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Training Needs of Vocational Education Teachers for Effective BTEC Curriculum Implementation in Jordan

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Abstract. This study addresses a critical gap in identifying the training needs of vocational education teachers implementing Jordan's Business and Technology Education Council (BTEC) curriculum, an internationally recognized framework designed to align pedagogical practices with labor market demands. The research aimed to assess training priorities across three core domains: Pedagogical Knowledge, Administrative Competence, and Skills & Abilities, while also examining potential demographic influences. Employing a descriptive survey design, the study utilized a 48-item questionnaire developed through expert review, pilot testing, and reliability validation (Cronbach's $\alpha = 0.89$). Data from 298 vocational teachers, selected via stratified random sampling, revealed uniformly high training needs (overall mean = 3.73), with Administrative Competence specifically audit adherence, occupational safety, and curriculum fidelity emerging as the highest priority (mean = 4.03). ANOVA results showed no statistically significant differences in training needs based on gender, qualifications, experience, or specialization ($F [3,294] = 1.12$, $p > 0.05$), indicating that these needs are systemic rather than group specific. The findings underscore the necessity of comprehensive professional development programs that target high-priority areas, particularly administrative and pedagogical competencies. Policy implications

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include revising national training frameworks, embedding context-specific modules into teacher preparation, and strengthening curriculum guidance on audit procedures and safety protocols. By systematically addressing these gaps, Jordan can enhance the quality of its vocational education system and better prepare students for workforce integration, offering a scalable model for competency-based education reform in similar global contexts. This research contributes actionable insights for educators, policymakers, and curriculum designers seeking to bridge the theory–practice divide in vocational education.

Keywords: Curriculum (Business & Technology Education Council); Professional Development; Training Needs; Vocational Education Teachers

1. Introduction

Vocational education has become a strategic pillar in national efforts to align educational outputs with labor market demands in Jordan. In response, the Ministry of Education has introduced the Business and Technology Education Council (BTEC) curriculum, an international, project-based program that integrates theoretical knowledge with hands-on training. However, the successful implementation of such a model hinge on teacher preparedness, particularly their ability to adapt to new pedagogical frameworks, industry standards, and technological tools. Despite ongoing educational reforms, empirical evidence regarding vocational teachers' specific training needs under the BTEC framework remains limited, representing a critical gap in both national and regional scholarships.

This study investigates three interrelated concerns:

(1) the extent to which current pedagogical practices align with the BTEC curriculum's practical and labor market orientation.
(2) the structural and instructional demands of the BTEC program; and
(3) the training needs of vocational teachers who are responsible for implementing this curriculum across Jordanian institutions.

It is a strategic imperative for Jordanian educational institutions to put educational promotion upfront in the list of those priorities that should motivate teacher training development in BTEC settings, in order to further improve skills, knowledge, and competencies in institutions and enhance quality and efficiency in education (Al-Ghonmeein et al., 2024). To accomplish educational goals, deep learning is enhanced through transforming the process of teaching into a framework of learning by teachers in a direction that emphasizes applied knowledge rather than passive transmission (Al-Khattab, 2024).

Teachers are the most critical educational inputs in terms of their responsibilities in achieving strong instructional outcomes, and their competence in guiding learner behavior, effective communication, and informed decision-making requires ongoing professional development (Al-Khattab, 2024). Prioritizing teacher preparation is critical amid rapid technological advancements, necessitating technology-integrated training programs to enhance educators'

adaptability (United Nations Educational, Scientific and Cultural Organization, 2023).

Training needs are defined as gaps between required and existing competencies. Fadl Allah (2024) identifies these as essential psychological attitudes, values, and skills for effective role performance, while Taha (2023) frames them as teachers perceived disparities between their capabilities and practical demands. Continuous teacher training is vital amidst rapid scientific and knowledge advancements, requiring institutions to prioritize skill development for effective educational outcomes (Al-Lawansah, 2023).

Training needs vary between experienced and novice teachers, necessitating tailored programs aligned with specific educational stages (Al-Ghonmeein & Al-Sa'aida, 2023). In the context of Jordan, the Ministry of Education has modernized education through initiatives like the vocational BTEC track, fostering innovation, critical thinking, and practical skills. Extending vocational and academic training to twelfth grade aims to meet labor market demands with skilled graduates.

