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Comparative TVET Curriculum: Indonesia and Philippines Based on Indonesia's Vision 2045

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ABSTRACT

Indonesia's Vision 2045 in the employment aspect, the first stage, is to anticipate job market disruption by facilitating access to reskilling and upskilling institutions in STEM areas of expertise. One of the reskilling and upskilling institutions in Indonesia is LKP. Based on this, this research aims to compare the LKP curriculum in Indonesia with the NCIII curriculum in the Philippines, which has been integrated with the STEM framework. The qualitative research approach of literacy study is applied in this study. The level of explanation in this study is a comparative study. To compare 2 curricula at different qualification levels, the AQRF framework is needed as an equalizer. Both curricula need to be converted according to the level in the AQRF, to produce an equivalent level. The results of comparing the two curricula show similarities and differences. In terms of similarities, both the LKP curriculum in Indonesia and the NCIII curriculum in the Philippines both adhere to the SILO approach to STEM, This approach indicates that each branch of science stands separately. Meanwhile, the difference is in the achievements of each element, for the LKP curriculum in Indonesia, competencies are separated based on work abilities, knowledge, attitudes, and values, whereas in the Philippines, the NCIII curriculum for each element of competency achievement is determined by the thinking skills domain, multiliteracies (is a soft skill in terms of literacy, for example, digital literacy, numeracy, and cultural literacy) in the STEM framework. NCIII is a national certification under the auspices of TESDA as the employment distribution authority in the Philippines. National certification is often used as a requirement for applying for jobs. Employment acceptance in Indonesia can accommodate employment acceptance in the Philippines, by using certification as a prerequisite for entering the workforce. The certification is proof that the candidate worker has adequate competence in the STEM field.

Keywords: Curriculum; LKP; NCIII; STEM Approach; STEM Framework.

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1. INTRODUCTION

Indonesia's Vision 2045 is an effort to realize the nation and state's goals based on the preamble to the 1945 Constitution. The opening of the 1945 Constitution has the meaning of justice, prosperity and sovereignty. Achieving that goal Indonesia Vision 2045 is supported by 4 main pillars: (1) human development and mastery of science and technology; (2) sustainable economic development; (3) equal development, as well as; and (4) strengthening national

resilience and governance. Each pillar has supporting aspects. TVET (Technical and Vocational Education and Training) is under the auspices of the first pillar in the development plan in Indonesia. The first pillar consists of several aspects, including: (1) population; (2) education; (3) health; (4) mastery of science and technology; (5) culture; and (6) employment. Among the aspects that are directly related to TVET are the aspects of education and employment (Kementerian Perencanaan Pembangunan Nasional/Bappenas, 2019). The education and employment aspects are in accordance with TVET, because TVET is a combination of formal, informal, and non-formal learning that equips the young generation with knowledge and skills for work (Kanwar et al., 2019; Njenga, 2023).

From the educational aspect, it is estimated that in 2045, 90% of workers in Indonesia will come from high school and equivalent graduates and universities (Kementerian Perencanaan Pembangunan Nasional/Bappenas, 2019). TVET is Vocational education must be improved by equipping the young population with technical skills. and then Study programs, areas of expertise, and subjects are developed to suit the dynamics of the world of work (Mayombe, 2024; Shi & Bangpan, 2022; Suharno et al., 2020). The role of vocational education is crucial to meet the average background of graduate workers (Kenayathulla, 2021). With a competency-based curriculum, vocational school graduates are expected to be able to fill strategic positions that require specific skills. After graduating, vocational high school students can continue to hone their skills according to the demands of the industrial world. Students can follow programs that have been provided by the government. so that students can obtain certification (accompanied by certain skills) that are recognized nationally and internationally.

For the employment aspect, the main hope is to increase economic growth from 2015 to 2045. In achieving this hope, employment development is divided into 3 stages: 1. Short term 2016-2025; 2. Medium-term 2026-2035; 3. Long term 2036-2045. For aspects of employment and education are included in the short-term plan. Short-term employment development (first phase) will be implemented from 2016 to 2025. The focus of the first development phase is to increase the relevance of skills to the needs of the world of work and to anticipate job market disruption due to very rapid technological developments. To handle this, it is necessary to focus on expertise in the STEM (science, technology, engineering and mathematics) fields (Kementerian Perencanaan Pembangunan Nasional/Bappenas, 2019).

