INSTITUTIONAL SUPPORT AND INDUSTRY ALIGNMENT AS PREDICTORS OF COMPETENCY DEVELOPMENT AMONG VOCATIONAL FOOD TECHNOLOGY INSTRUCTORS

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DOI: https://doi.org/10.52267/IJASER.2025.6304

ABSTRACT

This study examined the extent of training accessibility and the level of competency development among food technology educators in Surigao del Sur, Philippines. Using a descriptive design, the research assessed the educators' perceptions across four training accessibility indicators—availability of training programs, institutional support, geographic and financial constraints, and industry alignment—and three competency domains: pedagogical knowledge, technological integration (TPACK framework), and industry-relevant skills. Results revealed a moderate to high level of training accessibility, with institutional support and industry alignment receiving the highest mean scores. However, availability and frequency of specialized training programs received relatively neutral ratings, suggesting inconsistencies in professional development opportunities. On the other hand, competency development was rated high across all domains, with pedagogical knowledge scoring the highest. Educators demonstrated strong application of student-centered and experiential teaching strategies. Technological integration and industry-relevant competencies were also rated positively. However, findings indicated a need for increased participation in formal digital training and greater exposure to real-world food processing practices. These findings highlight institutions' need to allocate resources towards digital infrastructure, ongoing capacity-building programs, and enhanced industry partnerships to sustain and elevate teaching quality. The study provides empirical evidence that can inform policy directions for professional development in the technical and vocational education sector, particularly in food technology.

KEYWORDS: Food Technology Education, Competency Development, Training Accessibility, Technical and Vocational Education

INTRODUCTION

The quality of education in specialized disciplines such as food technology inherently depends on educators' competencies. In the province of Surigao del Sur, food technology educators are responsible for equipping students with practical food processing, safety, and innovation skills. Their effectiveness, however, is significantly influenced by access to relevant and timely professional development opportunities. Ajoc (2019) emphasizes that accessible and industry-aligned training is critical to maintaining instructional quality and fostering educators' ability to integrate current practices into classroom instruction.

Ongoing learning for educators is fundamentally important in equipping them to navigate a field of education undergoing rapid evolution, which is increasingly shaped by technological advancements and shifting industry demands. In Surigao del Sur, institutions such as the Provincial Training Center offer Technical and Vocational Education and Training (TVET) programs through the Technical Education and Skills Development Authority (TESDA) and the Commission on Higher Education (CHED) (TESDA Training Courses, n.d.). These programs are designed not only to upgrade the technical competencies of educators but also to align instructional content with prevailing industry standards. Cortes (2019) notes that continuous training enhances pedagogical strategies and fosters innovation and research capabilities among educators, thereby enriching the teaching-learning process.

Nonetheless, various systemic and contextual barriers continue to hinder the accessibility of such training programs. Geographic isolation, limited financial and institutional resources, and inconsistent support structures often constrain educators' ability to participate in professional development. Prior research has consistently identified the insufficient availability of appropriate educational materials as a significant impediment to successful teaching strategies, especially in implementing inclusive and technology-integrated education (Ajoc, 2019; Daling, 2018). The challenge of integrating digital tools into teaching underscores the urgent need for structured and sustained training programs supported by enabling environments.

Overcoming these difficulties requires a sophisticated comprehension of the enablers and constraints that shape training accessibility for food technology educators in the region. A systematic investigation of these factors can inform targeted interventions and policy decisions that enhance the effectiveness of professional development programs. Such initiatives are essential for improving individual educator competencies and aligning educational outcomes with national and global industry standards. This vision aligns with the broader agenda of the Department of Education in

Surigao del Sur to improve technical and vocational education through responsive and inclusive strategies (DepEd Surigao del Sur, 2021).

Accordingly, this study examines the accessibility of training and competency development among food technology educators in Surigao del Sur. Specifically, it seeks to identify the barriers and facilitators affecting access to professional development and to evaluate their influence on educators' pedagogical knowledge, technological integration, and industry-relevant competencies. By generating empirical insights, this research intends to inform educational policy and design more effective and accessible training initiatives. Ultimately, it contributes to the broader discourse on strengthening technical and vocational education through structured, sustainable, and context-sensitive professional development.