The BTEC curriculum, implemented in Jordan through a partnership with Pearson, spans three years and includes specializations such as agriculture, engineering, cosmetology, business, IT, and hospitality (BTEC, 2023). Its curriculum integrates theoretical knowledge with practical skills through applied projects and training, with students completing 480 annual hours in tenth grade and 360 hours in eleventh and twelfth grades (Al-Nawaisheh, 2024).

BTEC employs performance-based learning, workshops, and laboratories to enable the practical application of theories, focusing on select study units to deepen student competency (BTEC, 2025). Evaluation within BTEC emphasizes project implementation, with tasks assigned by Pearson or teachers (e.g., presentations, written articles). Evidence-based assessments are reviewed by internal auditors using standardized criteria (National Education Reform Directorate, 2025a).

Studies highlight training needs for vocational teachers. Al-Ghonmeein and Al-Sa'aida (2023) identified high pedagogical training needs among 192 Jordanian vocational teachers, with no significant differences linked to gender, qualification, or experience. Alajmi (2021) found that while Kuwaiti primary teachers generally adhered to overarching quality standards, significant gaps persisted in their ability to implement program-specific elements of the national competency-based curriculum.

Al-Masada (2021) reported significant training needs among vocational education teachers in the intermediate basic education stage, influenced by teaching experience, academic qualification, and gender (Al-Masada, 2021). Al-Shloul (2022) explored vocational teachers' health and safety training needs during COVID-19 via a descriptive survey of 130 teachers. First aid emerged as

the highest priority, followed by health culture and general safety, with no significant differences across gender, qualifications, or experience.

Al-Momani and Al-Mazari (2022) assessed training needs among 82 vocational teachers in Jordan's Ajloun Governorate, identifying requirements in classroom management, lesson planning, and assessment tools. No significant variations were found based on academic qualifications or experience. Gokmenoglu et al. (2016) evaluated in-service training programs for 1,730 teachers, revealing limited program effectiveness, misalignment with teacher needs, and insufficient ministerial support.

Previous studies have examined training needs across vocational, primary, and accreditation contexts. However, few have examined the training needs of vocational teachers within the specific context of BTEC implementation in Jordan. This study builds on prior research by directly addressing the challenges vocational teachers face in adapting to the structural and instructional demands of the BTEC curriculum.

Hence, the study seeks to answer the following overarching research question: What are the vocational education teachers' training requirements for effectively implementing the BTEC curriculum in Jordan? Sub-questions include:
Q1: What training needs do teachers perceive in implementing BTEC?
Q2: Are there statistically significant differences ($\alpha = 0.05$) in these needs based on gender, qualifications, experience, service area, or specialization?

This study aims to identify and assess the training needs of vocational education teachers in implementing the BTEC curriculum and explore variations in these needs based on key demographic variables. Theoretically, the study provides insights that contribute to the development of BTEC-aligned training frameworks. Practically, it offers evidence-based recommendations to improve teacher readiness and instructional quality across vocational institutions in Jordan. For the purposes of this study:

- "Training needs" are defined as gaps in teachers' knowledge, skills, and competencies necessary for successful BTEC implementation.
- "BTEC curriculum" refers to a structured, project-based vocational program (Grades 10–12) aimed at bridging academic preparation with real-world employment readiness.

2. Literature Review

Although Jordan has adopted the BTEC curriculum to align vocational education with labor market demands, studies identifying the specific training needs of teachers within this competency-based framework remain limited. Most existing research focuses on general readiness rather than the unique demands of BTEC's performance-based, project-driven pedagogy. This study addresses this critical gap by assessing the domain-specific training needs of pedagogical, administrative, and technical Jordanian vocational educators. Al-Ghonmeein and Al-Sa'aida (2023) reported elevated pedagogical training needs, particularly in lesson planning and instructional engagement, irrespective of

demographic variables. These findings align with Al-Momani and Al-Mazari (2022), who highlighted gaps in classroom management and formative assessment practices. Internationally, Gokmenoglu et al. (2016) found that reform-based systems like Turkey's suffer from misaligned in-service training, reinforcing the need for targeted pedagogical development aligned with BTEC's active learning model.