STEM disciplines are becoming increasingly important in today's society, as they can foster innovation and shape the future of the global economy (Ahmadov, 2020; Bacovic et al., 2022; Warsito et al., 2023). The labor movement can be accommodated through training systems (re-skilling and upskilling) and the availability of labor market information as well as providing competency certification based on international standards. When viewed from the first stage of employment development, course, and training institutions can accommodate the need for upskilling and reskilling (Grimes et al., 2022). In this case, what is meant by STEM discipline refers to the scientific field in the STEM group which stands alone.

So the main focus of this research is to examine institutions that bridge the world of education with the world of work in the STEM field. Course and training institutions are non-formal education levels with SKL-based assessment guidelines (graduate competency standards). Based on Presidential Regulation Number 8 of 2012 concerning the Indonesian National Qualifications Framework, the SKL is prepared based on the KKNI (Susilowati, 2023). If you look at the LKP curriculum, learning still does not apply the STEM framework. The LKP curriculum in Indonesia is designed to stand alone for each STEM field (SILO Approach). The Philippines is a country in ASEAN that has integrated the STEM framework in the TVET curriculum under the auspices of

TESDA (Technical Education and Skills Development Authority) (Sherlin Talento et al., 2022). When compared with the vocational school education level which is equivalent to ISCED 3 (Amalina et al., 2023; UNESCO, 2021a), the Philippines is called Technical-Vocational Education (Tech-Voc) (UNESCO, 2021b). Through TESDA in 2022 as many as 84.72% of Tech-Voc graduates in the Philippines were successfully absorbed into the world of work (TESDA, 2023), this figure is higher than the labor force participation rate in Indonesia in 2022 for the vocational school level, namely 77.67% (Badan Pusat Statistik, 2022). In increasing the relevance of skills to job market needs, the Philippines is used as a consideration for comparing curricula at course and training institutions in Indonesia. To review the curriculum policy so that it can be used as a learning experience to increase the acceptance of candidates in the job market.

The focus of this article is to examine the first stage of employment aspects in Indonesia's 2045 vision. The first stage of employment aspects starts from 2016-2025. So it can be formulated that the objectives of the discussion of this article include: (1) Comparison of the STEM point of view in Indonesia with the STEM point of view in the Philippines; and (2) TESDA's role in employment in the Philippines. As a comparison for the first point, compare the LKP level 4 curriculum in Indonesia with the level 3 national certification curriculum in the Philippines which has gone through the equalization stage. As a sample, the curriculum being compared is web programming because this subject is included in the STEM (i.e. technology) category.

2. METHODS

This research is a qualitative literature study so it produces logical arguments from various relevant sources that can answer the research topic. Data are collected from various sources such as research articles, theses/dissertations, books, or other relevant documents (Saputra & Sunarya, 2024). The explanatory level applied is comparative by comparing 2 variables, in this case the Indonesian and Philippine curricula (Lailla & Fitri, 2021). To compare the NQF (National Qualification Framework) in the Philippines as a comparison country with the curriculum and training institutions, it is necessary to equalize the qualification frameworks of the two countries. AQRF (ASEAN Qualifications Reference Framework) is a regional-level qualifications framework that functions as a tool for comparing qualifications across ASEAN/AMS (ASEAN member states) member countries (ASEAN, 2020a). In Indonesia, the Indonesian National Qualifications Framework (KKNI) can also be called IQF (Indonesian Qualifications Framework) (ASEAN, 2020b). Meanwhile, in the Philippines, the term for national qualifications is PQF (Philippine Qualifications Framework) (ASEAN, 2019).

Both PQF and IQF have a different number of levels. However, the difference in qualification levels of the two countries can be equalized through AQRF. AQRF consists of 8 levels, 1 level of AQRF can be represented by more than 1 level in a particular country (for example: IQF levels 3 and 4 are included in AQRF level 4). To compare curricula with a different number of levels, the curriculum level of the comparison country needs to be converted according to the level in AQRF. The result of the level conversion is compared with the level of the comparison country. The comparison country must also convert the curriculum based on the AQRF level. Post-vocational courses and training institutions in Indonesia have levels 3 or 4. If you look at AQRF, they are at level 3 (ASEAN, 2020b). To compare training institutions in Indonesia with AQRF level 3, they must also be compared with national qualifications with AQRF level 3. in the Philippines. AQRF level 3 in the Philippines is equivalent to PQF level 3 in the Philippines, PQF level 3 is called NCIII (National Certificates level 3) (ASEAN, 2019). So to compare level 3 or 4 courses and training institutions in Indonesia, you can compare them with NCIII in the Philippines. As a sample level 4

web programming training scheme, it will be compared with NCIII web development which has been integrated with the STEM framework.

