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Lesson learned from vocational training center as a school-to-work transition program in Indonesia

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ABSTRACT

The objective of this study is to assess the effectiveness of the refrigeration technology training program at the vocational training centers (VTCs) by employing the context, input, process, product, and outcome evaluation approach. This study is classified as evaluative research, employing a qualitative description approach. Data collecting employs several approaches such as observation, interviews, and documentation. The primary informants in this study included the head of the VTC, the organizer of the VTC, the instructor of the refrigeration technology training, and the participants of the refrigeration technology training. Triangulation methods are employed to guarantee the accuracy and reliability of the data. The findings indicate that the setting, process, and product elements can be categorized as satisfactory, while the input and outcome aspects remain in the poor category. To increase employment and reduce unemployment, this split air conditioning training can be expanded by strengthening program components in the input aspect, particularly facilities, and infrastructure, as well as in the output aspect.

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1. INTRODUCTION

In the current volatile, uncertain, complex, and ambiguous (VUCA) era characterized by continuous innovation and rapid transformation, every country endeavors to offer efficient and high-quality education [1]–[3]. The progress of a country is closely tied to the effective implementation of quality education that promotes competitiveness [4]. There is no doubt that enhancing the quality of education necessitates the cultivation of highly skilled individuals in today's globalized world [5]. However, the open unemployment rate in Indonesia for the year 2024 continues to be elevated.

The school-to-work transition plays a crucial role in preparing a professional workforce and employability skills. These roles include the preparation within the school focusing on the development of

personal resources is considered essential for the school-to-work transition [6], [7]; universities have taken a skills-based approach to enhance students' professional skills as a solution to improve education-to-work transition, but there is insufficient attention to assessing professional skills properly [8], [9]; personality measures are used for pre-employment selection, and schools need to prepare students to handle taking these assessments to enhance their work competence and employability [10], [11]; connecting the career-planning and development stage to the work-adjustment stage, and is necessary for a successful transition to the next stage [12]–[15]; career adaptability plays a role in predicting successful school-to-work transitions, and certain demographic and school-related variables positively predict career adaptability among vocational education and training graduates [16]–[24]; and work-integrated learning is valuable for preparedness for work, but access and participation in it are not equal among all student groups, urging the need for tailored approaches to optimize outcomes for all students [25]–[33].

The necessity for a proficient and adaptable workforce is undeniable in the context of Indonesia's evolving economic environment. Vocational training centers (VTCs), play a crucial role in meeting this demand by providing individuals with the necessary practical skills and knowledge to improve their chances of finding employment and making a positive impact on economic development [34]. Nevertheless, despite being widely acknowledged for their significance, VTCs encounter complex obstacles that impede their capacity to give training that is in line with the requirements of the contemporary workforce [35]–[37]. Technical and vocational education and training (TVET) is anticipated to mitigate the effects of unemployment in Indonesia and can contribute to the well-being of the community [38]–[42]. TVET in training institutions encompasses programs that focus on developing specific skills and competencies through vocational and short-term training courses [43]. Typically, non-formal TVET system requires a brief period to complete the training process, ranging from one to four months. The objective of job training center activities is to develop a skilled, disciplined workforce with an effective work ethic that can respond to existing job opportunities and foster job creation through independent enterprises [44]. The establishment of vocational training centers was a direct response to the community's demand for specialized institutes that provide training in specific production skills, with the aim of equipping workers for employment. It is anticipated that this initiative would ultimately lead to a decrease in the unemployment rate [45].

There are significant research gaps in understanding the intricacies and subtleties of these challenges, as well as in identifying innovative solutions that can transform VTCs into genuinely effective mechanisms for skill development. The current literature predominantly addresses broader VTCs issues in Indonesia, offering limited in-depth analysis of the specific challenges and opportunities within the VTCs system [44]. Although several studies have investigated particular elements such as curriculum development [46]–[49] or instructor training [50]–[54], there is a lack of a comprehensive and holistic approach to understanding the interrelationships between these factors. Furthermore, the absence of up-to-date and contextually relevant research has resulted in a disconnect between the training offered by VTCs and the specific requirements of businesses [55]. Consequently, there is an urgent need for research that not only identifies the key challenges faced by VTCs but also proposes innovative solutions to bridge this gap and enhance the effectiveness of training programs.