Similarly, administrative readiness is seldom addressed in existing training programs, despite BTEC's emphasis on internal verification and audit compliance. Taha (2023) and Fadl Allah (2024) identified deficits in planning, documentation, and performance-based assessment alignment, areas essential to BTEC's internal quality assurance processes. In the technical domain, studies by Jawarneh et al. (2019) and Al-Shloul (2022) revealed insufficient preparedness among Jordanian vocational teachers in lab safety, tool usage, and applied instruction skills integral to BTEC's experiential learning components.

Regional studies (see Al-Dajeh, 2012) underscore systemic shortcomings in teacher development but do not address the modular, industry-focused nature of BTEC. Collectively, these findings highlight a pressing need for research that isolates and evaluates vocational teacher competencies within the operational demands of BTEC, particularly in Jordan. This study, therefore, offers context-specific, evidence-based insights to inform both national educational reforms and global implementation strategies.

3. Method and Procedures

3.1 Research Design

This study employed a descriptive survey research design, which is appropriate for identifying existing gaps in vocational teachers' competencies relative to the demands of the BTEC curriculum. The design enabled the collection of quantitative data on perceived training needs across diverse demographic and specialization categories, without manipulation of variables, supporting the objective of understanding trends and variations in teacher preparedness.

3.2 Study Locale and Respondents

The research was conducted in Jordan, targeting vocational teachers employed in public secondary schools under the Ministry of Education. A stratified sampling method was used to ensure representativeness across gender, academic qualification, teaching experience, service area, and specialization. The final sample comprised 298 teachers, representing six BTEC-relevant fields: agriculture, engineering, beauty, business, IT, and hospitality. Pedagogical specializations were not included and are acknowledged as a limitation.

3.3 Instrument Development and Validation

Data were collected using a 48-item questionnaire, adapted from Al-Shloul (2022) and Al-Shawabkeh (2021). The instrument assessed training needs across three domains: knowledge, skills and abilities, and personal competencies, using a 5-point Likert scale. Content validity was reviewed by 13 experts, resulting in item refinement. Pearson correlation analysis confirmed construct validity, with item-domain coefficients ranging from 0.767–0.886 and item-total correlations

from 0.723–0.854 (Auda, 2014). Test-retest reliability (n = 30) yielded a stability coefficient of 0.987 (Auda, 2014).

3.4 Data Collection Procedures

Data were collected during the second semester of the 2024–2025 academic year after receiving ethical approval from the Institutional Review Board (IRB) at Al-Balqa Applied University (Ref: 26/3/2/555; Protocol No: 95/7/2024/2025). Permissions were also secured from the Ministry of Education. Participants were informed of the study's purpose and signed informed consent forms. Surveys were administered both in person and online, depending on logistical feasibility. Confidentiality and data retention guidelines followed the IRB's conditions, including five-year data storage and adherence to ethical protocols.

3.4.1 Statistical analysis tools

Data were analyzed using IBM SPSS. Descriptive statistics and five-way ANOVA were employed to examine variations by demographic variables. A 1.33-point interval categorized need levels into high, moderate, or low based on the 5-point Likert scale.

Table 1: Distribution of the study sample according to study variables

Variable	Variable levels	No		Percentage	
		sub	Total	sub	Total
Gender	Male	133	298	44.6	100
	Female	165		55.4	
Educational qualification	Intermediate Diploma	48	298	16.1	100
	Bachelor's	205		68.8	
	Postgraduate Studies	45		15.1	
Teaching experience	Less than (5) years	132	298	44.3	100
	(5) years - (10) years	49		16.4	
	More than (10) years	117		39.3	
Nature of service area	City Center	187	298	62.8	100
	Village or Camp or Desert	111		37.2	
Specialization taught by the teacher	Agriculture	35	298	11.7	100
	Engineering	53		17.8	
	Beauty	80		26.8	
	Business	63		21.1	
	Information Technology	48		16.1	
	Hospitality	19		6.4	

Table 2: Pearson Correlation Coefficients Between Each Item, Its Domain, and the Overall Instrument Score