3. RESULT AND DISCUSSION

3.1 Comparison of the STEM point of view in Indonesia with the STEM point of view in the Philippines

Competency units in Indonesia have been described by KOMINFO, horizontally described based on technology and communication (ICT) function areas and vertically described based on their KKNI level, so that each KKNI level has an ICT function area, each job is described at the KKNI level and Regional ICT has competency units (Kementerian Komunikasi dan Informatika Republik Indonesia, 2018). Competency units are arranged in an SKKNI scheme (Indonesian National Work Competency Standards) so that competency units act as a formulation of work abilities (Zalzulifa et al., 2019). In Indonesia, graduate competency standards consist of competency units, where each competency unit contains a competency element, and each competency has a graduation indicator from the aspects of workability, knowledge, attitudes, and values. The following is an example of a fragment of the competency structure of graduates of level 4 web programming courses and training (Kementerian Pendidikan Kebudayaan Riset dan Teknologi, 2022), as shown in Table 1.

Table 1. Piece of Competency Structure for Level 4 Web Programming Graduates

Competency Unit	Competency Elements	Workability	Knowledge	Attitudes and Values
1. Document the web program and use of the source repository	4.1 Create program code documentation (code documentation)	Accuracy in creating documentation tags in program code and then generating web program code documentation according to best practice	Accuracy in explaining the basic concepts of best practice web program documentation and the format of documentation tags inserted into web program code	Accuracy in applying a thorough and thorough attitude in writing tags in program code for documentation purposes
	4.2 Using source code repository	Accuracy in creating and operating local source code repositories and performing clone operations, commit operations and push operations on remote source code repositories	Accurately explains the working principles and basic operations of the source code repository	Accuracy in applying a thorough and disciplined attitude in using source code repositories

Meanwhile, in the Philippines, NCIII has been integrated with the STEM framework. The structure of the STEM framework can be seen in Figure 1 below.

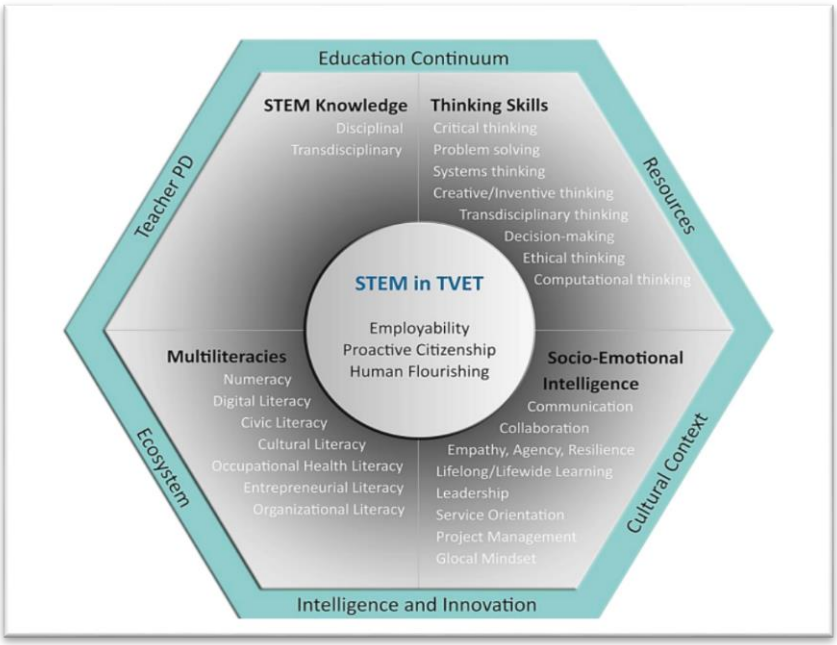

Figure 1. Structure of the STEM Framework

Based on Figure 1, this is a general overview of the STEM framework. The green outline shows the activities that can be carried out to obtain the abilities in question. Obtaining STEM Knowledge can be done through: (1) teacher professional development; (2) Continuing education. To gain the ability to think within a STEM framework, you can do so through: (1) continuing education; (2) resources. To obtain socio-emotional intelligence abilities, this can be done through: (1) cultural content; (2) intelligence and innovation. To obtain multiliteracy skills, you can do this through: (1) ecosystem; (2) intelligence and innovation. So if an ability is formed related to: (1) STEM Knowledge or thinking ability or socio-emotional intelligence or multiliteracy, it is hoped that it can form an ability to: (1) get a job; (2) proactive citizenship; and human development (Ilo & Tesda, 2021). Philippine national certification is composed of core competencies, each core competency has elements as indicators for achieving these core competencies through STEM-based competencies (Ilo & Tesda, 2021). The following in Table 2 is an example of a section of national certification level 3 (NCIII) for web development.