This study aims to evaluate the training program at Bogor VTCs using a modified context, input, process, product (CIPP) evaluation model [56] consisting of aspects of context, input, product, process, outcome. This will fill this critical gap by conducting a comprehensive and in-depth analysis of the challenges faced by VTCs in Indonesia [57]. This research contributes to the body of knowledge about vocational training in Indonesia by providing a comprehensive and nuanced understanding of the challenges and opportunities in the VTCs system obtained from the evaluation process with the context, input, process, product, outcome (CIPPO) approach. This research has the potential to revolutionize VTCs by offering evidence-based solutions and best practices. The goal is to create a highly competent and adaptable workforce that can effectively fulfill the demands of the 21st century labor market.

Furthermore, the research will have implications for policymakers, practitioners, and other stakeholders engaged in vocational training. These findings will provide valuable insights for the creation of policies and programs aimed at enhancing the quality and applicability of VTCs. Consequently, this will contribute to the overall enhancement of human resources in Indonesia. The ultimate goal of the research is to equip individuals with the necessary skills and knowledge to obtain significant employment and make a valuable contribution to the economic development of the country.

2. METHOD

This research is a program evaluation study conducted at VTC in Bogor Regency, West Java Province, Indonesia [58], [59]. The subjects of this study include training participants, instructors, organizing committees, and the head of the Bogor Regency VTC. The evaluation model employed is the CIPPO, an enhancement of the CIPP Stufflebeam model [56], as shown in Figure 1. Participatory observation was

conducted at the vocational training center from early March-December 2023. Additionally, the study utilizes an ex post facto research design [60] for analyzing data from 2021. The key informants in this study include the Head of the Bogor Regency VTC, five organizing committee members, four refrigeration technology training program instructors, and six participants from the 2021 refrigeration technology training program.

Data collection techniques included observation [61]–[63], in-depth interviews [64]–[68], and documentation [69]. Interviews were conducted to gather information about settings, inputs, training procedures, training results, and outcomes. Documentation studies collected information such as lists of trainees, instructor data, organizing committee members, attendees, and training schedules. The data analysis utilized a qualitative approach with the assistance of NVivo software. Triangulation methods-source triangulation, time triangulation, and triangulation of data collection techniques-were employed to ensure data validity [70]–[72]. Success criteria are essential to determine the outcomes of each evaluation conducted. For the evaluation of the refrigeration technology training program, the success criteria are based on the regulations set by the Ministry of Manpower concerning Employment Training Centers and the implementation of competency-based training.

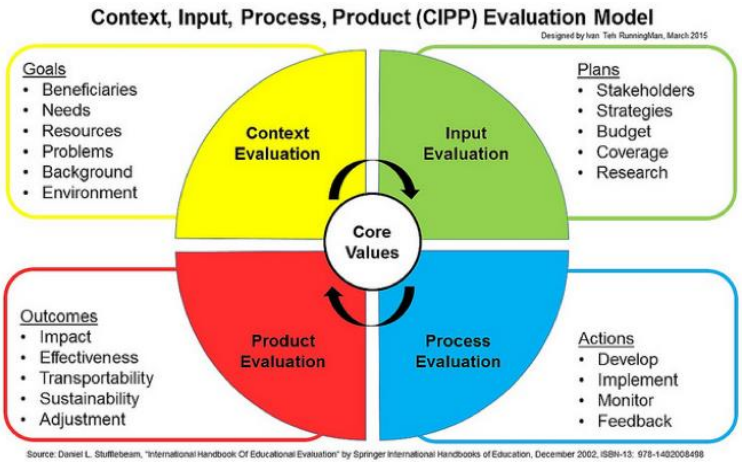

Figure 1. CIPP model [56]

3. RESULTS AND DISCUSSION

3.1. Context

The context aspect encompasses the legal basis for the training program's implementation, program objectives, tasks and functions, analysis of program needs, and indicators of program success. Context evaluation is a process that aids in decision-making, identifying the requirements that a program should fulfill, and establishing program objectives [73]–[76]. The research in this context encompasses several key findings, including the legal foundation utilized, the aims, duties, and activities of the VTCs, the alignment of community needs with the training provided, and the indicators of program effectiveness.

3.1.1. Legal basis of training program

The legal basis for the VTCs training is grounded in the Manpower Law, Article 9 No. 13 of 2003, which outlines job training. The purpose of job training is to equip participants with enhanced abilities and work competencies to become more productive and prosperous. The legal framework for the refrigeration technology training program at VTC Bogor has been thoroughly evaluated and meets the necessary requirements for organizing such a program. This conclusion is further supported by reviewing the relevant constitutional or ministerial regulations related to vocational training implementation and regional regulations governing the existence of VTC Bogor as a training facility. Vocational training in Indonesia is a cross-sectoral responsibility involving vocational teachers, with pre-service programs conducted by universities and in-service programs managed by the Ministry of Education and Culture [14].