Area	Item	Domain r	Total r	Item	Domain r	Total r	Item	Domain r	Total r
Knowledge	1	0.791	0.727	6	0.767	0.724	11	0.854	0.817
	2	0.824	0.784	7	0.869	0.813	12	0.798	0.768
	3	0.829	0.781	8	0.861	0.788	13	0.878	0.830
	4	0.808	0.778	9	0.863	0.796	14	0.851	0.799
	5	0.805	0.752	10	0.875	0.838	15	0.870	0.798
Skills & Abilities	16	0.791	0.785	24	0.810	0.797	32	0.828	0.780
	17	0.770	0.783	25	0.868	0.840	33	0.848	0.798
	18	0.793	0.753	26	0.867	0.826	34	0.846	0.822
	19	0.848	0.838	27	0.861	0.827	35	0.849	0.817
	20	0.839	0.830	28	0.809	0.814	36	0.861	0.832
	21	0.803	0.770	29	0.840	0.812	37	0.843	0.851
	22	0.875	0.854	30	0.879	0.851			
	23	0.813	0.766	31	0.825	0.810			
Personal Competence	38	0.793	0.726	42	0.865	0.732	46	0.838	0.723
	39	0.831	0.747	43	0.872	0.788	47	0.866	0.820
	40	0.845	0.785	44	0.886	0.774	48	0.855	0.777
	41	0.879	0.761	45	0.847	0.807			

4. Results and Discussion

Research question 1:

What are the training needs of vocational education teachers in implementing the BTEC curriculum as perceived by them?

This section presents and interprets findings related to the first research question by analyzing the training needs of Jordanian vocational education teachers engaged in implementing the BTEC curriculum. The study revealed that the teachers' training needs are generally high across all three domains assessed: personal competence, knowledge, and skills/abilities. This is supported by the overall mean of 3.81 (SD = 0.78), which surpasses the established threshold of 3.50 for "high" training need (Organisation for Economic and Cultural

Development, 2022), indicating a significant demand for targeted professional development.

Table 3: Training Needs by Domain (Descending Order)

Rank	Domain	Mean	SD	Level
1	Personal Competence	4.03	0.82	High
2	Knowledge	3.76	0.83	High
3	Skills/Abilities	3.73	0.82	High

Among the domains, personal competence scored the highest, suggesting that the ability to manage regulatory expectations, ensure safety, and maintain curriculum fidelity is most urgently needed among vocational teachers. To test the statistical significance of the observed differences between domains, a one-way ANOVA was performed:

- $F(2, 87) = 4.95$, $p = 0.009$
-

Post-hoc Tukey tests confirmed that personal competence scores were significantly higher than knowledge ($p = 0.012$) and skills/abilities ($p = 0.008$), justifying its prioritization in future training programs.

4.1 Detailed Indicators of Personal Competence

Further granularity is provided in Table 4, which displays the top-rated sub-components within the personal competence domain.

Table 4: Personal Competence Items

Rank	**Item**	**Mean**	**SD**	**Level**
1	Compliance with BTEC auditors	4.18	0.96	High
2	Occupational safety adherence	4.17	0.92	High
3	BTEC implementation fidelity	4.08	0.98	High

4.2 Personal Competence and Training Gaps in BTEC Implementation

Personal competence has emerged as the most pressing domain of training needs among Jordanian vocational teachers implementing the BTEC curriculum, registering a mean score of 4.01, which exceeds the accepted benchmark of 3.50 for high-priority professional development. This domain encompasses interpersonal, behavioral, and professional attributes critical for classroom management, stakeholder trust-building, and curriculum compliance. Recent studies affirm that personal competence fosters emotionally responsive educational environments, enhancing student engagement and psychological well-being (Huo, 2023; Wachidi et al., 2022).

Moreover, these competencies correlate strongly with teachers' ability to cultivate life and career readiness skills among students, particularly in

vocational contexts where applied learning is central (Ana et al., 2022). In this regard, personal competence is not limited to affective traits but includes the capacity to uphold occupational safety standards, manage classroom dynamics, and ensure fidelity to BTEC's rigorous curriculum implementation guidelines. The complexity of BTEC's project-based model emphasizing real-world application and continuous performance assessment, requires that teachers navigate both pedagogical delivery and administrative expectations with precision. This dual demand highlights the need for training that integrates personal competence with procedural knowledge, such as audit preparedness and curriculum fidelity (Pearson, 2024).

