way ANOVA for analyzing differences across educational qualifications and years of experience. The Least Significant Difference (LSD) test was employed post-ANOVA to determine specific group differences. These tests were selected to appropriately assess mean differences across categorical variables. The significance level was set at $p < 0.05$.

4. Results and Discussion

First Research Question: What is the degree of importance of technical education in Palestinian universities and its challenges in light of Total Quality Management?

To address this research question, the researchers computed arithmetic means and standard deviations for the responses provided across each of the study's three domains. Table 5 presents the aggregated results for all domains.

Table 5: Arithmetic Means, Standard Deviations, and Response Levels for the Domains and Overall, Domain

No.	Domain	Arithmetic Mean	Standard Deviation	Response Level
1	Domain 1: Importance of Technical Education in Palestinian Universities	4.24	0.374	High
2	Domain 2: Challenges of Implementing Total Quality Management in Palestinian Universities	4.15	0.372	High
3	Domain 3: Challenges of Implementing Technical Education in Palestinian Universities	4.24	0.383	High
Total		4.19	0.309	High

As shown in Table 5, the overall domain average was 4.19, which falls within the 'High' category on the 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), indicating strong consensus among respondents regarding the significance and challenges associated with technical education in Palestine.

Notably, both the domain of "Importance of Technical Education" and "Challenges of Implementing Technical Education" recorded the highest mean score of 4.24, underscoring faculty members' strong agreement with the importance of these aspects. In contrast, the "Challenges of Implementing Total Quality Management (TQM)" scored slightly lower at 4.15, albeit still within the high level of agreement, suggesting relatively more variability or uncertainty in respondents' perceptions of TQM-related issues. This differential may stem from institutional limitations in policy integration, leadership engagement, or resource allocation when it comes to quality management implementation.

Table 6: Arithmetic Means and Standard Deviations of the Study Sample Responses in Domain 1: Importance of Technical Education in Palestinian Universities

No.	Item	Arithmetic Mean	Standard Deviation	Response Level
1	Technical education diversifies sources of knowledge and information for faculty members.	4.27	0.522	High
2	Technical education contributes to saving time and effort.	4.34	0.526	Very High
3	Technical education enhances participation in virtual discussion forums.	4.19	0.548	High
4	Technical education provides learning opportunities for the less fortunate.	4.23	0.651	High

5	Technical education strengthens partnerships between the education and labor sectors.	4.20	0.596	High
6	Technical education provides multiple skills for faculty members.	4.20	0.576	High
Overall	Knowledge of the Importance of Technical Education in Palestinian Universities	4.27	0.374	High

According to Table 6, the highest-rated item was Item 2 ("technical education contributes to saving time and effort") with a mean score of 4.34, categorized as "Very High." This finding reflects the recognized efficiency and practicality of technical education programs, which often involve shorter durations and skill-based outcomes. Such programs offer alternative pathways for learners aiming to rapidly integrate into the labor market an essential consideration in the Palestinian context where socioeconomic constraints often necessitate faster educational turnarounds.

The lowest-rated item within this domain was Item 3 ("technical education enhances participation in virtual discussion forums") with a mean of 4.19, though still categorized as "High." This relatively lower score could be attributed to the inherently practical nature of technical education, which prioritizes physical engagement and hands-on learning over digital interaction. This finding is consistent with Tshabalala and Ncube (2014), who emphasized that virtual platforms often fail to replicate the experiential learning environment required in technical education.

Overall, the mean for Domain 1 was 4.27, demonstrating a consistent and strong endorsement of technical education's relevance. These results align with the findings of Msallam et al. (2020), who argued that technical education is vital for national development strategies, especially in contexts with labor market saturation and limited academic employment opportunities. Similarly, Nazzal & Ahmed (2024) emphasized the developmental role of technical education in fostering national self-sufficiency.

