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# A gender and industry-responsive curriculum model for technical-vocational teacher education program

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## Abstract

The study aimed to determine the gender and industry-practice gaps in the Technical-Vocational Teacher Education (TVTEd) program and fill these gaps through a curriculum model to make TVTEd gender and industry-responsive. The study used a mixed method approach where quantitative and qualitative data were utilized to develop the curriculum model. Phase 1 is quantitative descriptive research that focuses on the adequacy and usefulness of the pedagogical and technical skills of the curriculum using the lenses of TVTEd graduates and their supervisors. Phases 2 is a literature review that mapped the gender and industry-practice gaps in TVET. Phase 3 is a qualitative case study research focused on identifying the emerging gender issues constraining gender-responsive curriculum practices. Participants for Phase 1 were seventy-one (71) TVTEd graduates and thirty (30) academic and industry supervisors. Phase 2 scrutinized fifty-five (55) related studies. Participants of the Phase 3 included six (6) technical professors, seven (7) TVTEd graduates, and twelve (12) TVTEd students. Quantitative data were analyzed using statistical treatment (mean score, standard deviation, and weighted mean) and qualitative data were thematized using inductive thematic analysis. The results of the study showed a disparity in the technical skills of the TVTEd graduates, emerging gender and industry-practice gaps in the literature, and contradictions in the subjects (teachers), rules, tools, community, division of labor, and object within the activity system of TVTEd. The consolidated inputs from the four phases of the study were analyzed and utilized in developing a gender and industry-responsive curriculum model for TVTEd.

**Keywords:** Curriculum model, gender and industry-responsive, technical-vocational teacher education

## Introduction

Technical and Vocational Education and Training (TVET) is a formal or informal education and training process centered on the acquisition of practical or technical skills to enhance workplace learning and develop a person's occupational skills. According to UNESCO (2003), TVET entails the acquisition of practical skills, attitudes, understanding, and information related to vocations in various economic and social sectors. Consequently, TVET has been acknowledged for a long time as a vital component of human resource development (HRD) and a crucial instrument for socio-economic development (Pavlova, 2014; Pongo et al., 2014). Moreover, TVET is a significant factor in achieving the Sustainable Development Goals (SDG) of the United Nations by 2030, such as reducing poverty (SDG 1), expanding opportunities for lifelong learning (SDG 4), and creating jobs and decent work for all (SDG 8) (McGrath et al., 2018; Paryono, 2017; Edokpolor & Owenvbiugie, 2017).

One of the priority sectors of AmBisyon Natin 2040 (Ambisyon Natin 2040, n.d.) of the Philippine Government is education. And TVET, as part of the education sector, creates pathways toward career development and is also directly linked to another priority sector, which is manufacturing. Further, TVET is a significant pathway to increasing the participation of the marginalized sector in the growth processes of the Philippine economy. It is also essential for alleviating poverty, creating jobs, expanding the economy, reducing unemployment, and enhancing social and economic well-being (Rafukka, 2013; Nwachukwu, 2014).

Having AmBisyon Natin 2040 and the contribution of TVET in its attainment, tec-voc has been integrated into the K to 12 Curriculum. The Technical Education and Skills Development Authority (TESDA), a tripartite agency, along with the Department of Education (DepEd) and the Commission on Higher Education (CHED), crafted the curriculum. As a central player in the K to 12 Curriculum, TVET prepares students for higher education, employment, and entrepreneurship (TESDA, 2013). Thus, TESDA's budget has been increasing annually to cover a variety of projects for the operation of tech-voc education programs, such as the training for the work scholarship program, private education student financial assistance, and special training for employment programs (Ancho & Kadek Aria Prima Dewi PF, 2021). This increased the relevance of TVET as the country aligned its strategies to ASEAN integration and cooperation.

Notably, tech-voc teacher training contributes to genuine efforts to accelerate economic growth and development, improve employment quality, and expand employment opportunities. However, lacking specific mechanisms to ensure adequate levels of industry experience and exposure has a detrimental effect on the quality of technical teachers (Asian Development Bank, 2021). Thus, it is high time that this study looked into the evaluation of the Technical-Vocational Teacher Education (TVTEd) curriculum and the modifications it proposed to strengthen the capabilities of technical teachers in the country.

Furthermore, teachers of technical disciplines are expected to meet the Philippine Professional Standards for Teachers (PPST). The standards define the expanding knowledge, skills, and professional commitment that teachers are expected to possess. Concurrently, the standards support teachers' growing comprehension, which can be applied increasingly sophisticatedly to a broader and more complex range of teaching/learning situations. Hence, there are seven domains teachers in the Philippines must master to be effective in the twenty-first century. As articulated in the domains of PPST (Republic of the Philippines Department of Education, 2017), teachers must, among others, "know what to teach and how to teach it; maintain a learning-focused environment; respond to learner diversity; plan and design effective instruction; use a variety of assessment tools to inform

and enhance the teaching and learning process; establish community relationships and uphold professional ethics; engage in professional reflection and assume responsibility for personal, professional learning." The standards set by the Philippine government in the Philippine Professional Standards for Teachers must be met by the TVTEd curriculum. For this purpose, this study also looked into PPST as a basis for evaluating the curriculum. The specific career stage utilized is the "beginning teachers" since the graduates of the BTVTEd program are on this level.

Even more critical, TVET programs are ideally situated to play a major role in the COVID-19 pandemic. They have a significant potential to contribute, especially when anticipated structural changes in the education system and labor market are considered (Hoftijzer et al., 2020). During the COVID-19 recovery phase, there are opportunities for smart investments in pre-service TVET and adult training to "rebuild better" programs and systems. In this phase, TVET can retrain or upgrade the skills of students who dropped out during school closures and those who have become unemployed. TVET can also aid in developing the skills required for adjusting to the structural changes brought about by the COVID-19 pandemic. TVET students' employability and other human development outcomes would be enhanced by a continued emphasis on acquiring and developing foundational cognitive and socio-emotional skills, such as empathy and resiliency, which have become increasingly valued during pandemic. Moreover, investment in technology and digital skills can ensure lifelong access to learning opportunities and future workforce adaptability.

Again, this has increased the importance of revisiting the TVTEd curriculum as part of its contribution is the strengthening of the TVET system, especially in times of crisis like the COVID-19 pandemic. Despite the pressing concerns of the situation, there is still little existing literature focusing on the role of TVET during this crisis. This has created a new instruction landscape coupled with curriculum modifications to make it pandemic-proof and flexible. The situation requires curricular experts to adjust the curriculum toward developing independent TVET learners with industry-aligned skills. Thereupon, this study developed a TVTEd curriculum model that is flexible and inclusive.

With the premise of the significant contributions of TVET and TVTEd to the country's development, there are challenges in the system that should be highlighted to maximize the field's potential. One of these challenges is gender inclusivity in TVET. In the technical-vocational field, gender stereotyping is rampant. TVET systems are frequently biased against women, affecting men's and women's selection, access to, and participation in specific learning programs or occupations (UNESCO, 2016). As a result, this gendered division of labor perpetuates gender inequalities in the workplace and throughout society.

For development to prosper, it entails the participation of everyone in the community. Regardless of the gender and orientation of the human person, everyone is enjoined to participate in the development of a sustainable society. Gender equality is significant and is widely recognized worldwide. It is necessary for achieving sustainable development, which cannot be accomplished without women's full participation and engagement. Women, at all levels, must have equal access to decision-making, leadership, opportunities for employment, political participation, economic resources, and, most importantly, access to high-quality education (UNESCO, 2016).

UNESCO-UNEVOC (n.d.) recognized this impending problem in the TVET industry. TVET can increase women's productive participation in the labor market by equipping them with the skills necessary to perform future jobs. This potential, however, remains largely untapped in specific occupational sectors. Women are significantly less likely to enroll in TVET in most developing countries, including the Philippines.