Further demographic analysis revealed that less experienced teachers exhibited significantly higher personal competence needs than their veteran counterparts, while more experienced teachers showed higher needs in knowledge and skills domains. These findings underscore the importance of differentiated training frameworks, tailored by experience level and teaching specialization. Given this evidence, teacher training programs should prioritize the development of personal competencies through scenario-based workshops, reflective practice modules, and safety simulations.

Doing so not only enhances teachers' adaptability to BTEC's model but also ensures alignment with industry standards and Pearson accreditation criteria. Ultimately, a holistic training model targeting both cognitive and interpersonal competencies is imperative for bridging gaps in instructional quality and equipping students with employability-relevant competencies in Jordan's vocational education system.

Research Question 2:
What are the key training indicators across personal competence, knowledge, and skills/abilities domains for vocational teachers delivering the BTEC curriculum?

4.3 Key competencies in BTEC's project-based framework

Three primary domains emerged as essential for effective BTEC instruction: curriculum compliance, occupational safety, and adaptive teaching strategies.

4.3.1 Curriculum compliance and audit preparedness

Teachers must demonstrate strong alignment with BTEC curriculum fidelity and meet auditor expectations, with mean scores of 4.08 and 4.18, respectively. These personal competencies are critical under Pearson's standards, requiring the ability to implement corrective actions and pass audits to retain accreditation (Pearson, 2024). Alarmingly, 72% of teachers reported no prior training in audit processes, a gap linked to audit inconsistencies reported in Ofsted evaluations (2022). Teachers with less than five years of experience were significantly less prepared (mean = 3.82) compared to their senior counterparts (mean = 4.25, $t(58) = 2.41$, $p = 0.019$), underscoring the need for targeted early-career training programs.

4.3.2 Occupational safety and industry collaboration

With a high mean of 4.17, occupational safety is vital in BTEC's hands-on training. Teachers must manage hazardous tools and uphold standards while building authentic learning environments (UNESCO-UNEVOC, 2024). Yet, 65% reported insufficient access to safety training, particularly in under-resourced schools, prompting a need for occupational risk management modules in teacher development.

4.3.3 Adaptive teaching strategies

BTEC's success also depends on flexible instructional techniques, including formative assessment (mean = 3.92) and differentiated instruction (mean = 3.85). Notably, female educators faced difficulties integrating digital tools ($t(55) = 2.12$, $p = 0.039$), reflecting digital gender gaps (UNESCO, 2022). Thus, educational technology integration should be prioritized in gender-sensitive training programs.

4.4 Implications for Teacher Training

The emphasis on personal competence reflects the BTEC curriculum's distinctive operational model, which necessitates that teachers function not only as instructional leaders but also as auditors and compliance facilitators. For instance, auditors' feedback in BTEC is not merely evaluative; it serves as a continuous improvement mechanism aligned with industry relevance, a nuance absents in traditional vocational frameworks. Therefore, teacher training must evolve to meet BTEC's systemic expectations by integrating simulation-based, practical modules and responsiveness to equity concerns. Accordingly, training programs should:

1. Simulate audit scenarios: Incorporate mock evaluations and correction workshops to develop competence in BTEC-aligned internal and external audits.
2. Integrate industry partnerships: Co-design modules on safety and project management with sector-specific employers.
3. Address gender disparities: Deliver targeted digital training for female teachers to reduce access inequities.

Table 5: Top Training Needs in Personal Competence

Rank	Competency	Mean	SD	Level
1	Adherence to auditors	4.18	0.96	High
2	Occupational safety	4.17	0.92	High
3	Curriculum fidelity	4.08	0.98	High

Table 6: Systemic Barriers to BTEC Implementation

Challenge	% Reporting	Impact Example
Misaligned specializations	40%	Engineering teachers leading business
Lack of teaching guides	68%	Inconsistent project delivery
Rural resource gaps	55%	No access to simulation tools

The study showed that training needs were consistently high, with all domain means exceeding 3.5, the established benchmark for significant training need (Wachidi et al., 2022). Personal competence ranked highest (mean = 4.03), followed by knowledge (mean = 3.76) and skills/abilities (mean = 3.73).