Table 7: Arithmetic Means and Standard Deviations of the Study Sample Responses in Domain 2: Challenges of Implementing Total Quality Management in Palestinian Universities

No.	Item	Arithmetic Mean	Standard Deviation	Response Level
1	Some academic leaders' reluctance to implement Total Quality Management (TQM).	3.89	0.658	High
2	Lack of specific criteria governing the implementation of Total Quality Management.	3.97	0.658	High
3	Ambiguity of strategies and policies for implementing Total Quality Management.	3.96	0.629	High

4	Low relevance of educational programs to labor market needs.	4.15	0.603	High
5	Lack of an organizational climate that encourages performance excellence.	4.25	0.556	High
6	Low contribution of faculty members engaged in technical education to scientific research.	4.11	0.609	High
7	Weak communication channels between university departments and administrations.	4.07	0.672	High
8	Insufficient financial incentives.	4.50	0.526	Very High
9	Insufficient non-financial incentives.	4.52	0.569	Very High
10	Limited professional development programs for faculty members.	4.21	0.622	High
11	Absence of units dedicated to the development of technical education curricula.	4.13	0.616	High
12	Differences in the foundations used in the formulation and preparation of curricula.	4.11	0.665	High
13	Incompatibility between curricula and available materials.	4.15	0.702	High
14	Structural issues in the strategy for vocational and technical education and training in Palestine.	4.02	0.676	High
15	Weak relationship between universities and the labor market.	4.21	0.641	High
16	Lack of updates related to labor market needs.	4.19	0.590	High
Overall	Challenges of Implementing Total Quality Management in Palestinian Universities	4.15	0.372	High

As shown in Table 7, the item receiving the highest rating was Item 9 ("insufficient non-financial incentives") with a mean of 4.52, categorized as "Very High." This suggests a notable concern among faculty regarding the lack of moral or psychological reinforcement in the workplace. The slightly lower but still high rating for Item 8 ("insufficient financial incentives") further reinforces the conclusion that both monetary and non-monetary motivational structures are lacking in Palestinian technical institutions. The prominence of non-financial concerns may indicate that recognition, professional respect, and collegial support are perceived as equally, if not more, critical than financial rewards. These findings corroborate Al-Shahrani and Shahbazi's (2022) assertion that non-financial motivators are essential in fostering organizational commitment, particularly in developing educational sectors.

Item 1 ("some academic leaders' reluctance to implement TQM") received the lowest mean score (3.89), though still within the "High" range. This suggests that respondents may not place primary responsibility on leadership for TQM's challenges. Instead, the broader institutional ecosystem comprising resources, policies, and collaborative involvement is perceived as central. This interpretation supports Prieto et al. (2020), who emphasize that TQM success depends on the collective efforts of all stakeholders, rather than unilateral decision-making from leadership.

The domain average of 4.15 reinforces the notion that faculty perceive considerable barriers to TQM implementation, even while recognizing its importance. Compared to other domains, its relatively lower score might reflect limited institutional familiarity with TQM principles, fragmented governance, or resource constraints. This is consistent with Tshabalala and Ncube (2014), who observed that lack of training and policy alignment often hinder the adoption of quality frameworks in higher education.

Table 8: Arithmetic Means and Standard Deviations of the Study Sample Responses in Domain 3: Challenges of Implementing Technical Education in Palestinian Universities

No.	Item	Arithmetic Mean	Standard Deviation	Response Level
1	Weak infrastructure supports technical education.	4.35	0.551	Very High
2	Weak financial capacity of technical education institutions in Palestine.	4.36	0.613	Very High
3	Failure to integrate individuals with disabilities into technical education.	4.02	0.693	High
4	Inaccessibility for students to technical education institutions due to occupation.	4.23	0.551	High
5	Economic challenges faced by some students' families in technical education.	4.33	0.587	High
6	Difficulty in securing some technical education students in the local labor market.	4.30	0.600	High
7	Weak career guidance and counseling services for technical education students.	4.10	0.581	High
8	Lack of training experts for modern technical specialties at the university.	4.25	0.637	High
9	Variation in student enrollment across technical specialties.	4.22	0.522	High
Overall	Challenges of Implementing Technical Education in Palestinian Universities	4.24	0.383	High

According to Table 8, Item 2 ("weak financial capacity of technical education institutions") ranked first with a "Very High" score of 4.36. This reflects widespread concern over underfunding, particularly in institutions that rely heavily on tuition fees and external donations with minimal government support. The implication is that without robust and sustainable funding mechanisms, the expansion and modernization of technical education will remain severely limited.