The International Center for Technical and Vocational Education and Training (UNESCO-UNEVOC) developed a plan to enhance national TVET systems via institutional transformation, capacity building, and international cooperation. This is part of SDG 4, which focuses on education quality and calls on the Member States to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (p. 8). Their Medium-Term Strategy for 2018-2020 focused on the three thematic priorities. One of those three is the promotion of equity and gender equality in TVET (UNESCO-UNEVOC, 2020).

Moreover, SDG 5 addresses gender equality regarding women's and men's access to training. As a critical pillar of sustainable and viable economic development, TVET contributes to SDG 5's goal of eliminating discrimination against women and girls, thereby promoting economic growth and development through gender equality (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH, n. d.). In some regions, women are routinely denied the same employment rights as men, despite having more women in the workforce than ever before. Sexual violence and exploitation, unequal distribution of unpaid care and domestic labor, and discrimination in public office remain formidable obstacles. Climate change, natural disasters, conflict, and migration disproportionately affect women and children. Women also need equal access to land and property, sexual and reproductive health, technology, and the Internet. Even though more women are in public office than ever, promoting more female leaders would help advance gender equality (UNDP, n.d.).

Likewise, globally, disparities in women's access to skill development and labor market participation persist. Women face numerous obstacles, including gender bias in occupational choices, obstacles to education and training, particularly in rural and informal economies, as well as sociocultural and economic constraints. To address these issues, nations must integrate gender considerations into their national skills development policies and strategies, create gender-sensitive training environments, expand opportunities for women in technology-intensive fields, promote role models, and encourage and enable women to participate in opportunities for lifelong learning.

Due to the government's emphasis on women's equal access to education as a human right, statistics show that the enrollment of girls in primary and secondary schools has increased significantly. However, this is not the case in Technical and Vocational Education; very few women enrolled in vocational courses, mainly technical, due to the significant challenge women face in school and even after graduation (Williams et al., 2018). For this purpose, this study focused on the evaluation of gender responsiveness of the TVTEd curriculum as well as the development of a proposed gender-responsive curriculum model.

Besides gender issues, there are also impending problems in the TVET system, those are skills issues. These could include one or a combination of skills mismatch, skills shortage, and skills gap. But since technical and vocational knowledge is the primary driver of a nation's economic and social development (Alam, 2008 as cited by Ali Idris & Muhammad Rashid Rajuddin, 2013); thus, the lingering challenges in the skills misalignment of academe and industry affect the country's economic growth. Therefore, investing in human capital, in this sense, is an investment in a country's future.

In addition, the purpose of vocational education is to foster the development of skills uniquely suited for identifying occupations (Agrawal, 2013). Vocational education programs prepare students to competently perform practical tasks. It entails acquiring the skills and competencies necessary for success in industrial and commercial occupations. Vocational education prepares students for employment by emphasizing the development of vocational skills. Aftab Uddin Ahmad and Mohd Habibur Rahman (2012) noted that vocational education is crucial for a nation's development because it provides the necessary skilled workforce. Individuals and the nation as a whole require skills for sustainable economic growth. Therefore, vocational education has become one of the most effective

strategies for developing human resources that countries must adopt in order to train and modernize the technical workforce required for industrialization and national development. Similarly, Okoro (2021) argued that vocational education is essential to the economic growth of any nation.

In spite of government efforts to revitalize vocational education at all levels, vocational education graduates lack essential workplace skills, including occupational and employability skills (Alinea, 2022). Individuals are considered employable when they acquire employability skills components through quality education and training. Indeed, according to Alinea (2021), university technical graduates lack the necessary skills for entry-level technician positions. There is a gap between the competencies of technical graduates and the expectations of the industry. Therefore, additional financial resources are necessary for the training and development of newly hired employees. In addition, many technical students lack the necessary abilities, knowledge, and skills to perform the tasks they will eventually undertake in the field (Radermacher et al., 2014). Lack of these abilities and skills can hinder a person's productivity and employment opportunities. In addition, the skills gap is a growing global concern (Cappelli, 2015). There have been numerous complaints in recent years about the disparity between the skills taught in school and those required by industry. To investigate these skill gaps, tech-voc institutions are conducting interviews with industry representatives. The evidence gathered indicates a deficiency in technical skills that should have been acquired during college (U.S. Bureau of Labor Statistics, 2014). The same reason is the main factor for the increasing unemployment rate in TVET. This can be traced to skills mismatch, shortage, and gap issues. Consequently, this study also focused on evaluating the TVTEd curriculum from the standpoint of industry responsiveness.

With the growing concerns on gender and industry responsiveness of the TVET system, TVTEd, as a teacher education program for technical teachers, has significant contributions to perpetuating or alleviating gender and industry gaps. As much as how vital TVET is in developing a nation, more so are the technical teachers. They navigate the TVET curriculum so that necessary skills will be transferred to students during the teaching and learning processes. Technical teachers are crucial agents of social change. Their roles are critical to forming technical workers and the country's labor force.

Considering technical teachers' pre-service preparations, thus, the Bachelor of Technical-Vocational Teacher Education was instituted. During pre-service teaching, pre-service teachers must acquire a variety of skills. Due to the ever-changing nature of classroom challenges in the twenty-first century, these skills are crucial to the holistic development of students. Without the proper and appropriate acquisition of these teaching skills, technical teacher-graduates joining the academe will affect the quality of future industry leaders.

Aside from the several teaching or pedagogical skills technical teachers must possess, they are also expected to be trained technically. The necessary technical skills vary depending on the nature of the field. So, they are expected to be well-versed in pedagogy and technical skills to perform well in the TVET field as trainers or educators. Technical skills of the TVTEd curriculum must be aligned with the Philippine National Standards for technical skills. TESDA governed the formulation, implementation, and evaluation of the said standards. These standards are stipulated in the different Training Regulations (TR) for National Certifications (NC). These standards are aligned with the basic to advanced skill requirements of the industry. Therefore, it is necessary to align the TVTEd curriculum with the TESDA standards.

Aside from the skill standards, TESDA also sets standards for trainers called the Trainers Methodology (TM). These are specific to all trainers and assessors of technical

competencies and all technical-vocational education-related teaching skills. The required trainer competencies are separated into basic and core competencies. A trainer must possess the same competencies for all National Certificate (NC) training. TESDA administers an examination to determine a candidate's qualifications as a TVET trainer/technical trainer, competency assessor, or training facilitator/coordinator. For that reason, the BTVTEd curriculum includes a variety of Trainer's Methodology-related courses. However, the curriculum does not fully incorporate the alignment of the TM principles, the competencies hierarchy, and the curriculum mapping.

With the premises mentioned, there are impending issues mainly supported by literature on gender and industry responsiveness in the TVET field. Technical-vocational teachers are significant players in perpetuating these practices that develop non-inclusive cultures. Moreover, technical teachers contribute to the skills issues between what the academe produces and the industry's needs. Thus, this study attempted to comprehensively integrate the concerns into the teacher education curriculum specific to technical-vocational education using a curriculum model.

The study evaluated the TVTEd curriculum using the lenses of the graduates, industry, and students on the adequacy and usefulness of the skills acquired by the graduates. In addition, the curriculum was also evaluated to determine emerging gender issues that hinder the gender-inclusive curriculum implementation among technical teachers in TVTEd. The literature was also reviewed to assess the emerging themes in TVET practices among neighboring countries. The lenses in the literature review focused on gender and industry-practice gaps, including the solutions that TVET practitioners and educators used to bridge the gap.

## Conceptual framework

The curriculum is validated when the curriculum evaluation shows reliable data of aligned intended, implemented, and attained outcomes (McTighe & Wiggins, 2007). It is the same consideration used in the conduct of this study. The study was composed of three phases contributing to the development of a gender and industry-responsive curriculum model for technical-vocational teacher education program.