Table 2. NCIII WEB development curriculum pieces

Core Competencies	Element	STEM-based competencies
1. Leverage Software Methodologies	1.1 Identify project requirements and software methodology	Project Management, Systems thinking
	1.2 Apply software methodology	ICT literacy Computational, thinking
	1.3 Use code versioning tools	Computational thinking ICT, literacy
	1.4 do testing	Critical thinking, Problem-solving, Transdisciplinary thinking

The main aim of the integrated STEM framework is to form students' Soft Skills, in the form of Employability, Proactive Citizenship, and Human Flourishing, through several components as shown in Figure 1. In Indonesia, STEM-based learning is learning that involves multidisciplinary knowledge. In this case, scientific disciplines include science, technology, engineering, and mathematics (Nurtanto et al., 2020). However, there are several approaches related to STEM-based learning, including: (1) SILO; (2) Embedded (Embedded Approach); and (3) Integration (Integrated Approach) (Quang et al., 2015). The main difference between the three approaches is the way various scientific disciplines collaborate. The SILO approach is to consider the scientific fields of science, technology, engineering, and mathematics as separate scientific fields (Cheng & So, 2020). The next approach is the embedded approach, in this approach there is a main subject in STEM which is then linked to other subjects as secondary subjects to strengthen understanding of learning (Rahmawati & Juandi, 2022). While an integrated approach is an approach that connects STEM subjects to produce relevant learning content, educators are required to relate STEM subjects to real-world conditions (Kelley & Knowles, 2016).

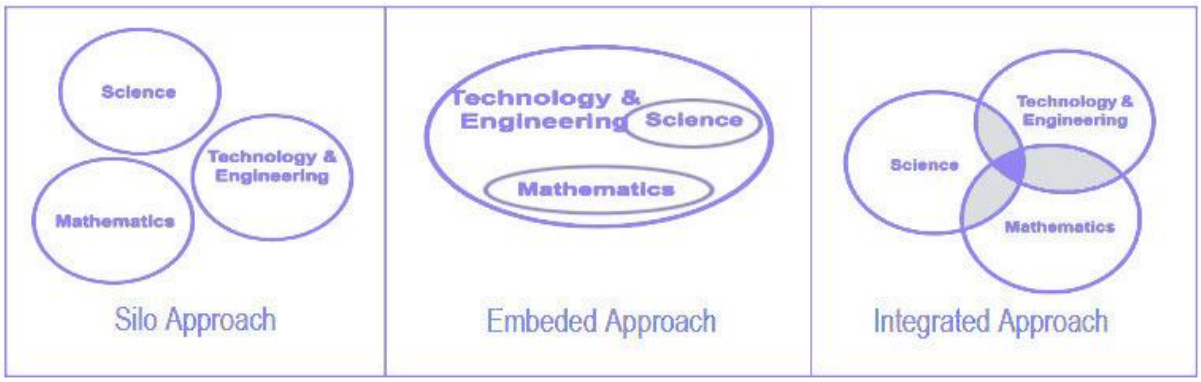

Figure 2. Types of STEM Approaches

Based on Figure 2, the SILO approach is described as separate STEM subjects. This is intended to maintain the domain of each subject, for example, in science, technology, and mathematics lessons, three subjects stand separately and assessments are carried out separately. Meanwhile, the embedded approach. There is 1 main subject, for example, which is embedded in other STEM subjects in Figure 2, and there is a Technology subject which is embedded in Science and Mathematics subjects, in the embedded approach only the main subject is assessed. And the last one is the integrated approach, the integrated approach is different from the embedded and SILO approaches, the integrated approach removes the walls separating each subject, and the integrated paradigm can combine at least 2 subjects to produce 1 learning subject (Juniaty, Siti, & Supriyono, 2016).