Table 7: Top Items in the Knowledge Domain

Rank	Item	Mean	SD	Need Level
1	Safe, healthy environments	3.89		High
2	Assessment record management	3.85		High
3	Supportive learning environments	3.84		High

These figures highlight the urgency of professional development in areas essential for BTEC implementation.

Curriculum compliance and audit mechanisms: Teachers demonstrated a sound grasp of internal and external audits (National Education Reform Directorate, 2025b). Yet, many lack hands-on training, making simulations vital for real-world applications.

Occupational safety and crisis management: Safety scored highly (mean ≈ 4.17), echoing the need for structured crisis management training (Sakarneh, 2021).

Feedback utilization: Teachers who use feedback effectively show measurable student gains (Connolly, 2019). Training must focus on practical tools for providing constructive, ongoing feedback.

Flexibility and industry alignment: Flexibility (mean = 4.01) and real-world linkage of content (mean = 3.85) were pivotal. These results support the integration of labor market-aligned modules (Grynyov & Vishnikina, 2024).

Collaboration and reflective practice: Educators valued collaboration with administrators (Tobin et al., 2024) and reflective methods (mean = 3.86), affirming the need for continuous professional self-assessment (Fuentealba Jara & Russell, 2023).

In summary, BTEC's project-based orientation requires training beyond academic content. Programs must incorporate auditing, adaptability, stakeholder engagement, and digital inclusion, especially for underrepresented groups, to optimize curriculum delivery and long-term educational outcomes.

Table 8: Arithmetic Means and Deviations for the Items of the Skills and Abilities Domain, Arranged in Descending Order

Rank	Area	Arithmetic average	Standard deviation	Degree need
1	Ability to build strong relationships with stakeholder groups (students, parents) 3.98	3.98	0.978	High
2	Ability to teach BTEC vocational subjects 3.91	3.91	0.942	High
3	Ability to relate BTEC knowledge to life 3.85	3.85	0.968	High
4	Use constructive feedback in the assessment process 3.83	3.83	0.941	High
5	Taking into account students' levels and individual differences in teaching 3.82	3.82	0.931	High
6	Ability to encourage BTEC students to research and investigate 3.81	3.81	0.991	High
7	Ability to relate BTEC knowledge and skills to labor market requirements 3.79	3.79	0.983	High
8	Apply best teaching and learning practices 3.78	3.78	0.886	High
8	Employ cognitive resources (library, videos, workshops, internet, etc.) to implement the BTEC curriculum 3.78	3.78	0.974	High
8	Ability to deal with and understand the symbols and signs used in the BTEC program 3.78	3.78	1.062	High
11	Employ appropriate teaching strategies in implementing practical aspects and educational situations in the BTEC curriculum 3.75	3.75	0.939	High
12	Ability to explain practical projects related to the (BTEC) curriculum and their employment 3.69	3.69	1.000	High
12	The ability to possess the skills of analyzing and understanding the (BTEC) curriculum assignments 3.69	3.69	0.998	High
14	Employing different teaching strategies in teaching the (BTEC) curriculum to develop the learner's diverse intellectual skills 3.68	3.68	0.927	High
15	Understanding and implementing exploratory learning 3.66	3.66	0.952	High
15	Activating appropriate educational tools, activities and means in teaching the (BTEC) curriculum topics 3.66	3.66	1.000	High
17	Planning to implement the (BTEC) curriculum activities collectively or individually within the school 3.65	3.65	0.970	High
18	The ability to encourage students to enroll in (BTEC) specializations 3.63	3.63	1.106	High
19	Working on developing remedial and enrichment plans for learners from low and distinguished levels within (BTEC) 3.55	3.55	1.025	High

Rank	Area	Arithmetic average	Standard deviation	Degree need
20	Using software related to the (BTEC) curriculum 3.54	3.54	1.064	High
21	Working on developing a daily, quarterly and annual plan to implement the (BTEC) curriculum 3.53	3.53	0.989	High
22	Using applications compatible with the (BTEC) curriculum 3.52	3.52	1.051	High
Field as a whole		**3.73**	**0.823**	**High**

Table 8 indicates that vocational education teachers exhibit consistently high training needs in the domain of skills and abilities, with a mean of 3.73, exceeding the established threshold (mean > 3.5) for "high" need (Organisation for Economic and Cultural Development, 2022). Fourteen items received high ratings, while eight were rated as moderate-high, validating the necessity for robust domain-specific training programs.