3.1.2. Duties and functions of the training program institution

The primary task of VTC Bogor is to organize job skills training for job seekers, workers, and other community members who require competency training and certification. Additionally, VTC Bogor functions to prepare individuals who are skilled, disciplined, productive, polite, and devoted to God Almighty. The

institution effectively manages the training program from start to finish, ensuring smooth organization and execution. VTCs in Indonesia play a multifaceted and crucial role in workforce development and economic growth. They address the shortage of skilled labor and help reduce unemployment through various programs and initiatives. For instance, VTCs programs in the electricity sector have significantly contributed to mitigating unemployment issues [34]. The role of VTCs is vital in equipping the workforce with necessary skills, thereby enhancing employability and supporting the country's economic advancement.

3.1.3. Training program needs analysis

The implementation of a good training program should be based on the needs of the Bogor community. Although refrigeration technology training program can be considered well-executed, it does not align with the specific needs of the Bogor Regency area. The necessity for a refrigeration technology training program was determined by the training package from the central ministry, but it does not suit the industrial sector in Bogor Regency due to the limited presence of such industries. This misalignment is evidenced by the lack of interest from participants in the refrigeration technology training program. Thus, the current implementation of the refrigeration technology training program does not meet the needs of the Bogor community. Moreover, the execution of the split air conditioning preparation program at the VTC Bogor Regency does not align with the procedure of identifying community requirements as outlined in Ministerial Regulation Number 2014 (guidelines for the implementation of competency-based training). This procedure involves assessing the needs of the community at the industry, position, and individual levels. The need for this training program is mostly determined by the outcomes of the program evaluation conducted both before and afterward the training [77]–[79].

3.1.4. Objectives of the refrigeration technology training program

The VTCs, as the executing body of the Manpower and Transmigration Office, aims to facilitate Industrial and Entrepreneurship Training by implementing competency-based training [80]–[86]; promote VTCs graduates by collaborating with relevant industries or organizations [87]–[92]; and mitigate unemployment in Bogor [34], [37]. The refrigeration technology training program at VTCs Bogor is designed with a specific objective to ensure high-quality implementation standards. The VTCs is tasked with executing various industrial and entrepreneurship training programs, with a particular focus on competency-based training methodologies. This approach not only equips participants with the necessary skills and knowledge but also fosters collaborations with relevant industries and organizations to promote VTC graduates, thereby enhancing employability outcomes. Notably, the refrigeration technology training program at VTC Bogor is developed with a strategic emphasis on maintaining rigorous implementation standards to ensure the delivery of high-quality vocational education and training, contributing to local efforts to reduce unemployment rates.

3.1.5. Indicators of the success of the training program

Through in-depth interviews with key informants [64], [93], it was found that the refrigeration technology training program at VTC Bogor exhibits indicators of program success. Specifically, all trainees who participate in the program successfully pass with a 100% completion rate and demonstrate excellent competence, enabling them to effectively compete in the job market. The refrigeration training program at VTC Bogor has been successfully implemented, meeting the criteria for excellence based on performance indicators. This serves as a standard by which the effectiveness of the refrigeration training program at VTC Bogor may be measured. Furthermore, it is imperative to sustain this achievement in order to ensure that graduates of the refrigeration training program possess enhanced qualifications [94]–[96]. The examination of the contextual component is presented in Table 1.

Table 1. Context aspect

Aspect	Sub-aspect	Indicators	Category
Context	Legal basis for implementation	Require fundamental legal documents and the implementation of training programs possess fundamental legal papers of an organization	Good
	Duties and function	VTCs has specified roles and functions and is carried out according to the regulations of the Minister of Manpower	Good
	Program needs analysis	The analysis of program requirements is conducted in accordance with identification at the positional, industry, and individual levels.	Not decent
	Purposes	Alignment of program objectives for training with industry requirements	Good
	Success indicators	In accordance with the Regulation of the Minister of Manpower of Republic of Indonesia no. 8 of 2014 concerning guidelines for the implementation of competency-based training.	Good

The refrigeration technology training program at the VTC Bogor is currently being implemented successfully. The presence of a well-defined legislation governing the execution of the refrigeration technology training program, along with the allocation of primary responsibilities and roles, serves as evidence of the program's effective implementation. This training program is characterized by explicit objectives and a well-defined implementation process [65]. Nevertheless, there are still signs of training programs that do not align with the requirements of the residents of Bogor.