Meanwhile, in the Philippines, the STEM framework formulated by TESDA is focused on forming Soft Skills, based on Figure 1. The Soft Skills in question are: employability, proactive citizenship, and human progress. The meaning of employability is that from the aspects of knowledge, skills, and attitudes someone can get a job. The meaning of proactive citizenship is the realization of constructive actions by citizens towards their community, for example, passively obeying the law to proactively help their community and contribute to society (Kim et al., 2022). Meanwhile, human progress is defined as lifelong learning in a higher sense, which means achieving the highest self-actualization, meaning developing oneself to the point of being useful to many people. Human progress can be likened to human ecology, occurring when humans are

interconnected with physical, social, spiritual, creative, and natural existence through meaningful and intentional practices (Mccormack & Titchen, 2014). To support this, there are 4 main domains which can be seen in Figure 1. The first domain is STEM knowledge, namely: an approach that connects several knowledge in STEM subjects to solve problems in the real world. The second domain involves related thinking skills: solving problems, understanding relationships, making informed decisions, or innovating for the improvement of personal, community, workplace, and regional/national contexts. The next domain is multiliteracy. This domain is related to a form of literacy that bridges STEM knowledge, skills, attitudes, character, and values (Ilo & Tesda, 2021). The final domain discusses Social-Emotional Intelligence, namely the capacity to integrate cognition, feelings, and intuition to recognize, understand, manage, apply, and express our emotions and social interactions at the right time, for the right purpose, in the right context. , and with the right people (Rozental, 2017). If the stem approach is connected to the STEM framework, it will look like in Figure 3.

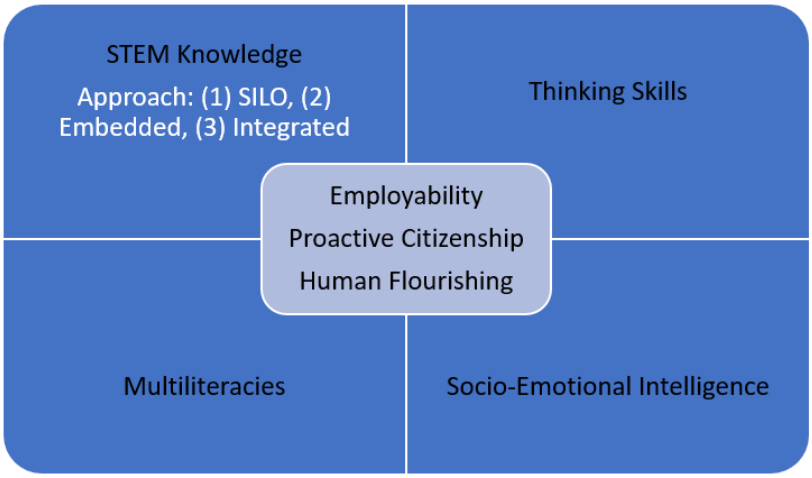

Figure 3. Relationship between STEM Approaches and STEM Frameworks

The discussion of the STEM framework in the Philippines does not end with the approach but for further goals such as: Employability, Proactive Citizenship, and Human Flourishing. However, the STEM approach is part of the STEM framework which is included in the STEM knowledge domain as in Figure 3. The core competency development approach, elements when linked to STEM competencies in the NCIII web development curriculum are included in the Thinking Skill, Multiliteracies domain by integrating STEM thinking abilities in each of them. each element for a core competency. When viewed based on core competencies, elements, and competencies based on STEM, the NCIII curriculum adheres to the SILO approach, because it focuses only on the field of technology without involving the fields of science, engineering, or mathematics, the same as the LKP level 4 web programming curriculum in Indonesia. So both the LKP level 4 curriculum in Indonesia and the NCIII curriculum in the Philippines adhere to the SILO approach, but the difference is the competency achievements of each element, in Indonesia the LKP level 4 competency achievements are separated based on work abilities, knowledge, and attitudes and values, whereas in the Philippines NCIII curriculum, each competency achievement element is determined by the domain of thinking skills, multiliteracies in the STEM framework.