4.4.1 High-priority competency clusters

Continuous assessment and stakeholder engagement: Teachers reported a strong ability to maintain effective communication with students and parents, reinforcing the role of relationship-building in performance outcomes (Zhang & Wu, 2025).

Vocational subject expertise and real-world integration: Teachers demonstrated readiness to deliver BTEC-aligned instructional content, combining academic expertise with practical relevance (Taha, 2023).

Feedback utilization and personalized instruction: High scores in feedback practices (e.g., 3.83) confirm the demand for adaptive strategies such as differentiated instruction, aligning with BTEC's project-based philosophy (Compen et al., 2024; Connolly, 2019).

Industry relevance and inquiry-based learning: Teachers showed strong interest in project-based learning and labor market integration (Nilsook et al., 2021) and higher-order inquiry skills (Rafiq et al., 2023), validating the curriculum's applied orientation.

4.4.2 Moderate-priority areas and development needs

Despite overall high needs, items rated between 3.52–3.69 points to moderate gaps in areas such as exploratory learning and planning strategies. These areas still warrant targeted development, particularly in terms of inclusive and differentiated instruction (Al-Ghonmeein et al., 2024).

4.4.3 Policy implications and statistical validation

Statistical review confirmed domain-wide training gaps, supported by item-level deviations and alignment with international frameworks (Pearson, 2024). ANOVA/t-tests are recommended to substantiate mean differences across demographics. These findings support policy recommendations to develop

structured modules for continuous professional development, particularly in audit practices, safety protocols, stakeholder engagement, and adaptive pedagogies.

4.4.4 Pedagogical proficiency and adaptive strategies

These findings highlight the multifaceted responsibilities of BTEC teachers, particularly in applied pedagogy, adaptive instruction, and direct engagement with industry standards. In this study, "high training needs" are operationally defined as mean scores exceeding 3.5 on a five-point Likert scale. To fully capitalize on BTEC's project-based instructional model, continuous professional development should target identified deficits in inclusive pedagogical practices, formative assessment strategies, and labor market-aligned instructional delivery.

4.4.5 Curriculum mastery and assessment practices

Item (8) revealed that teachers demonstrate strong competence in applying BTEC-aligned teaching strategies and a clear understanding of curriculum benchmarks and learning outcomes. This cognitive mastery, reflected in their interpretation of curriculum goals, instructional planning, and evaluation tools, is foundational for achieving project-based outcomes in vocational settings (Winch, 2021; Yusop et al., 2022). Items (11) and (12) further confirmed teachers' ability to deliver critical thinking frameworks through brainstorming, cooperative learning, and hands-on projects (Al-Ghonmeein et al., 2024; Harianto, 2024).

4.4.6 Audit mechanisms, safety, and collaborative practices

Item (4) underscored the teachers' awareness of internal and external audit mechanisms under the BTEC curriculum. These mechanisms, critical for quality assurance, require educators to maintain documentation fidelity, ensure lesson alignment, and collaborate in performance assessments (National Education Reform Directorate, 2025a; Ministry of Education, Jordan, 2024). Additionally, strong teacher-stakeholder relationships, including parental engagement and administrative collaboration, were evident and contributed meaningfully to student achievement (Zhang & Wu, 2025).

4.4.7 Insights on inclusive and adaptive instruction

Although inclusive education and cognitive adaptability ranked slightly lower than other domains (means between 3.55 and 3.69), these areas remain vital for customizing instruction. Teachers must be trained to recognize individual differences and cultural diversity in their classrooms, as highlighted by Al-Ghonmeein et al. (2024).

Research Question 3:

Are there statistically significant differences in training needs among vocational education teachers based on demographic variables (gender, qualification, experience, service area, specialization)?

To answer this, mean scores and standard deviations were calculated for training needs across demographic groups (Table 9).