METHODOLOGY

A descriptive research methodology was utilized in this investigation to examine the accessibility of training and competency development among food technology educators in Surigao del Sur. It aimed to identify key skills, training needs, and the extent to which existing professional development programs align with industry demands. The research was conducted within the CARCANMADCARLAN area—comprising the municipalities of Carrascal, Cantilan, Madrid, Carmen, and Lanuza—where secondary schools offer Food Technology as part of the Senior High School (SHS) curriculum and as an exploratory course under the Technology and Livelihood Education (TLE) program in Junior High School (JHS). These schools serve as critical venues for equipping students with competencies aligned with the food industry, making them ideal settings for the study.

A total of 100 food technology educators—20 from each district—were purposively selected as respondents. These participants are directly involved in delivering food technology instruction at the SHS and JHS levels. Their experiences offer valuable insights into the region's current state of professional development, training barriers, and instructional competencies.

The primary data collection instrument was a structured questionnaire comprising four key sections: (1) Demographic Profile; (2) Training Accessibility, which assessed availability of programs, institutional support, geographic and financial constraints, and alignment with industry needs; (3) Competency Development, focused on pedagogical knowledge, technological integration (TPACK), and industry-relevant skills; and (4) Perceived Barriers, identifying systemic obstacles to training participation. Responses were measured using a 5-point Likert scale to ensure quantitative reliability.

Data collection followed ethical research protocols. Official authorization was secured from the individual holding the position of Schools Division Superintendent, school heads, and department coordinators. Informed consent was secured from all participants, emphasizing confidentiality and voluntary participation. Surveys were administered in printed and digital formats based on respondent convenience, and follow-ups were conducted to ensure a high response rate. To analyze the data, descriptive statistics, including mean, frequency, standard deviation, and percentage, were utilized to summarize the collected responses and assess trends in training accessibility and competency levels.

RESULTS AND DISCUSSION:

Table 1. Extent of training accessibility among food technology educators

Training Accessibility	Indicators	WM	VD
Availability of Training Programs	There are sufficient training programs available for food technology educators.	3.30	Neutral
	Training programs are conducted regularly	3.17	Neutral
	Training topics are updated with new food technology trends	3.42	Agree
	The training programs are specifically tailored for educators in food technology	3.43	Agree
	There are opportunities for both theoretical and hands-on training.	3.47	Agree
	Average	3.36	Agree
Institutional support	My school encourages participation in professional development programs.	4.13	Agree
	Financial assistance is provided to attend training sessions.	3.74	Agree
	There are clear policies supporting teachers' access to training programs.	3.83	Agree
	My school collaborates with external organizations to provide training.	3.79	Agree
	Training completion is recognized and rewarded within my institution.	3.75	Agree
	Average	3.85	Agree
Geographic and financial constraints	Training sessions are held in accessible locations.	3.68	Agree
	I can afford the expenses associated with attending training programs.	3.70	Agree
	Training costs (registration, transportation, and accommodation) are reasonable.	3.77	Agree

	My institution provides allowances or reimbursement for training expenses.	3.72	Agree
	Online training options are available for teachers with geographic constraints.	3.57	Agree
	Average	3.69	Agree
Industry Alignment	Training programs cover current industry practices in food technology.	3.66	Agree
	Training includes practical sessions with industry-standard equipment	3.68	Agree
	Experts from the food industry are involved in training sessions.	3.68	Agree
	Training programs help educators integrate industry-relevant skills into teaching.	3.85	Agree
	Training includes food safety regulations and emerging food technology trends.	3.83	Agree
	Average	3.74	Agree

Legend: 1.00 - 1.80 Strongly Disagree 1.81 - 2.60 Disagree 2.61 - 3.40 Neutral 3.41 - 4.20 Agree 4.21 - 5.00 Strongly Agree

The findings presented in Table 1 reveal the overall status of training accessibility among food technology educators in the Surigao del Sur Division, as assessed through four critical indicators: (1) availability of training programs, (2) institutional support, (3) geographic and financial constraints, and (4) industry alignment. The aggregate results indicate a generally moderate to high level of training accessibility, with most indicators receiving mean ratings within the "Agree" range. However, nuances in individual item responses highlight key areas requiring further policy and programmatic attention.

Availability of Training Programs received a mean score of 3.36 (Agree), reflecting a generally positive perception of training availability. Nevertheless, two specific items— "There are sufficient training programs available" (M = 3.30) and "Training programs are conducted regularly" (M = 3.17)—were rated neutrally, suggesting perceived inconsistencies in both the frequency and sufficiency of offerings. These findings resonate with the results of Kaden (2020), who emphasized the detrimental effects of irregular and discipline-misaligned professional development on the sustained growth of technical educators. Similarly, Sablić, Mirosavljević, and Škugor (2021) argue that limited access to updated and frequent training hampers teachers' capacity to remain responsive to emerging technologies and pedagogical innovations in the food sector.