3.2. Input

The input aspects typically fulfill the desired criteria, including having capable program staff, programs that align with the participants' characteristics, clear objectives, a flexible and coordinated curriculum, suitable facilities, and accessible processes [97]. The input evaluation component comprises human resources, facilities, supporting equipment, budgets, and appropriate procedures and norms. The assessment of this input factor pertains to the examination of personnel, facilities, infrastructure, and funds for the refrigeration technology training program at VTC Bogor. This has a significant impact on the effectiveness of a training program.

3.2.1. Human resources

Human resources encompass the preparedness of the organizing committee, the preparedness of instructors, and the preparedness of training participants [34]. The role of the recruitment committee is to facilitate and initiate the registration process for the training program, ensuring that it is accessible to all citizens in the Bogor area. Prospective trainees who have registered are subjected to written tests and interviews as part of the selection process. In general, the execution of this training program has been satisfactory. However, there is room for improvement in terms of the number of instructors. Currently, there is a shortage of instructors in the VTC Bogor, resulting in some employees having to fulfill multiple responsibilities simultaneously. This can disrupt the centralized workflow of these employees.

3.2.2. Training program facilities and infrastructures

The facilities and infrastructure of the refrigeration technology training program play a crucial role in its implementation, since they greatly influence the long-term viability of the program. The learning resources provided for the refrigeration technology training program at VTC Bogor consist of comprehensive learning modules, practical tools, and functional materials that sufficiently fulfill the participants' requirements. The workshop area is equipped with other amenities, such as a study room and an instructor's room, all of which are maintained in a tidy and hygienic condition. Furthermore, there are well-maintained chairs, desks, computers, air conditioners, fans, whiteboards, projectors, air conditioning trainers, electrical panels, refrigerator trainers, and sound systems available. Nevertheless, the room's current condition does not align with the appropriate provisions for practical equipment. Hence, it is imperative for the local government to enhance the reconstruction of VTC Bogor, particularly by improving its facilities and infrastructure to facilitate training activities. The success of the training program is significantly influenced by the facilities and infrastructure [98]–[100].

3.2.3. Training program funding

The funding for training programs at VTC Bogor, specifically refrigeration technology training, is sourced from the state revenue and spending budget. VTC Bogor receives this funding in accordance with the requirements outlined in the Implementation Budget Entry List and Work Operational Instructions. The budget allocation has adequately addressed all training requirements, including provisions for participation facilities, participant expenses, transportation reimbursement, and funding for report preparation for VTC Bogor. Table 2 provides an assessment of input aspects in relation to sub-districts. The evaluation of inputs to the refrigeration technology training program is inadequate in terms of infrastructure and facilities, including building and supporting facilities [101]. There are numerous areas that require improvement. Additionally, there is still a dearth of human resources, particularly in terms of the number of employees who possess organizational skills.

3.3. Process

The evaluation of inputs to the split air conditioner training program is inadequate in terms of infrastructure and facilities, including building and supporting facilities. There are numerous areas that require improvement. Additionally, there is still a dearth of human resources, particularly in terms of the number of employees who possess organizational skills [58], [102].

Table 2. Input aspect

Aspect	Sub-aspect	Indicator	Category
Input	Human resources	Ensure sufficient human resources in accordance with the implementation criteria outlined in Regulation No. 8 of 2014 by the Minister of Manpower and Transmigration.	Not decent
	Facilities and infrastructure	Possess infrastructure and facilities that adhere to the VTC standards outlined in the Regulation of the Minister of Manpower and Transmigration No. 8 of 2017.	Not decent
	Training program budget allocation	The feasibility of the budget allocation in relation to the implementation of the VTC.	Good

3.3.1. Human resources

The recruitment of trainees commences with batch 1 in January each year. The distribution of information regarding refrigeration technology training via social media platforms such as Instagram and Facebook. The assessment for potential trainees is conducted through a written examination that covers both general knowledge and fundamental concepts, followed by an interview test. Subsequently, for aspiring trainees who have successfully cleared the examination, proceed by providing the necessary documents/files. The selection of trainees adheres to the framework outlined in the Ministerial Regulation on Recommendations for the implementation of competency-based training. This program has successfully fulfilled the necessary criteria and possesses a satisfactory mechanism for recruiting participants. The refrigeration technology training program was conducted at VTC Bogor from March 2, 2021 to April 29, 2021, spanning a total of 260 hours of instruction. The split air conditioner training activities have been executed effectively and efficiently due to the meticulous planning of the timetable, which aligns with the allotted lesson hours in the curriculum and meets the trainees' requirements [35].