Table 9: Teachers' Training Needs by Demographic Variables

Variable	Level	Mean	SD	N
Gender	Male	3.82	0.769	133
	Female	3.79	0.788	165
	Total	3.81	0.779	298
Educational Qualification	Intermediate Diploma	3.77	0.865	48
	Bachelor's	3.77	0.757	205
	Postgraduate	4.02	0.762	45
	Total	3.81	0.779	298
Teaching Experience	<5 years	3.86	0.835	132
	5–10 years	3.73	0.776	49
	>10 years	3.77	0.713	117
	Total	3.81	0.779	298
Service Area	City Center	3.85	0.750	187
	Village/Camp	3.72	0.822	111
	Total	3.81	0.779	298
Specialization	Agriculture	3.78	0.904	35
	Engineering	3.59	0.695	53
	Beauty	3.82	0.782	80
	Business	4.03	0.793	63
	IT	3.74	0.699	48
	Hospitality	3.79	0.778	19
	Total	3.81	0.779	298

To assess significance, a five-way ANOVA was conducted (Table 10).

Table 10: Five-Way ANOVA Results

Source	SS	df	MS	F	p	η^2
Gender	0.873	1	0.873	1.487	.224	0.005
Qualification	3.352	2	1.676	2.854	.059	0.019
Experience	0.415	2	0.207	0.353	.703	0.002
Service Area	1.774	1	1.774	3.021	.083	0.010
Specialization	7.069	5	1.414	2.407	.037	0.040
Error	167.952	286	0.587	—	—	—
Total	180.253	297	—	—	—	—

Only 'specialization taught' reached significance ($p = 0.037$), indicating subject area influenced perceived training needs. Teachers in business subjects reported higher needs than engineering teachers. Gender, qualification, experience, and service area showed no statistically significant differences ($p > 0.05$). Effect sizes

revealed small to moderate impacts for specialization ($\eta^2 = 0.040$) and minimal impacts for the remaining variables ($\eta^2 < 0.02$). These findings suggest professional development should be tailored based on teaching specialization to enhance relevance.

5. Practical Implications and Recommendations

The alignment of high domain means with curriculum demands supports the urgency of BTEC-specific teacher training. Programs should target cognitive mastery, adaptive pedagogy, and compliance-oriented practices. Furthermore, future research should:

- Employ larger, more demographically balanced samples.
- Use longitudinal designs to track changes over time.
- Incorporate objective measures beyond self-reporting to minimize bias.

These refinements will further strengthen the evidence base for policy interventions and institutional planning in Jordan's vocational training sector.

6. Conclusion

This study underscores the urgent imperative to address the substantial training needs of Jordanian vocational education teachers involved in implementing the BTEC curriculum. The findings reveal that personal competence, particularly in areas such as audit adherence, occupational safety, and curriculum fidelity, emerges as the most critical domain, followed closely by knowledge and skills/abilities. These domains collectively shape the effectiveness of BTEC's project-based instructional model. The implications suggest that BTEC success depends not only on technical know-how but also on interpersonal, regulatory, and adaptive competencies.

Moving forward, targeted interventions such as mentorship, industry-aligned training, and scenario-based workshops are essential to equip teachers with the multifaceted skills required for successful BTEC delivery. Furthermore, the influence of demographic variables such as specialization underscores the need for differentiated training pathways. By focusing on pedagogical relevance and labor market alignment, the study affirms that holistic teacher training models are pivotal to enhancing the quality and sustainability of vocational education in Jordan.

7. Recommendations

In light of the findings, it is recommended that policymakers, curriculum designers, and educational leaders adopt differentiated and domain-specific professional development frameworks tailored to the BTEC curriculum. These should include structured training in personal competence (e.g., audit processes, curriculum compliance, and occupational safety), integration of formative assessment tools, and the promotion of inclusive pedagogies. Training programs should be sensitive to the unique needs of early-career teachers and address disparities such as gendered access to digital technologies. Collaboration between the Ministry of Education and industry stakeholders is essential to ensure that training remains aligned with real-world labor market demands. In

addition, curriculum developers should embed feedback loops and reflective practices into teacher training protocols to enhance instructional adaptability. Future research should adopt longitudinal designs and performance-based evaluations to explore how BTEC-specific training interventions influence teacher efficacy and student employability over time.

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