**Figure 1**

*Conceptual Framework of the Study*

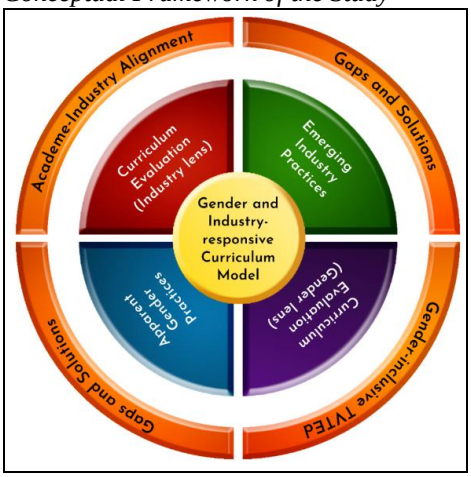


Figure 1 shows the general conceptual framework of the study. The framework is presented circularly, signifying the continuous curriculum development processes within the research locale. It was then subdivided into four quadrants comprised of the several phases of the study. These are curriculum evaluations and literature reviews that show the technical-vocational teacher education program being assessed by technical teachers, industry experts, graduates, and students regarding gender and industry responsiveness. The central aim of this study was represented in the core of the framework, that is, gender and industry-responsive TVTEd curriculum model. It was achieved using the three phases that contributed to the attainment of the objectives of this study. The results of each phase were also reflected in the framework above. These are academe-industry alignment for the curriculum evaluation (industry lens), gender-inclusive TVTEd for the curriculum evaluation of the curriculum practices within the activity system (gender lens), and gaps and solutions for the literature reviews that identified the emerging gender and industry-practice gaps in TVET.

This study sought several improvement areas over the existing curriculum by the proposed gender and industry-responsive curriculum model. The emphasis was on the current CHED's and TESDA's minimum requirements to match the industry's and academe's expectations and integrate the industry's requirements into specific and selected technical and professional education courses. A synchronized curriculum model with gender and industry expectations was the result of the integration. The features/activities integrated into the curriculum offerings, specifically the technical courses, can be used constructively by the universities, faculties, and departments to reinvigorate, refresh and rejuvenate the technical-vocational teacher education program.

## Research objectives

The study proposed a gender and industry-responsive curriculum model for technical-vocational teacher education program. Specifically, the study attained the following objectives:

1. Assess the adequacy and usefulness of the technical-vocational teacher education curriculum through the lenses of the TVTEd graduates and supervisors (academic and industry)
2. Map the gender and industry-practice gaps arising from the TVET literature and the solutions to address them
3. Identify the emerging gender issues that constrain the implementation of gender-responsive curriculum practices in technical-vocational teacher education program
4. Develop a curriculum model for technical-vocational teacher education program based on the analysis of results

## Methodology

This study utilized the mixed-method approach to research. Basically, it is a mix of quantitative and qualitative studies leading to the development of a curriculum model as an output. The study is comprised of four phases detailed as follows:

### *Phase 1: Industry-responsiveness*

The first phase of the study employed a quantitative methodology. Typically, this is a descriptive study. It assessed the adequacy of the graduates' curriculum-acquired skills. This also assessed the usefulness of the acquired skills to the current profession. Individuals and

experts in technical-vocational teacher education participated in the study. They were chosen purposively. Two types of respondents were BTVTEd graduates and their supervisors (academe and industry). The complete number of BTVTEd graduates, seventy-one (71) in total, is used. This includes the civil, electronic, and mechanical specializations.

Supervisors from cooperating schools of the research site (cooperating teachers, subject coordinators, and school heads) represented the academe, with five (5) from each specialization; cooperating industry linkages of the University's BTVTEd program represented industry, also with five (5) from each specialization. A questionnaire is used for data collection. Using a four-point Likert scale, the respondents' perceptions of specific aspects or components of the curriculum were measured. The instrument gathered information regarding the respondents' general assessment, in terms of adequacy and usefulness, of the pedagogical and technical knowledge and skills gained from the curriculum in the various fields of specialization and their applicability to their actual jobs or workplaces. The adequacy scale consisted of "very adequate," "more than adequate," "fairly adequate," and "inadequate." The scale for usefulness is "very useful," "more than useful," "fairly useful," and "useless."

Utilizing frequency counts and percentages, a profile of the respondents was constructed. Utilizing descriptive statistics such as mean scores, standard deviations, and overall weighted mean, the respondents' curriculum evaluation was computed. An independent t-test was used to determine the significance of the difference between the graduates' and supervisors' evaluations.

***Phase 2: Gender and industry-practice gaps***

The second phase of the study is a literature review on the gender and industry-practices gaps existing in TVET practices. MAXQDA was used to conduct an inductive thematic analysis. The adaptable search strategy was utilized to support the literature's themes. The exploratory design was chosen over the explanatory design because this study compares and contrasts the similarities and differences between the available literature on gender and industry-practice gaps and solutions to address them. The qualitative method is used to analyze and evaluate the data in the literature review (Snyder, 2019).

In terms of gender gaps, at the initial screening, twelve (12) articles were identified, and seven (7) were chosen based on several criteria. However, in industry-practice gaps, 43 articles were identified as initially promising. The initial screening accepted thirty-one (31) articles, and twenty-five (25) articles were selected based on various criteria. The following were the criteria: a) published between January 2006 and December 2021 (fifteen years); b) addressing gender and industry-responsiveness in TVET; c) published in English. In addition, solutions to bridge the gaps were also the focus of the review. The chosen articles were retrieved from multiple databases. These are open-access, full-text articles that were sampled using keywords. For gender gaps, the keywords used were "tech-voc gender," "gender gaps," "technical teachers," and "TVET gender." On the other hand, the keywords used for industry-practice gaps were "industry gaps", "industry-practice gaps", "industry practices", "TVET industry", and "skills gap". The search is conducted using the title, abstract, and keywords mentioned previously, followed by the exclusion of abstract-only articles and those unrelated to TVET gender and industry-practice gaps.

***Phase 3: Gender-responsiveness***

Phase 3 employed a qualitative approach and a case study design. The qualitative research design served as a foundation for the collection and consolidation of data that revealed the

emerging gender issues in the implementation of a gender-responsive curriculum for technical-vocational teacher education.

The research was conducted at a state university in the Philippines. In-depth interviews, focus group discussions, and document analysis generated the data. Teachers, graduates, and students in a technical-vocational teacher education program participated in the study. They were also selected deliberately. Three females and three males have been selected as the six technical educators. The second and third groups of participants consisted of seven graduates and twelve fourth-year students, including members of the LGBTQIA+ community. The number of participants varied based on the level of data saturation for each participant group. Four focus group discussions involving groups of participants who were not individually interviewed were held. This was done to further triangulate the interview-generated data. In the findings, pseudonyms were assigned for data privacy and to protect the participants' identities. In addition, there are no conflicts of interest involved in this study.

A modified version of Chikunda's (2014) interview guide was used to collect data, with modifications made to fit the study's objectives. The first section of the guide solicited information on the socio-demographic characteristics of the participants. The second section gathered data that provided answers to specific research-related questions. The questions identified emerging gender responsiveness issues in the implementation of the curriculum.

The primary focus of data-generating instruments is on emerging gender issues. On the basis of the occurrence of responses and the perspectives of the participants, contradictions rooted in the activity system's components emerged.

## Findings and discussion

The following are the results of the study:

### *Objective 1. Industry-responsiveness*

The tables below detail the demographic profile of the respondents to the study. In Tables 1 and 2, among the graduates, females dominated in numbers except for mechanical technology, where males comprised seventy (70) percent. Sixty-seven (67) percent of academic supervisors are female. Males dominated the industry as supervisors. There are two LGBTQIA+ graduates; however, there is no representation from the supervisors. The participation of all the graduates in the three specializations is exceptional, providing the most accurate responses out of the whole population.

**Table 1**

*Gender Profile of Participating Graduates*

| BTVTEd specialization | Graduates | | |
|---|---|---|---|
| | Male | Female | LGBTQIA+ |
| Civil technology | 7 | 21 | 1 |
| Electronics technology | 6 | 15 | 1 |
| Mechanical technology | 14 | 6 | 0 |

**Table 2**

*Gender Profile of Participating Supervisors*

| BTVTEd specialization | Supervisors | | | | | |
|---|---|---|---|---|---|---|
| | Academe | | | Industry | | |
| | Male | Female | LGBTQIA+ | Male | Female | LGBTQIA+ |
| Civil technology | 1 | 4 | 0 | 4 | 1 | 0 |
| Electronics technology | 2 | 3 | 0 | 3 | 2 | 0 |
| Mechanical technology | 2 | 3 | 0 | 4 | 1 | 0 |

The following tables present the assessment of graduates and their academic and technical supervisors in the pedagogical and technical skills, respectively, obtained from the BTVTEd curriculum. The assessment was limited to the level of acquired skills and their usefulness in the TVTEd profession.