This finding echoes the conclusions of Sulastri et al. (2022), who noted that financial fragility is a primary impediment to educational reform in the region. Item 3 ("failure to integrate individuals with disabilities") received the lowest mean score (4.10), albeit still within the "High" category. This outcome may reflect partial efforts toward inclusion, perhaps supported by community-based acceptance, cultural norms, and pilot-level initiatives. However, the relatively lower rating underscores the absence of systemic legislative mandates and dedicated resources for inclusive education. As Prieto et al. (2020) argue, successful inclusion in technical education necessitates structural accommodation and staff preparedness elements that appear to be underdeveloped in the current context.

The overall domain mean of 4.24 demonstrates a high level of agreement regarding the existence and severity of challenges impeding the delivery of technical education in Palestine. Together with the findings from Domain 2, this suggests a confluence of systemic, structural, and financial barriers that require coordinated institutional and policy-level responses.

Table 9: Results of the Independent Samples t-test Based on the Gender Variable

Domain	Gender	N	Mean	Degrees of Freedom	t-Calculated Value	Significance Level
Importance of Knowledge about Technical Education in Palestinian Universities	Male	24	4.22	82	0.306	0.761
	Female	60	4.25			
Challenges of Implementing Quality Management in Palestinian Universities	Male	24	4.18	82	0.403	0.688
	Female	60	4.14			
Challenges of Implementing Technical Education in Palestinian Universities	Male	24	4.17	82	1.041	0.301
	Female	60	4.27			
Overall, Domain	Male	24	4.18	82	0.193	0.848
	Female	60	4.20			

Statistically significant at the level (0.05)

As shown in Table 9, no statistically significant differences were found between male and female faculty members in their perceptions across all three domains. The overall domain mean for males was 4.18, and for females, 4.20, with a p-value of 0.848 far above the 0.05 significance threshold. Similarly, the domain-specific differences were negligible and statistically insignificant (p-values ranging from 0.301 to 0.761).

These results indicate that gender is not a determining factor in shaping perceptions of the importance of technical education or the challenges associated with its implementation and with TQM in Palestinian universities. This finding stands in contrast to Msallam et al. (2020), who reported gender-based differences favoring males, and Tshabalala and Ncube (2014), who found higher sensitivity among female respondents. However, it supports the findings of Prieto et al. (2020), who concluded that gender did not play a statistically significant role in shaping faculty perceptions regarding quality initiatives.

Interestingly, while the numerical mean values differ slightly, the overlap in standard deviations and the lack of statistical significance affirm the homogeneity of perspectives across gender. This may suggest that professional experiences within technical institutions tend to converge irrespective of gender, perhaps due to shared challenges, uniform institutional policies, and similar expectations.

Table 10: Arithmetic Means and Standard Deviations of the Importance of Technical Education in Palestinian Universities and Its Challenges in Light of Total Quality Management, Based on Academic Qualifications.

Domain	Academic Qualification	Number	Mean	Standard Deviation
Importance of Knowledge in Technical Education in Palestinian Universities	Diploma	9	4.37	0.397
	Bachelor's Degree	37	4.31	0.328
	Master's Degree	23	4.14	0.436
	Doctorate	15	4.13	0.334
Challenges of Implementing Total Quality Management in Palestinian Universities	Diploma	9	4.36	0.366
	Bachelor's Degree	37	4.03	0.404
	Master's Degree	23	4.24	0.265
	Doctorate	15	4.17	0.368
Challenges of Implementing Technical Education in Palestinian Universities	Diploma	9	4.45	0.424
	Bachelor's Degree	37	4.17	0.429
	Master's Degree	23	4.27	0.295
	Doctorate	15	4.24	0.336
Overall, Domain	Diploma	9	4.39	0.352
	Bachelor's Degree	37	4.13	0.347
	Master's Degree	23	4.23	0.220
	Doctorate	15	4.18	0.270