3.3.3. Participant attendance during training activities

The trainees' attendance is utilized to ascertain their attendance record, evaluate their discipline, and gauge their level of enthusiasm in the training program [53]. The attendance element is a determining factor for the eligibility of the participant to take the competency exam. If the participant frequently and consistently misses attendance, they will be ineligible to take the competency exam administered by VTC Bogor.

3.3.4. Materials and curriculum of refrigeration technology training program

The curriculum and syllabus that have been produced are in line with the learning materials offered in the refrigeration technology training program. To ensure that the content is thoroughly prepared and covers the full subject in line with the competences to be attained, it is also tailored to the length of the training session. The content is contained in a learning module that serves as a trainee resource. This refrigeration technology training program covers the following competency unit material: i) using K3 principles in the workplace; ii) putting quality procedures into practice; iii) reading engineering drawings; iv) using hand tools; v) testing, emptying and charging the local air conditioning system; vi) maintaining the commercial air conditioning room and air temperature regulation system. According to an assessment of the curriculum and material, the split air conditioning training program complies with VTC standards and the necessary competencies [46].

3.3.5. Learning methods of refrigeration technology training program

The refrigeration technology training program employs the training and question-and-answer learning approach, combining practical and theoretical aspects with a ratio of 30% theory and 70% practice. The primary focus is on promoting learning via practical application, enabling trainees to achieve mastery in the proper installation of air conditioners. The instructional methods employed in the process of delivering learning are generally efficient and adequately cater to the requirements of the trainees [51], [54]. The split air conditioning training program utilizes an active learning method concept. This paradigm is employed to facilitate trainees' efficient and autonomous adaptation. Participants are provided with modules containing material, followed by explanations, enabling them to work based on the module's content. If participants encounter difficulties and have a lack of comprehension, they will proactively seek clarification from the instructor and engage in discussions with their peers. It might enhance the learners' self-assurance. The learning media facilities at VTC Bogor are of excellent quality and perfectly fit for use. The presence of educational media greatly facilitates instructors or learners in conducting the training process. The learning approach utilizes many media, including air conditioner trainers for practical tasks, modules for theoretical learning, office stationery for recording contents, and whiteboards and projectors for distributing content.

3.3.6. Learning evaluation and competency test

Evaluation of learning is conducted upon completion of a single unit of competence. The assessment is conducted by administering a job or exam question that aligns with the finished competency unit. In order to assess the trainees' aptitude, bravery, and self-assurance, the instructor will inquire about the participants' work and request them to provide explanations once they have completed their tasks [75], [89], [103]. This is accomplished through the utilization of the demonstration approach, specifically by showcasing the trainees' work outcomes in front of other participants. Participants who successfully complete the training can obtain a certificate of competence from the National Professional Certification Agency (BNSP). The Professional Certification Institute (LSP) administers a competency test to assess the trainees' skills and abilities. This test serves as the final evaluation to determine the trainees' competencies. Overall, the learning evaluation and competency exam have been successful. However, it is crucial to enhance the quality of the training process to ensure that graduates possess high-quality skills, competence, adaptability, and capabilities that are applicable in the professional field. Table 3 displays the outcomes of the assessment of the process aspect.

Table 3. Process aspect

Aspect	Sub aspect	Indicator	Category
Process	Recruitment flow	The compatibility of the trainee recruiting process with the guidelines for implementing competency-based training in the Minister of Manpower and Transmigration Regulation Number 8 of 2014.	Good
	Implementation of training	The training is implemented in accordance with the competency-based training implementation scheme outlined in the guidelines for the implementation of Competency-Based Training.	Good
	Learning evaluation and competency test	The assessment of competency for graduation through the Professional Certification Institute (LSP)	Good

3.4. Product aspect

3.4.1. Quality of training program results

The refrigeration technology training program aims to improve participants' knowledge and skills regarding refrigeration technology so that participants are able to maintain and repair domestic refrigeration equipment for households properly according to work procedure standards. The refrigeration technology training program is expected to not only provide knowledge and skills but also change students' minds, become more creative, advanced as well as prepare them to face the world of competition and corporate work. The component of achieving goals is measured through three indicators, namely the ability of participants to understand the training, the motivation of participants to participate in the next training, and the ability to practice skills because training instructors at VTC Bogor are only able to provide theoretical or practical guidance and form the mentality and confidence of trainees [82]. Participants acquire a more comprehensive comprehension of coolers and learn how to install them with effectiveness, efficiency, precision, and in compliance with regulations.