**Table 3**

*Summary of Pedagogical Skills*

| Areas | Adequacy | | | | Usefulness | | | |
|---|---|---|---|---|---|---|---|---|
| | Graduates | SD | Supervisors | SD | Graduates | SD | Supervisors | SD |
| Civil technology | 3.37 | VA | 3.29 | VA | 3.47 | VU | 3.37 | VU |
| Electronics technology | 3.52 | VA | 3.44 | VA | 3.54 | VU | 3.46 | VU |
| Mechanical technology | 3.36 | VA | 3.48 | VA | 3.40 | VU | 3.52 | VU |
| AWM | 3.42 | VA | 3.40 | VA | 3.47 | VU | 3.45 | VU |

*Note.* SD- Scale Description

As evident in Table 3, both the graduates and the supervisors rated the curriculum as “very adequate” and “very useful” in providing pedagogical skills to the graduates. This is evident in the experiential learning courses taken by the graduates, like field studies and practice teaching. The ratings given by the supervisors, both on adequacy and usefulness, are lower than what was perceived by the graduates.

**Table 4**

*Summary of Technical Skills*

| Areas | Adequacy | | | | Usefulness | | | |
|---|---|---|---|---|---|---|---|---|
| | Graduates | SD | Supervisors | SD | Graduates | SD | Supervisors | SD |
| Civil technology | 3.20 | MA | 3.22 | MA | 3.27 | VU | 3.41 | VU |
| Electronics technology | 3.16 | MA | 3.41 | VA | 3.22 | MU | 3.41 | VU |
| Mechanical technology | 3.20 | MA | 3.41 | VA | 3.21 | MU | 3.42 | VU |
| AWM | 3.19 | MA | 3.35 | VA | 3.23 | MU | 3.41 | VU |

*Note.* SD- Scale Description

Table 4 shows that there is a remarkable difference in the evaluation of the graduates and the supervisors in the technical skills acquired from the BTVTEd curriculum. Graduates often considered themselves less than what their supervisors perceived. These findings are considered premises on how to improve the curriculum to make it more responsive to the changing needs of the academe and the industry.

Even if the graduates and supervisors agree that the curriculum is very adequate and very useful in terms of pedagogy, there still exists a significant difference in the assessment of technical skills. These data are very significant inputs in developing the industry-responsive curriculum model.

**Table 5**

*Significant Difference in the Adequacy of Pedagogical Skills of BTVTED Graduates*

| Group | *Mean* | *SD* | Computed *t*-value | Tabular *t*-value 0.05, *2df* | Decision | Interpretation |
|---|---|---|---|---|---|---|
| Graduates | 3.42 | 0.09 | 0.200 | 4.303 | Accept $H_o$ | Not significant |
| Supervisors | 3.40 | 0.10 | | | | |

*Note. SD*- Standard Deviation

Table 5 presents the significant difference in the adequacy of pedagogical skills among BTVTEd graduates. It reveals that when the variances are assumed, a *t*-value of 0.200 and a tabular value of 4.303 were obtained. Since the computed *t*-value is less than the critical value, this proves that there is no significant difference between the evaluations of the graduates and supervisors. Therefore, the null hypothesis is accepted.

**Table 6**

*Significant Difference in the Usefulness of Pedagogical Skills of BTVTEd Graduates*

| Group | *Mean* | *SD* | Computed *t*-value | Tabular *t*-value 0.05, *2df* | Decision | Interpretation |
|---|---|---|---|---|---|---|
| Graduates | 3.47 | 0.07 | 0.28 | 4.303 | Accept $H_o$ | Not significant |
| Supervisors | 3.45 | 0.08 | | | | |

*Note. SD*- Standard Deviation

Table 6 reflects a *t*-value of 0.28 and a tabular value of 4.303 when data on the usefulness of pedagogical skills of BTVTEd graduates were analyzed. It reveals that when the variances are assumed, since the computed *t*-value is less than the critical value, the null hypothesis is accepted. Thus, there is no significant difference between the evaluations of the graduates and supervisors.

**Table 7**

*Significant Difference in the Adequacy of Technical Skills of BTVTEd Graduates*

| Group | *Mean* | *SD* | Computed *t*-value | Tabular *t*-value 0.05, 2df | Decision | Interpretation |
|---|---|---|---|---|---|---|
| Graduates | 3.19 | 0.02 | -2.26 | 4.303 | Accept $H_o$ | Not significant |
| Supervisors | 3.35 | 0.11 | | | | |

*Note. SD*- Standard Deviation

Supervisors and graduates evaluated the BTVTEd curriculum based on the performances of the latter. The significant difference in the adequacy of technical skills among BTVTEd graduates was presented in Table 7. Analysis of the data reveals that when the variances are assumed, an absolute *t*-value of 2.26 and a tabular value of 4.303 are obtained. Since the absolute value of the *t* value is less than the critical value, this implies that the graduates' and supervisors' ratings are not significant. The null hypothesis is therefore accepted.

**Table 8**

*Significant Difference in the Usefulness of Technical Skills of BTVTEd Graduates*

| Group | *Mean* | *SD* | Computed *t*-value | Tabular *t*-value 0.05, *2df* | Decision | Interpretation |
|---|---|---|---|---|---|---|
| Graduates | 3.23 | 0.03 | -8.65 | 4.303 | Reject $H_o$ | Significant |
| Supervisors | 3.41 | 0.01 | | | | |

*Note. SD*- Standard Deviation

The table reveals the significant differences in the assessments of the graduates on the usefulness of technical skills. This analysis shows that when the variances are calculated, the absolute value of the *t*-value is 8.65, and the tabular value is 4.303. Because the computed *t*-value is greater than the critical value, this demonstrated that there is a significant difference between the graduates' and supervisors' evaluations. As a result, the null hypothesis is ruled out.

The tables presented reflect the curriculum evaluations of graduates and supervisors. There are several reasons why graduates may view the curriculum as adequate for evaluating themselves as products of the curriculum. The measure of significant differences established relationships that confirmed the value of curriculum evaluation using the lens of the supervisors. In that sense, factors were identified to bridge the gap between the skill preparation provided by the university, both in pedagogy and technical skills, and the required entry-level of the academe or the industry. Thereby, improving the curriculum to make it more industry-responsive.

The technical teacher education program aims to instill high cognitive and psychomotor abilities to teach technical and vocational subjects in junior and senior high schools. In Phase 1, supervisors and graduates both rated the graduates' pedagogical skills as

adequate. This justified the current program's effectiveness when looking from the pedagogical perspective. Graduates must use their pedagogical skills in their current profession to teach technical courses. Since tech-voc teacher education is a dual major program (Commission on Higher Education [CHED], 2017), BTVTEd graduates can choose to work in the industry or pursue teaching. Pedagogical skills, in this sense, prepare graduates for cognitive-related jobs if they do not intend to teach.

BTVTEd graduates are mostly tech-voc educators, but some work in the industry. When they choose to teach, tech-voc teachers differ from traditional educators. To transfer relevant skills to students, technical teachers need industry experience. Pedagogical skills are essential, but teachers will be ineffective without industry experience. Thus, upon graduation, they opt to be employed in the industry to gain technical experience that will help them improve their technical skills. This will then benefit their future students when they choose to teach. This pattern is a waste of resources and time. It will be better for both sectors if there is a clear alignment between what technical skills the academe provides and the industry-level skills. That is why the curriculum should include relevant industry experiences aligned with specific areas of specialization. The curriculum plays a significant role in giving graduates the skills they need to succeed in the workplace – whether in the academe or the industry.