Institutional support emerged as the strongest dimension, with a mean of 3.85 (Agree). Respondents affirmed that their respective institutions provide encouragement, logistical support, and recognition for training engagement. This aligns with the findings of Zang, et.al (2021), who highlighted that

institutional incentives and administrative backing significantly enhance teachers' motivation to pursue continuous learning. Moreover, Sims & Fletcher-Wood (2020), opined that collaboration with external training providers—an essential feature of effective professional development frameworks and appears to be a practice increasingly adopted by schools in the study locale

The indicator on Geographic and Financial Constraints recorded a mean of 3.69 (Agree), indicating that most educators do not consider these factors substantial barriers to training participation. This can be attributed to the growing availability of hybrid and fully online training formats, which have improved accessibility, especially in geographically dispersed regions. Anis, (2024) affirm that post-pandemic digital education infrastructure has played a pivotal role in bridging gaps in professional development access. Nevertheless, affordability remains a salient concern, underscoring the continued importance of financial support mechanisms for public school educators.

On Industry Alignment, the average rating of 3.74 (Agree) suggests that educators perceive the training content to be mainly relevant to current industry standards. Topics such as food safety, modern processing techniques, and emerging trends were reportedly well-integrated into the training modules. This relevance is essential in technical and vocational education, where aligning with industry needs enhances skill transferability and readiness for the labor market (Nkwanyane et al., 2020)). Moreover, favorable responses regarding engagement with industry experts affirm the value of school-industry partnerships. This is consistent with Offodum & Oyelami, (2022) assertion that competency-based teaching is best fostered through strong industry-academia collaboration.

While the study affirms the general adequacy of institutional and logistical support mechanisms for teacher training, it also identifies critical gaps in the availability and regularity of specialized training programs. Bridging these gaps is essential to ensure a sustainable and responsive professional development ecosystem. The positive assessment of industry alignment suggests a promising direction for further strengthening food technology education through enhanced industry-school linkages and more consistent, needs-based training interventions. These findings can inform policy revisions and capacity-building initiatives designed to elevate the competencies of educators in the technical-vocational domain.

Table 2. Extent of competency development among food technology educators

Competency Development	Indicators	WM	VD
Pedagogical Knowledge	I can effectively design lesson plans for food technology subjects.	4.36	Strongly Agree
	I apply student-centered teaching strategies in my classes.	4.42	Strongly Agree
	I am confident in using varied assessment tools to evaluate student learning.	4.34	Strongly Agree
	I can develop learning materials suited to food technology education.	4.40	Strongly Agree
	I use hands-on and experiential learning methods in my teaching	4.43	Strongly Agree
	Average	4.39	Strongly Agree
Technological Integration (TPACK Framework)	I effectively integrate digital tools and multimedia in teaching food technology	4.17	Agree
	I am proficient in using industry-relevant software and equipment.	3.98	Agree
	I have attended training on how to apply technology in food technology education.	3.85	Agree
	I use technology to enhance student engagement and practical learning I use technology to enhance student engagement and practical learning	4.19	Agree
	I can guide students in using digital tools for food technology projects.	4.02	Agree
	Average	4.04	Agree
Industry-Relevant Skills	I have hands-on experience with food processing techniques.	4.06	Agree
	I am knowledgeable about food safety standards and regulations.	4.25	Strongly Agree
	I teach food preparation skills that align with industry requirements.	4.17	Agree
	I stay updated on emerging trends in the food industry.	4.11	Agree
	I can train students in food product development and innovation.	4.00	Agree
	Average	4.12	Agree

Legend: 1.00 - 1.80 Strongly Disagree 1.81 - 2.60 Disagree 2.61 - 3.40 Neutral 3.41 - 4.20 Agree 4.21 - 5.00 Strongly Agree

Table 2 shows the self-assessed extent of competency development among food technology educators in Surigao del Sur, emphasizing three key domains: pedagogical knowledge, technological integration based on the Technological Pedagogical Content Knowledge (TPACK) context, and industry-relevant skills. The results reveal a generally high level of perceived competency across all

domains, indicating a well-prepared cadre of educators. Specifically, pedagogical knowledge received the highest weighted mean (WM = 4.39, Strongly Agree), followed by industry-relevant skills (WM = 4.12, Agree), and technological integration (WM = 4.04, Agree).