Table 11: Results of One-Way ANOVA Test Based on Academic Qualification Variable

Domain	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Value	Statistical Significance
Importance of Technical Education in Palestinian Universities	Between Groups	0.741	3	0.247	1.81	0.151
	Within Groups	10.893	80	0.136		
Challenges of Implementing Total Quality Management in Palestinian Universities	Between Groups	1.112	3	0.371	2.84	0.043*
	Within Groups	10.415	80	0.130		
Challenges of Implementing Technical Education in Palestinian Universities	Between Groups	0.610	3	0.203	1.40	0.247
	Within Groups	11.582	80	0.145		
Overall Domain	Between Groups	0.543	3	0.181	1.95	0.128
	Within Groups	7.429	80	0.093		

Significant at α = 0.05 level

There are no statistically significant differences stated in the null hypothesis at the The results presented in Tables 10 and 11 reveal no statistically significant differences at the α = 0.05 level in the overall domain or in Domains 1 and 3, as indicated by p-values of 0.151 and 0.247, respectively. However, a statistically significant difference was found in Domain 2 (Challenges of Implementing TQM), where the p-value was 0.043, indicating a meaningful variation in perception among academic qualification groups.

The highest awareness in this domain was observed among bachelor's degree holders (mean = 4.03), compared to their counterparts at the master's and doctoral levels. This suggests that faculty members with bachelor's degrees may be more attuned to practical, operational challenges in quality implementation possibly due to their direct engagement with hands-on instruction in vocational settings, especially in institutions such as UNRWA-affiliated technical colleges. This experiential grounding may enhance their sensitivity to gaps in quality frameworks, particularly when these frameworks lack coherence, support, or relevance to local industry demands.

Conversely, the lack of significant differences in perceptions of the overall importance of technical education and its general challenges implies that these issues are experienced uniformly across qualification levels. This points to the prevalence and visibility of these challenges at the institutional level, where practical exposure and institutional culture may outweigh formal academic preparation in shaping perceptions. This interpretation aligns with the

conclusions of Msallam et al. (2020), Ahmady and Shahbazi (2022), and Al-Shahrani and Al-Shahrani (2022), all of whom reported no significant differences in perceptions based on academic qualification.

In contrast, Nazzal & Ahmed (2024) reported higher perceptual awareness among bachelor's degree holders, which partially aligns with the current study's findings in Domain 2. To further explore the nature and direction of these differences, post hoc comparisons using LSD tests were recommended and conducted in the next stage of analysis.

Table 12: Results of the LSD Test for Multiple Differences According to the Academic Qualification Variable in the Challenges of Implementing Total Quality Management in Palestinian Universities

Domain	Academic Qualification	Diploma	Bachelor's	Master's	Doctorate
Challenges of Implementing Total Quality Management in Palestinian Universities	Diploma	-	0.32920*	0.12077	0.18889
	Bachelor's	-0.32920*	-	-0.20843*	-0.14032*
	Master's	-0.12077	0.20843*	-	0.06812
	Doctorate	-0.18889	0.14032	-0.06812	-

Table 12 presents the post hoc results for the only domain where significant differences by academic qualification were found: Challenges of Implementing Total Quality Management. These results confirm statistically significant differences at $\alpha = 0.05$ between diploma holders and bachelor's degree holders in favor of the latter, and between bachelor's and master's degree holders in favor of master's degree holders. All other pairwise comparisons were not statistically significant.

This layered pattern may reflect a graduated understanding of quality management complexities. Diploma holders may lack the strategic exposure that bachelor's holders typically gain through curriculum design and classroom execution, especially in vocational institutions. Master's degree holders, on the other hand, may benefit from deeper theoretical knowledge and involvement in program-level evaluation, which sharpens their awareness of the structural and procedural challenges of TQM. These interpretations are supported by the context-specific nature of teaching in Palestine, where vocational teaching is closely tied to practical qualifications and institutional experience.