In addition, academe-industry alignment entails many factors to be fully met. One crucial factor is that insufficient equipment and tools hindered curriculum goals (Akinseinde, 2004). Reduced workshop and laboratory opportunities can diminish the productivity and effectiveness of teachers. Since the factor in question is not a part of this study, the researchers may infer from the data that several factors contribute to graduates' perceptions of their position on the scale.

Moreover, 21st-century education requires community partnerships. Partners play many roles (Peterson & White, 2013). This includes financial support from stakeholders, moral support from parents, camaraderie with barangay officials, and a sense of belonging in a teacher's community. To develop technical teachers, community links and professional engagement should be emphasized in pre-service teacher curricula.

Thus, considering the various requirements for a technical teacher to be qualified to teach, Phase 1 highlighted the importance of technical skills in the tech-voc teaching profession. Looking into its results, the graduates and supervisors agreed that the curriculum is very adequate and very useful in terms of pedagogy. However, the technical skills, which are prerequisites in teaching technical subjects, were assessed differently by the supervisors and the graduates. This disparity is evident in the findings of the first phase of the study and is a reflection of a weaker alignment of the academe and industry in the research locale. In that sense, factors were identified to bridge the gap between the skill preparation provided by the University and the required entry level of the industry. These findings were considered premises on how to improve the curriculum to make it more responsive to the changing needs of the academe and industry. Thus, Phase 1 shared this substantial foundation in developing the industry-responsive curriculum model.

### *Objective 2: Gender and industry-practice gaps*

Based on the analysis of qualified research articles, the following are the emerging themes in gender and industry-practice gaps:

**Table 9**

*Gender Gaps and Solutions*

| Gender gaps | Solutions |
|---|---|
| • Gender stereotyping: Challenges to inclusivity<br>• Culture as a factor of gender discrimination<br>• Parenting styles influencing career choices | • Policies and guidelines toward equal TVET access and practice<br>• Internship and career programs as industry pathways<br>• Community: Support system towards gender inclusivity |

Table 9 shows the gender gaps existing in TVET practices. Since tech-voc is usually a male-dominant field, discrimination is a prevailing challenge against women and the members of the LGBTQIA+ community. Regardless of gender or orientation, everyone is encouraged to contribute to a sustainable society. Sustainable development requires women's and LGBTQIA+ individuals' participation and engagement because development can only be attained if it entails the participation of everyone. These marginalized genders must have equal access to decision-making, leadership, employment, political participation, economic resources, and quality education (UNESCO, 2016).

The prevailing gender concerns in TVET were the challenges to inclusivity, like gender stereotyping, culture as a factor of gender discrimination, and parenting styles influencing career choices (Alinea, 2022). Inequality, stereotyping, and biases continue to exist within the tech-voc system. These prejudices have even reached the classroom, where learning is compromised due to gender norms (Pregoner et al., 2020). The existence of this gender gap continues to contribute to an imbalance in the supply of workers of both sexes. This affects both the number of workers and the well-being of the minority. Moreover, gender stereotypes crept into the industry. This exacerbates the problem of the gaps.

According to the TVET literature, gender disparities stem from people's diverse cultural practices and ideologies. Deeply entrenched prejudices, attitudes, and customs confine individuals and prevent them from reaching their full potential (Egun & Tibi, 2010). Furthermore, culture is linked to parenting styles among TVET students and graduates. Clearly, parents significantly influence their children's career decisions (Mustapha et al., 2013). Since parents are influenced by non-inclusive cultural practices, gender, predominantly females and LGBTQIA+, are discouraged from pursuing TVET.

However, gender disparities can be reduced through a variety of strategies. When enforced by memoranda, laws, or resolutions, policies and guidelines can provide equal access and opportunity to all genders (van der Meulen Rodgers et al., 2011). Policy and guidelines also generate budgets that are typically problematic for TVET. Even though it may sound convincing, it is an external force that compels people to comply. However, internal forces remain the most effective means of eradicating biases and prejudices.

Internship and career programs effectively instill the importance of inclusivity in TVET (Mustapha et al., 2013). Thus, the value of the TVET program can be communicated to the students, allowing them to develop an interest in pursuing TVET. When policies and guidelines support these changes, incorporating them into the curriculum would be simple. The school's community and other stakeholders can be an excellent addition to gender equality advocacy as a collective effort.

**Table 10**

*Industry-Practice Gaps and Solutions*

| Industry-practice gaps | Solutions |
|---|---|
| • Transversal skills as determinants of TVET employability<br>• Mismatches and shortages of technical skills<br>• Administrative support as an integral part of the TVET system | • Curriculum development: Impact of teachers and instructions<br>• Academe-industry collaborations as work-based learning<br>• Seminars and training toward the demands of the industry |

Table 10 details the industry-practice gaps and the solutions to address them. The literature review highlighted the emerging themes in the TVET practices contributing to industry-practice gaps. These gaps are the lack of transversal skills that are key determinants of TVET employability nowadays, mismatches and shortages of technical skills, and the lack of administrative support in the TVET systems.

Various studies identify industry-practice gaps. Students and graduates of TVET also lack the necessary transversal and employability skills to remain in the workforce (Rosen et al., 2018). Influenced by the fourth industrial revolution, the TVET system prioritizes technical skills over equally critical human skills. However, there is a widening gap between graduates' technical skills and the industry's requirements. Students and graduates of TVET are required to develop both technical and transversal competencies. Moreover, the lack of administrative support in the TVET system exacerbated the disparities between industry and practice. Without it, the infrastructure, facilities, industry connections, teachers, and students will never attain the desired level of TVET.

However, TVET is working to address the gaps between the academe and industry. First, it is prudent to begin with the curriculum. The curriculum must be aligned with industry standards, and collaboration with the business community is crucial (Mimi Mohaffyza Mohamad et al., 2021). All curriculum development processes should involve a productive partnership with the industry. Curriculum plan, design, implementation, and assessment should involve industry partners. Industry-practice gaps will be reduced when these strategies are coupled with collaborative efforts in training and workshops and sharing resources such as laboratories and shops.

Consequently, even if there are industry-practice gaps, there are solutions to bridge them. But despite the numerous efforts to reduce the gaps, these gaps continue to pose obstacles and problems that prevent the improvement of TVET. Yet, the reality that TVET is the cradle of any country's workforce remains a reality that can aid economic development and stability. Unquestionably, tech-voc education is a viable and sustainable option for helping individuals realize their full potential as economic growth and development contributors to the nation. The tech-voc education landscapes of the Philippines and ASEAN indicate a promising leap toward opportunities for personal and professional advancement and nation-building. Because qualifications and standards are explicitly aligned with job and industry requirements, technical and vocational education programs can be redesigned and improved to make them more appealing as a career path. In addition, it is believed that education and training are responsive to stakeholders, the enterprise, and the future industry that will require these qualifications. As a mechanism for diplomacy and cooperation, tech-voc can also promote international collaboration (Ancho & Kadek Aria Prima Dewi PF, 2021).

***Objective 3: Gender-responsiveness***

In Phase 3, the technical-vocational teacher education program in a state university is the activity system, assuming curriculum practices in technical-vocational teacher education as the object. Using diagnostic questions, issues or tensions defined by Engeström (1987) were identified and classified as contradictions in the activity system. These are detailed in Table 11 below:

**Table 11**

*Contradictions in the Activity System*

| Elements in the Activity System | Contradictions |
|---|---|
| Subject | Gender biases of teachers.<br>Gender role stereotyping that hinders women's and LGBTQIA+ individuals' progress in tech-voc.<br>Gender stereotypes in resources, content, and language. |
| Rules | Nonengagement of teachers with gender-related policies.<br>Lack of knowledge of curriculum policy requirements about gender equality and inclusivity.<br>Lack of certain instrumentalities within the activity system about gender. |
| Tools | Absence of conceptual and material tools to help support gender-responsive curriculum practices. |
| Community | The patriarchal culture of the activity system is contributed by the environment, the family, and the teachers. |
| Division of labor | Biases, stereotypes, and discriminations against women because of physical ability considerations. |
| Object | The results of interactions between other elements of the activity system. |

Phase 3 found that the tech-voc teacher education program as an activity system has very limited representations of LGBTQIA+ individuals. This can be associated with the lack of access to TVET or TVTEd. According to Thoreson (2017), in the Philippines, students who are LGBTQIA+ too often find that their schooling experience is marred by bullying, discrimination, lack of access to LGBT-related information, and in some cases, physical or sexual assault. These abuses can cause deep and lasting harm and curtail students' right to education, protected under Philippine and international law. Thus, the minimal number of LGBTQIA+ individuals in the activity system can also be linked to the fear of coming out. Coming out can be a challenging process. The majority of individuals receive the message that they must be heterosexual and act according to society's definition of their gender, as sexual orientation and gender identity codes are strictly enforced by society. For LGBTQIA+ individuals, there may be a sense of being different or of not fitting into the roles expected by family, friends, coworkers, and society at large. Coming out requires confronting societal reactions and attitudes toward LGBTQIA+ individuals (University of Washington, n.d.).