3.4.2. Percentage of trainees passing

Trainees who participated in the split air conditioner refrigeration training program from the beginning to the end of the training activities have achieved the program success indicators and are declared 100% passed. Participants who completed the split air conditioner refrigeration training program demonstrated a high level of competence, as evidenced by their ability to meet all the program's success indicators. The structured curriculum and practical sessions ensured that trainees developed the necessary skills and knowledge, which contributed to the overall effectiveness of the training [104]. Consequently, the program achieved a 100% pass rate, underscoring the success of both the trainees and the instructional methodology implemented.

3.4.3. Participants' readiness to face the business world and the industrial world

Participants in refrigeration technology training possess a strong aspiration to engage in employment, serving as a driving force for their preparedness in the professional realm. The VTC Bogor refrigeration technology training program provides individuals with the necessary knowledge and abilities to effectively compete in the professional world and commercial sector. The trainees' self-motivation, knowledge, and skills have significantly improved, equipping them to effectively compete in the industrial sector [53]. The assessment of several product attributes is presented in Table 4.

Table 4. Product aspect

Aspect	Sub aspect	Indicator	Category
Product	Quality of training program results	The trainees have competence and are ready to work in the industry	Good
	Percentage of trainees passing	Have a high graduation percentage	Good
	Participants' readiness to face the industrial world	The knowledge and skills of the trainees have increased and they are ready to compete in the world of work and business.	Adequate

3.5. Outcome aspect

3.5.1. Outcomes for trainees and VTCs

The outcomes of this training program yield a rise in employment prospects and an increase in the integration of trainee graduates into the workforce. Nevertheless, the assessment of the effectiveness of this training has not been fully optimized due to the constraints of the tracer research data collected by VTC Bogor. Hence, it is imperative to enhance the surveillance of employed alumni. Therefore, it is crucial to enhance the monitoring and tracking of alumni employment outcomes to ensure more accurate evaluations of the training's effectiveness and to inform future program improvements [102].

3.5.2. Outcomes for VTCs and industries

The mutual exchange of benefits between sectors that have partnered with VTC is evident in the employment opportunities and professional attitudes displayed by graduates employed in those areas [8], [90]. The assessment of the results from the VTC Bogor and the industry remains unsatisfactory, as does the level of reciprocity between the trainees and VTCs. Tables 5 displays the assessment of the outcome element and the proportion of the overall evaluation results.

The assessment of the refrigeration technology training program at VTC Bogor, considering the whole context aspect, has yielded a favorable result, with a score of 80%. However, the input aspect has not achieved the required requirements for training implementation, with a success rate of 33.3%. The assessment of the implementation of the split air conditioner training program has yielded satisfactory results [14]. The assessment of the product component of the split air conditioner training program yielded a good result of 66.7%. An assessment of the reciprocal split air conditioning training program indicates that it need improvement, with a 50% deficiency rate.

Table 5. Outcome aspect

Aspect	Sub aspect	Indicator	Category
Outcome	Outcomes for trainees and VTCs	The rate at which training alumni are being recruited into the sector is on the rise.	Good
	Outcomes for VTCs and industries	Job prospects and work attitudes of graduates working in industry	Considerable

4. CONCLUSION

The research findings on the evaluation of the refrigeration technology training program at VTC Bogor indicate that the general context aspect is satisfactory. However, the input aspect does not meet the standards for training implementation. This is because the organizing committee, which has dual positions, still needs to increase the number of personnel. Additionally, there is a need for improvements and additions to facilities and infrastructure. The assessment of the implementation of the split air conditioning training program has been satisfactory and in line with the criteria for organizing the training center. The assessment of the product component of the split air conditioning training program has yielded a satisfactory outcome, with a 100% graduation rate. Furthermore, this training program has successfully fulfilled all program performance indicators. The evaluation of the split air conditioning reciprocal training program still need enhancements to develop a more effective training program.

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