The observed differences substantiate the need to differentiate capacity-building strategies across faculty qualification levels. Bachelor's degree holders, often working at the instructional level, may require support in translating TQM principles into teaching practice. Master's degree holders may serve as quality champions due to their broader evaluative and programmatic insights.

Table 13: Means and Standard Deviations for the Importance of Technical Education in Palestinian Universities and Its Challenges in Light of Total Quality Management Attributed to Years of Experience

Domain	Years of Experience	Number	Mean	Standard Deviation
Importance of Knowledge in Technical Education in Palestinian Universities	Less than 5 years	15	4.24	0.382
	5 - Less than 10 years	21	4.24	0.352
	10 - Less than 15 years	20	4.33	0.401
	15 years and above	28	4.17	0.372
Challenges of Implementing Total Quality Management in Palestinian Universities	Less than 5 years	15	4.23	0.450
	5 - Less than 10 years	21	4.10	0.451
	10 - Less than 15 years	20	4.25	0.309
	15 years and above	28	4.08	0.290
Challenges of Implementing Technical Education in Palestinian Universities	Less than 5 years	15	4.30	0.433
	5 - Less than 10 years	21	4.24	0.429
	10 - Less than 15 years	20	4.30	0.324
	15 years and above	28	4.17	0.364
Overall, Domain	Less than 5 years	15	4.25	0.402
	5 - Less than 10 years	21	4.17	0.373
	10 - Less than 15 years	20	4.28	0.239
	15 years and above	28	4.12	0.232

Table 14: Results of the One-Way ANOVA Test According to the Variable of Years of Experience

Domain	Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F-value	Statistical Significance
Importance of Knowledge in Technical Education in Palestinian Universities	Between Groups	0.302	3	0.101	0.711	0.548
	Within Groups	11.332	80	0.142		
Challenges of Implementing Total Quality Management in Palestinian Universities	Between Groups	0.515	3	0.172	1.246	0.299

	Within Groups	11.013	80	0.138		
Challenges of Implementing Technical Education in Palestinian Universities	Between Groups	0.280	3	0.093	0.627	0.600
	Within Groups	11.912	80	0.149		
Overall Domain	Between Groups	0.370	3	0.123	1.298	0.281
	Within Groups	7.602	80	0.095		

As shown in Table 14, no statistically significant differences at the $\alpha = 0.05$ level were found in the faculty members' responses across the three domains or the overall score based on years of experience. This uniformity suggests that perceptions related to technical education and TQM implementation challenges are largely stable across professional experience levels. The absence of significant variation may be attributed to the widespread institutional exposure to shared constraints such as underfunding, policy fragmentation, or limited training resources irrespective of career stage.

Furthermore, the rapid evolution of educational technologies and increased access to professional development opportunities may have reduced experiential disparities among faculty. Junior faculty, through exposure to digital innovations and continuous learning platforms, may quickly acquire competencies comparable to their more seasoned peers. This explanation aligns with the findings of Msallam et al. (2020), who reported a similar lack of significant variation based on teaching experience.

In contrast, Al-Shahrani and Al-Shahrani (2022) identified perceptual differences in favor of faculty with less than five years of experience, suggesting that more recent entrants may exhibit heightened sensitivity to institutional inefficiencies or quality gaps. However, in the present study, this distinction was not observed, possibly due to the relative uniformity of challenges across the Palestinian technical education sector.

The analysis of faculty perceptions across the three domains importance of technical education, challenges in implementing Total Quality Management (TQM), and challenges in implementing technical education revealed several consistent and contextually grounded insights.
The following key findings emerged:

- Strong Consensus on Importance: Faculty members demonstrated a high level of agreement regarding the significance of technical education in Palestinian universities, with an overall domain mean of 4.27. The highest-rated items emphasized time efficiency and labor market alignment, underscoring the perceived practical value of technical education.

- TQM Challenges Identified: While still receiving a "high" rating, Domain 2 (TQM implementation) recorded the lowest domain mean (4.15),

indicating greater variability or uncertainty among respondents. The most critical issues included insufficient financial and non-financial incentives and a weak organizational climate highlighting systemic barriers to quality assurance practices.