Moreover, the activity system experienced and is experiencing contradictions within its elements. These elements are the subjects, rules, tools, community, division of labor, and object. Each element contributed to the factors that impeded gender-responsive curriculum practices in TVTEd, which have been analyzed thematically.

Gender biases of teachers, gender-role stereotyping that hinders women's and LGBTQIA+ individuals' advancement in tech-voc, and gender stereotypes in resources,

content, and language are recurring themes in the subject. The technical teachers who are participants in the study also favored men, which discriminated directly against women and LGBTQIA+ individuals. They also failed to recognize the significance of women in advancing the tech-voc field and blamed them for their weaker physical abilities. Likewise, teachers lacked the conceptual tools necessary to make lessons applicable to gender-responsive pedagogies. This lack of pedagogical skills impacted their gender-responsive teaching practice.

Teachers appeared to perpetuate discrimination and biases between genders in a male-dominated field. As a result of teachers' biases, women and LGBTQIA+ individuals experience a demoralizing effect that diminishes their self-confidence, belief in their abilities, and outlook on success. It appeared that teachers' gender bias has longer-term effects on women and LGBTQIA+ individuals, affecting their career opportunities and earnings.

Regarding rule contradictions, the gender-related policies and the school's gender committee are emerging gender aspects. Although there are policies and committees in place, teachers are unaware of them, and those who are aware do not experience or perceive their existence. This lack of participation in gender-related policies resulted from ignorance regarding the curriculum policy requirements on gender equality and inclusivity. This also hindered certain instruments that can only be advantageous to the teacher if they are correctly oriented.

Participants of Phase 3 were surveyed regarding both conceptual and material curriculum tools. Due to the limited number of seminars and training within the activity system and the teachers' lack of engagement in gender-related policies and research, curriculum practices are traditional compared to contemporary socio-cultural demands. In addition, gender responsiveness for them is limited to integration and does not include gender mainstreaming. For them, it is restricted to incorporating specific topics into the curriculum and conducting seminars, workshops, and training related to gender, which are all superficial manifestations of gender responsiveness. This concept of integration has been added to the emerging gender issues that place barriers to gender inclusivity, thus not resulting in gender-responsive curriculum practices.

Also, the community is generating considerable interest in the activity system. It is defined by the culture of the school, the teachers, and the community. The majority of participants believed that culture hinders gender-responsive curriculum practices. Parents and family members of students exhibited bias and discrimination against women and LGBTQIA+ individuals enrolled in TVTEd. Moreover, due to contradictions within the subject and other factors, the community develops its contradictions. Furthermore, these contradictions perpetuate the problems.

Furthermore, the division of labor is also a major concern. In the activity system, women are regarded as less skilled and weaker in physical ability. Laboratory tasks in automotive and mechanical technology programs are separated based on their physical demands. This prevents women from reaching their full potential due to gender-based discrimination. Thus, most tech-voc female graduates are employed in offices and computer work rather than in fields aligned to their specialization. These factors place women in a disadvantageous position and deny them equal opportunities with men. Other participants have recognized that these contradictions extend to the industry, so it is no longer confined to the activity system, consequently sustaining contradictions and perpetuating problems. However, there is no emerging theme in the division of labor regarding discrimination among LGBTQIA+ individuals.

However, the mentioned issues can also serve as catalysts for growth. In response to the findings of Phase 3 of this study, a curriculum implementation framework was created

to assist TVET and tech-voc teacher education institutions in adopting gender-responsive curriculum practices. In addition, recommended solutions emerged from the collected data, and these perspectives within the activity system are excellent beginnings for gender responsiveness.

Training, seminars, and workshops centered on gender can equip teachers, students, and even parents in the activity system with knowledge of gender equity and inclusivity. In the long run, awareness is only the beginning of much more effective gender mainstreaming. These initiatives can also provide teacher training on technicalities such as modifying syllabi, employing gender-responsive pedagogies, and integrating gender equality into the curriculum. Local government units, non-governmental and governmental organizations, parents, and the business sector can be tapped for gender-related programs and collaborative projects. They can have a fair share of the training budget, and their perspective will aid in developing a holistic approach to addressing the issues.

If the University maintains a gender-focused partnership agenda, the tech-voc industry can be valuable in resolving the contradictions. In addition, a collaborative effort from various levels of the education system, such as elementary, secondary, TVET, and tertiary education, can better emphasize gender equity in creating a balanced curriculum. Writers of curricula should view gender responsiveness in the curriculum as something that begins with the learners' earliest years.

Regarding contradictions and gaps emerging among the LGBTQIA+ individuals, In the Philippines, legislators and school administrators have recognized the problem and devised solutions. Existing policies and statutes prohibit bullying and harassment on the basis of sexual orientation and gender identity. The adoption of these policies sends a clear message that bullying and discrimination in educational institutions are unacceptable and should not be tolerated. On paper, these policies are strong; however, they have not been enforced adequately. In the absence of effective implementation and monitoring, many LGBTQIA+ students continue to be bullied and harassed. Negative treatment from peers and teachers is exacerbated by discriminatory policies that stigmatize and disadvantage LGBTQIA+ students, as well as a lack of information and resources about LGBTQIA+ issues in schools (Thoreson, 2017). Thus, an effective implementation plan and monitoring should be imposed in the activity system.

Emerging gender issues can also be addressed by formulating policies based on research and extension. The policy can be derived from any part of the curriculum development process if it is grounded in research and extension activities addressing gender discrimination and biases in tech-voc.

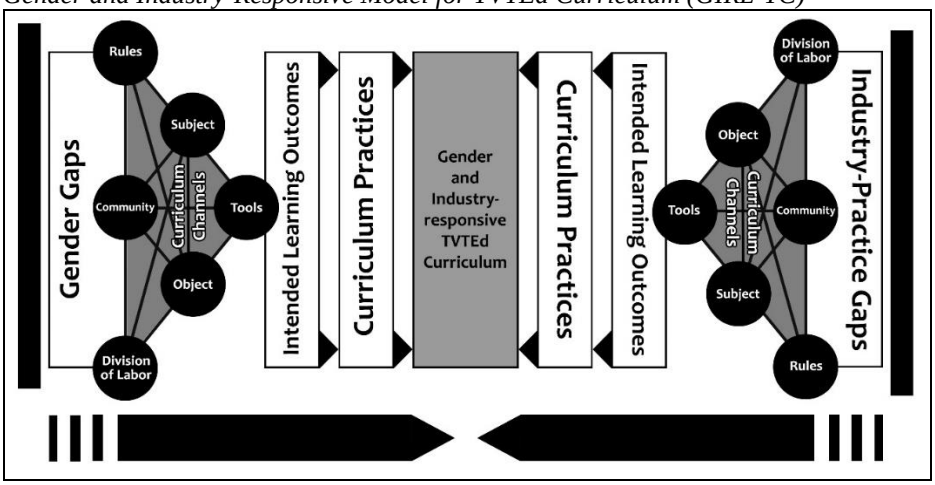
### *Objective 4. Gender and industry-responsive curriculum model for technical-vocational teacher education program*

The major output of this study is the curriculum model grounded on the findings. It is the gender and industry-responsive model for technical-vocational teacher education curriculum (GIRL-TC). It was further detailed by separating the model into two individual submodels – the gender-responsive TVTEd curriculum model (GReT-C Model) and the industry-responsive TVTEd curriculum model (IResT-C Model).