3.2 TESDA's Role in Employment in the Philippines

LKP non-formal education aims to produce graduates who have competencies suitable for the world of work. Based on these objectives, the LKP curriculum adapts to the KKNI so that LKP is referred to as non-formal education with a competency-based curriculum (KBK) (Amri et al., 2018). Based on Law of the Republic of Indonesia number 20 of 2003, LKP is a non-formal education that is structured and has levels. LKP is provided for people who need educational services to replace, supplement, and/or complement formal education so that lifelong education can be created (Herlinda et al., 2017). Because the LKP curriculum is based on the KKNI, there is a leveling that is equivalent to education, job training, and work experience so that it is recognized according to work competency in certain sectors (Nurdin, 2017). Because of this, the LKP curriculum only focuses on 1 job sector, so if it is linked to the STEM approach, the LKP curriculum in Indonesia is included in the SILO Approach. Based on Table 1, starting from competency units, competency elements, work abilities, knowledge, attitudes, and values are all related to technology subjects in STEM, there is nothing related to science, engineering, and mathematics. In the Philippines, Tesda has the role of: (1) Determining policy and planning in TVET; (2) Standardization of competency development, assessment, and certification in TVET; (3) Delivery in TVET; and (4) Registration of a program and accreditation in TVET. However, what is related to the comparative study of curricula based on qualifications is the standardization of competency development for assessment and certification in TVET. In the Philippines, the country's NQF is called PQF (Philipine Qualification Framework). Below in Figure 4 is the qualification framework in the Philippines.

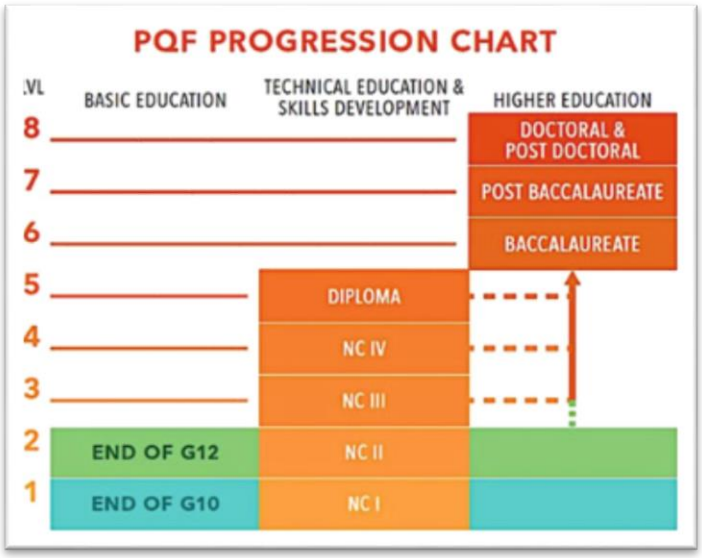

Figure 4. Philippine Qualifications Framework

Based on Figure 4, after graduating from senior secondary education, if candidates want to apply for jobs, they can carry out official certification through TESDA. The nature of the certificate is not a credit, so it cannot be converted as a higher education equivalent. Only Tesda has full authority over certification. Certification in the Philippines is valid for 5 years, which means that after the certificate expires the candidate needs to re-certify. All people who register for work and have been certified have been recorded by TESDA through the online site. TESDA also provides a

job vacancy page and national certification is often a requirement for job applications (Budhrani et al., 2018).

4. CONCLUSION AND SUGGESTIONS

Both in Indonesia and the Philippines, LKP level 4 and NCIII adhere to the SILO approach, however, in the Philippines, they integrate the STEM framework in their curriculum, so that each competency unit in the Philippines is not measured based on psychomotor, affective, and cognitive, but is measured based on the STEM framework. Then in Indonesia, for level 4, it is covered by LKP which is an institution that accommodates up-skilling or re-skilling, while in the Philippines regarding NCIII which is one part of national certification, it is covered by TESDA. Tesda also provides job vacancies that require candidates to have certification. so that workers in the Philippines have proven STEM skills.

The striking difference between the two curricula of the two countries is the skills acquired after undergoing training. The Philippines tends to emphasize soft skills that can make candidates have a proactive personality towards the country, self-actualization that is beneficial to oneself and others, and soft skills in finding jobs according to the candidate's abilities. These soft skills are very important as provisions for job seekers, if applied in Indonesia, they can be inserted into the curriculum in the affective aspect. To compare the curriculum with an integrated and embedded approach, it is necessary to compare the curriculum with a higher level, because basically the higher the level of work, the more macro the scope, so that various STEM fields are needed in the same job. Suggestions for future researchers are to compare reskilling and upskilling institutions with countries other than the Philippines whose curricula adopt an integrated or embedded approach.

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