The data indicate strong pedagogical competency among food technology educators, with all indicators receiving strongly agree ratings. Notably, the highest mean scores were recorded for using hands-on and experiential learning strategies (WM = 4.43) and the application of student-centered teaching approaches (WM = 4.42). These findings are consistent with constructivist teaching models, which posit that active, learner-centered pedagogies promote more profound understanding and student engagement (Moate & Cox, 2015). When considering technical and vocational education and training (TVET), such pedagogical strategies are essential for fostering cognitive development and practical skill acquisition (Okolie et al., 2021). The high ratings in this domain suggest that food technology educators effectively utilize pedagogical approaches aligned with global best practices in competency-based education.

The domain of technological integration yielded a mean rating of 4.04 (Agree), suggesting moderate to high levels of confidence in utilizing technology in instructional practice. The highest rated item in this domain—using technology to enhance student engagement and facilitate practical learning (WM = 4.19)—indicates proactive adoption of digital tools. However, the lowest rated item—participation in technology-related training programs (WM = 3.85)—points to a potential gap between informal use of technology and formal, institutionalized professional development. These findings echo the conclusions of Naidoo & Dawuwa, (2019), who argue that effective technology integration in TVET requires individual initiative and structured training support. Moreover, Motto, (2021) accentuated the role of sustained professional growth in achieving meaningful TPACK implementation. Thus, while educators appear to integrate digital tools effectively, institutional investments in structured ICT training remain crucial.

The domain of industry-relevant skills received a mean rating of 4.12 (Agree), indicating that educators perceive themselves as adequately equipped to impart knowledge and skills relevant to the food technology sector. The highest rated competency was knowledge of food safety standards and regulatory compliance (WM = 4.25), underscoring the importance placed on safety and hygiene in food handling, which are critical components in vocational food education. However, slightly lower ratings were observed for competencies related to food product development (WM = 4.00) and direct experience in food processing techniques (WM = 4.06). These results suggest that while theoretical and regulatory knowledge is robust, there may be a need for enhanced practical exposure and industry immersion. Chiuariu et al., (2024) stressed the significance of sustained industry linkages and field-

based experience for educators to align instructional content with evolving labor market demands. Bridging this gap would enhance the authenticity and applicability of classroom instruction.

The findings suggest that food technology educators possess strong pedagogical and industry-related competencies, positioning them to meet contemporary technical education's instructional and workforce demands. However, the moderate ratings in technological integration and practical industry engagement reveal areas requiring targeted capacity-building efforts. Institutional strategies such as expanding access to digital training programs, fostering industry-academe partnerships, and offering immersive learning opportunities for educators are vital. Furthermore, national policy frameworks must support the continuous professional development of TVET educators, particularly in emerging technologies and industry innovations, to ensure educational relevance and labor market responsiveness.

In conclusion, while current competencies among food technology educators in Surigao del Sur are commendable, sustained investments in professional development, technological training, and industry collaboration are imperative. These efforts will not only enhance instructional quality but also guarantee that the food technology employees remain competent, competitive, and responsive to the dynamic needs of the sector.

CONCLUSION

The findings of this study reveal that food technology educators in Surigao del Sur demonstrate a high level of competency, particularly in pedagogical knowledge, with strong adherence to student-centered and experiential learning strategies. This reflects effective instructional practice aligned with constructivist and competency-based education principles, critical in technical and vocational education and training (TVET) contexts.

While technological integration and industry-relevant skills also received favorable ratings, these domains exhibited slightly lower mean scores, suggesting areas for targeted development. Specifically, the moderate participation in formal technology-related training and limited exposure to hands-on industry experiences highlight the need for sustained institutional support in these areas. These findings are consistent with prior studies highlighting the value of constant professional development and strong industry-academia linkages to maintain teaching relevance in evolving food technology sectors.

In light of these insights, it is recommended that educational institutions invest in ongoing digital pedagogy training, establish structured partnerships with industry players, and provide access to

immersive, practice-based learning opportunities. Policymakers and administrators should also consider aligning national frameworks for teacher development with the dynamic competency requirements of technical education. The high self-assessed competence of food technology educators indicates readiness to meet instructional and labor market demands; however, strengthening technological and industry engagement remains essential for sustaining quality, relevance, and innovation in food technology education.

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