This section shows in detail the gender and industry-responsive curriculum model for tech-voc teacher education program. The discussion focused first on the main model (GIRL-TC), followed by the two submodels that highlighted the gender and industry components of the curriculum model.

**Figure 2**

*Gender and Industry-Responsive Model for TVTEd Curriculum (GIRL-TC)*




The curriculum model above, Figure 2, is a diagram where gender and industry components meet in the middle to depict the gender and industry-responsive curriculum for the TVTEd program. They carried the same elements on either side of the model. This feature allows the academic community to use the same entry points in adopting academe-industry alignment and gender equity.

The model's left side is the gender component; the right part focuses on the industry component. There are arrows that meet in the middle depicting the flow of the diagram. The arrows start as a broken line and then become solid as they approach the middle portion. This portrays the changes happening in the activity system as it transforms into a gender and industry-responsive curriculum.

The model is comprised of several elements. These are the gaps (industry-practice and gender), the curriculum channels, the intended learning outcomes, the curriculum practices, and the main goal in the middle. These elements flow from the model's outer parts and meet in the middle of the diagram. Each element is detailed in the succeeding paragraphs.

In addition, the GIRL-TC can be used effectively in all phases of the curriculum development process. Considerations in the different elements of the curriculum channels are opportunities to reform the curriculum from planning to designing, designing to implementing and implementing to evaluating. To further elaborate the GIRL-TC, each component is discussed in detail below.

***Gender-Responsive TVTEd Curriculum Model (GReT-C Model)***

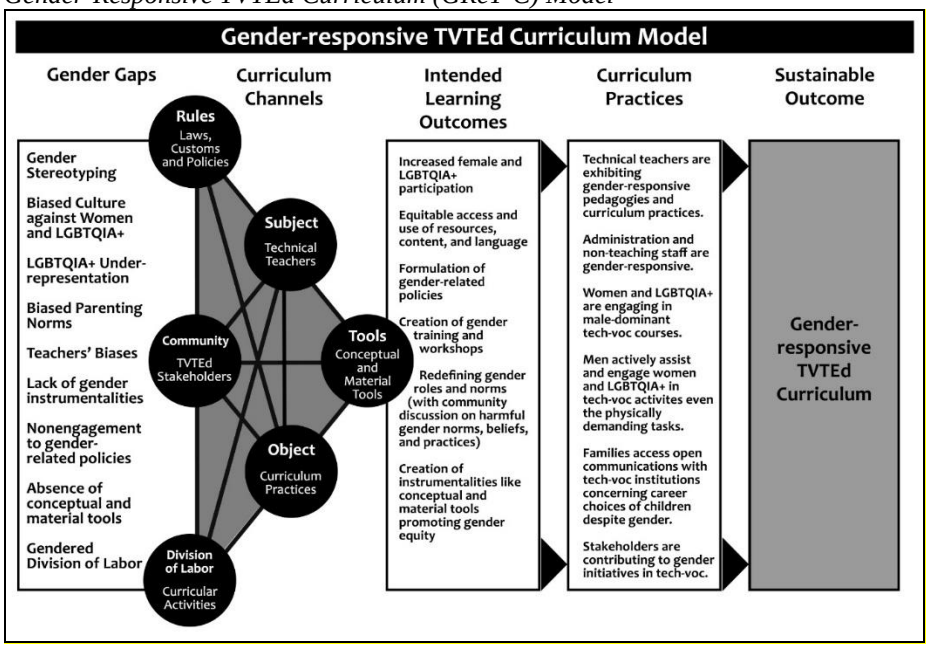
The study shows the emerging gender gaps in the TVET literature and the contradictions within the activity system constraining gender-responsive curriculum practices. These challenges that keep women and LGBTQIA+ individuals in a disadvantaged position in tech-voc perpetuate gender biases and discrimination. With this study's results as inputs, the curriculum model below, GReT-C Model, Figure 3, was developed to make tech-voc teacher education gender-responsive.

The structure of the model is adapted from the gender pathways conceptual framework or simply Pathways™. Pathways™ is originally a framework for designing

health communication programs related to gender, particularly for women (Health Communication Capacity Collaborative, 2016). The elements in the model include gender gaps, curriculum channels, intended learning outcomes, and the curriculum practices leading to the sustainable gender-responsive TVTEd curriculum. The model follows a system flow starting from the identification of the gender gaps that are evident in the TVTEd activity system. The identified gender gaps can be addressed in the different entry points coined as the curriculum channels. These channels are evident in all curriculum development processes and will eventually attain the intended learning outcomes (ILO). When the attainment of the intended learning outcomes is sustained, gender-responsive curriculum practices follow. The last element of the model is the end goal of the processes, that is, the sustainable gender-responsive TVTEd curriculum.

**Figure 3**

*Gender-Responsive TVTEd Curriculum (GReT-C) Model*




The elements in the curriculum model are detailed as follows:

**Gender gaps.** Identified in the study are gender stereotyping, biased culture against women and LGBTQIA+ individuals, the underrepresentation of LGBTQIA+ in the activity system, biased parenting norms, teachers' biases, lack of gender instrumentalities, nonengagement to gender-related policies, absence of conceptual and material tools, and gendered division of labor. These are the most frequently emerging gender issues in tech-voc teacher education and TVET. Institutions that might use the GReT-C model can include other gender gaps not mentioned depending on the needs of their context.

**Curriculum channels.** The channels identified in the model are innovations influenced by the Cultural Historical Activity Theory (CHAT) of Engeström (2005). Considering the TVTEd as the activity system, elements within it experienced and are experiencing contradictions that constrain the implementation of gender-responsive curriculum practices.

These elements are the subject (teachers), rules, tools, community, division of labor, and object. The lines that connect them show the complex relationship among elements. Though contradictions were first mapped in the study, the same elements will be used in the model as entry points for transformation, making the curriculum gender-responsive using the curriculum channels. The collaboration between elements will develop into the intended learning outcomes that are discussed below. The curriculum channels will likely change as well depending on the context of the TVET and TVTEd institutions. However, other evolving themes can be captured by the interconnection of the channels.

**Intended learning outcomes.** Intended learning outcomes will emerge when members of the TVTEd activity system become aware of the identified gender gaps in their practice and the curriculum channels are utilized for gender responsiveness. The model has identified several intended learning outcomes that include but are not limited to increased female and LGBTQIA+ participation; more equitable access and use of resources, content, and language; formulation of gender-related policies; creation of gender training, and workshops; redefining gender roles and norms (including community discussion on harmful gender norms, beliefs, and practice); and creation of instrumentalities like conceptual and material tools promoting gender equity. These outcomes can only be attained when there is a sustainable effort promoting gender awareness to gender mainstreaming. When several gender gaps are inserted depending on the context of the TVET or TVTEd, the creation of additional intended learning outcomes will likely happen.