- Infrastructure and Funding Gaps: Within Domain 3, faculty emphasized the weak financial capacity and infrastructure limitations of technical education institutions. These were rated highest in severity, suggesting that institutional constraints remain a fundamental obstacle to sustainable program delivery.

- No Gender-Based Differences: Results from the independent samples t-test revealed no statistically significant differences in perceptions across male and female faculty members, suggesting shared professional experiences and a uniform set of institutional challenges.

- Academic Qualification Matters for TQM: ANOVA and LSD post hoc tests showed significant differences based on academic qualification in Domain 2 only, with bachelor's and master's degree holders reporting greater awareness of TQM-related challenges. This likely reflects their direct instructional engagement and exposure to program-level implementation.

- Years of Experience Not a Differentiator: No significant perceptual differences were identified based on years of experience. This indicates that challenges are perceived similarly across faculty career stages, potentially due to the widespread and systemic nature of the issues being assessed.

Collectively, these findings reinforce the urgency of institutional reforms targeting quality assurance, incentive structures, and infrastructural development within technical education in Palestine. They also highlight the need for differentiated support strategies tailored to faculty qualifications, while acknowledging the sector-wide uniformity of challenges.

5. Conclusion

This study investigated faculty perceptions regarding the importance of technical education and the challenges associated with implementing Total Quality Management (TQM) in Palestinian universities. The research pursued four main objectives: to assess faculty views on technical education, to identify institutional and contextual barriers to TQM, to examine the influence of demographic factors on these perceptions, and to propose strategic recommendations for reform. The findings revealed a strong faculty consensus on the value of technical education, particularly in enhancing employability and reducing instructional inefficiencies.

Nevertheless, several structural challenges persist, including inadequate infrastructure, limited institutional readiness for TQM, and insufficient non-financial incentives for faculty. While gender was not a statistically significant

factor, bachelor's degree holders demonstrated greater awareness of TQM-related challenges, likely due to their practical involvement in technical institutions.

The implications of this research are both theoretical and practical. On a theoretical level, the study extends the literature on quality management in higher education by situating TQM within the uniquely fragile Palestinian context, marked by geopolitical instability and constrained institutional capacity. It demonstrates the necessity of adapting global quality assurance frameworks to local realities. Practically, the study offers clear guidance for institutional leaders and policymakers aiming to reform technical education. By linking faculty insights with systemic reform agendas, the study reinforces the importance of faculty engagement, market-aligned curricula, and improved incentive structures. In doing so, it aligns with Sustainable Development Goal 4 by promoting inclusive, equitable, and high-quality education.

Despite its contributions, the study has limitations. Its cross-sectional nature precludes longitudinal analysis of evolving faculty perspectives. Additionally, the sample was geographically confined to the West Bank, limiting the generalizability of findings to other regions like Gaza or East Jerusalem. Future studies should employ longitudinal or mixed-methods approaches to track institutional change over time and explore faculty perspectives across the broader Palestinian context. Moreover, targeted studies focusing on gender-specific experiences and the long-term impact of TQM training initiatives would deepen the field's understanding of effective reform pathways.

Based on the study’s findings, the following recommendations are proposed to guide reform efforts:
At the institutional level in the short term, faculty should be supported through structured TQM capacity-building programs, with a focus on practical applications within technical education settings. Institutions should also adopt inclusive policies that emphasize non-financial incentives, such as peer recognition, growth opportunities, and participatory governance. Communication channels between faculty and leadership must be strengthened to ensure that TQM implementation is both collaborative and context sensitive.

In the medium to long term, national authorities and higher education regulators should work toward developing a comprehensive quality assurance framework for technical education that is grounded in TQM principles and responsive to local constraints. Technical education curricula must be revised and regularly updated in consultation with labor market stakeholders to ensure relevance and employability. Furthermore, policies promoting gender inclusivity should be integrated into institutional strategies, addressing sociocultural barriers and providing dedicated support for female faculty and students in technical education.

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