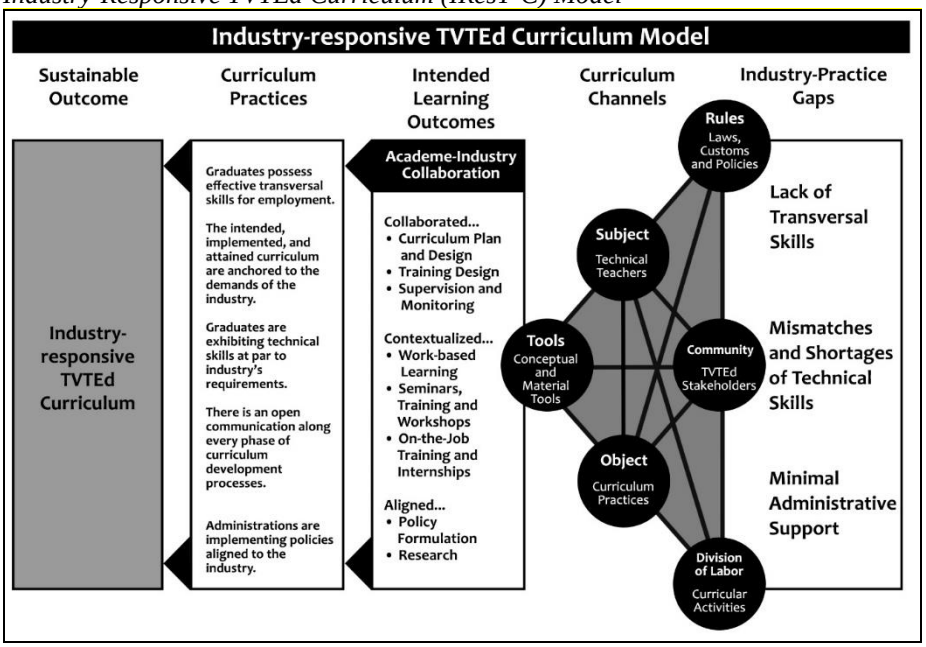
**Curriculum practices.** To attain a gender-responsive curriculum, TVET and tech-voc teacher education programs should sustain gender-responsive intended learning outcomes using the GReT-C model. Curriculum practices that are gender-responsive will come out naturally, and that activity system will be characterized by an environment where technical teachers are exhibiting gender-responsive pedagogies and curriculum practices; administration and non-teaching staff are gender-responsive; women and LGBTQIA+ individuals are engaging in male-dominant tech-voc courses; men actively assist and engage women and LGBTQIA+ in tech-voc activities even the physically demanding tasks; families access open communications with tech-voc institutions concerning career choices of children despite gender; stakeholders are contributing to gender initiatives in tech-voc.

## ***Industry-Responsive TVTEd Curriculum Model (IResT-C Model)***

Tech-voc teacher education program prepares students for industry works aligned to their specialization and for the teaching profession as a trainer, assessor, and technical teacher in senior high schools, TVET institutions, or HEIs with tech-voc teacher education program (CHED, 2017). However, because of the prevalent academe-industry gaps in the field, as evident in this study's findings, most graduates end up working in areas that are not aligned with their specialization. Thus, the curriculum model above, IResT-C Model, Figure 4, has been developed to address the gaps in the academe-industry alignment. This is the detailed part of the industry counterpart of the gender and industry-responsive curriculum model developed in this study. IResT-C model mirrors the GReT-C model, so they overlap in the middle when combined. It resembles the same flow but is in the opposite direction.

**Figure 4**

*Industry-Responsive TVTEd Curriculum (IResT-C) Model*




The IResT-C model is composed of several elements that are detailed below:

**Industry-practice gaps.** These are the main considerations that are needed to be addressed immediately. These are the lack of transversal skills, mismatches and shortages of technical skills, and minimal administrative support. Depending on the context of a TVET institution, whether tech-voc or tech-voc teacher education, these identified gaps may vary, and some other gaps may also be added. However, the model exhibits flexibility. As long as the identified gaps are resolved in the curriculum channels, industry-responsive outcomes will be achieved.

**Curriculum channels.** The curriculum channels are also enhanced from the CHAT of Engeström (2005). Though the methodology used in Articles 1 and 3 (studies that focused on industry responsiveness) does not use CHAT as the theoretical lens, since TVTEd is the same activity system, implementation along with gender concerns will be convenient. The curriculum channels are the same as discussed in the gender-responsive model. These are the elements of the activity system where curriculum practices will be aligned to the industry. The lines that connect the elements show the complex relationships among them and how each element affect the others. It is a whole school approach where every element should contribute to the alignment efforts of the academe and the industry. The interconnection of the channels caters the other evolving themes that may arise depending on the TVET and TVTEd contexts.

**Intended learning outcomes.** The intended learning outcomes were drawn from the curriculum practices addressing the identified industry-practice gaps in the activity system. These outcomes are aligned with the industry-practice gaps, considering the interconnection of the various identified curriculum channels. Also, the interactions of the identified

intended learning outcomes will address the gaps in the lack of transversal skills, mismatches and shortage of technical skills, and minimal administrative support. Indeed, intended learning outcomes were also drawn from the findings of the study. These are the academe and industry collaborations that include but are not limited to curriculum planning, designing training, supervision and monitoring, work-based learning, seminars, training and workshops, on-the-job training, immersions and internships, policy formulation, evaluation, and research.

**Curriculum practices.** When intended learning outcomes become sustainable, industry-responsive curriculum practices will be attained eventually. The main goal is to have an activity system whose graduates possess effective transversal skills for employment; the intended, implemented, and attained curriculum are aligned and anchored to the demands of the industry; graduates exhibit technical skills at par with the industry's requirements; also, there is an open communication along every phase of the curriculum development process; and the administration is implementing policies aligned to the industry.

It is also imperative in the relationship between the academe and industry to maintain checks and balances within the activity system. With that, TVTEd students and graduates can be equipped with the necessary skills needed by the 21st-century TVET industry.

## Conclusions and recommendations

Following a comprehensive and exhaustive analysis of the data and outcomes, the following conclusions were reached:

The TVTEd curriculum produces graduates equipped with the necessary pedagogical skills as expected by the supervisors of the academe. However, there is a disparity in the technical skills of the graduates based on their different responses from the supervisors. This disparity signifies an academe and industry misalignment in terms of technical skills. Therefore, this has been an important factor contributing to the development of the curriculum model that will make the curriculum industry responsive.

In addition, there are existing gender and industry-practice gaps in the TVET system. These gaps exacerbated the impending problems in academe-industry alignment and gender responsiveness of TVET and TVTEd. However, there are also solutions proposed to address the gaps. For relevant skills to be taught to TVET students, the identified solutions in this study rely on a comprehensive collaboration between all parties involved in curriculum development. Therefore, to address the gaps in TVET, the various stakeholders must participate in all curriculum development processes. These gaps are significant indicators that help ensure quality TVET practices regarding skill delivery to students, thereby producing graduates with industry-relevant skills and are also gender-responsive.

Likewise, there are contradictions in the TVTEd activity system. Although the results indicated that teacher educators in the activity system are aware of gender inequalities as they relate to disparity, they are unable to systematically engage with gender issues in the curriculum, thereby limiting the agential potential of future teachers to engage with gender issues in their curriculum practices. This is despite the availability of numerous gender-related policies with the potential to transform the curriculum.

Lastly, the findings of the three phases of the study were consolidated, creating a gender and industry-responsive curriculum model. When properly implemented, the consolidated efforts and measures of the elements in the activity system will make the tech-voc teacher education program gender and industry-responsive. Their interactions with all the components in the model will eventually bridge the gender and industry-practice gaps,

thereby attaining a strong academe-industry alignment and a gender-inclusive and industry-responsive curriculum.

In terms of recommendation, establishing a close connection and alignment between academe and industry would help bridge their gaps in terms of their demands and expectations through collaborations in all phases of curriculum development. The findings can be used as baseline data in developing policies and guidelines that will help address the impending problems of the TVET system. TVET institutions should craft and modify existing written curricula adhering to the gender gaps identified in this study. In addition, LGBTQIA+-related gaps and contradictions should be further studied. Also, the need for local and international immersion and training in both "hard" and "soft" or transversal skills must go hand in hand with a synchronized TVTEd curriculum. Interventions in the forms of programs, projects, seminars, workshops, training, research and extension services should be given priority among technical in-service and pre-service teachers to hone awareness and thereby mainstream gender in the curriculum practices.

Furthermore, with the changing and updating nature of the industry, further study on the same nature should be pursued to keep TVET institutions up to date with the needs of the industry and be gender-responsive. In addition, research that focuses on the efficient alignment of the TVET curriculum to the industry needs should be conducted. This research may include other factors that affect the quality of graduates, like policy-practice gaps, facilities and equipment available, and student support.

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