Mixed Model Evaluation CSE-UCLA and Assessment Evaluability Performance Monitoring (AEPM) as an Approach to Evaluating the Competency Test Certification Program

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ABSTRACT

The aim of the study is to assess the competency test certification (CTC) program for mechanical engineering techniques in Vocational High Schools (VHS) by combining the CSE-UCLA program evaluation model with the Assessment Evaluability And Performance Monitoring (AEPM) in order to determine the program's effectiveness level in detail. This program evaluation research use a mixed-methods approach, with a quantitative approach to evaluate the accuracy of the data collected during the research period and a qualitative approach using the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) analysis. System assessment, program planning, implementation of the program, program improvement, program certification, and performance monitoring are the six evaluation components that make up the program evaluation design used in this study, which combines the CSE-UCLA model with the AEPM. The head of the machining program, the head of the workshop, the productive machining teachers, the vice principal in charge of curriculum, the vice principal in charge of industrial relations, the vice principal in charge of facilities and infrastructure, and the principal are the subjects of this research. Five sample vocational high schools in the Special Capital Region of Jakarta Province area were given questionnaires as part of the data collection process. The technique for determining all subjects uses the Purposive Sampling technique. With an average of all program dimension components, the research results indicate the level of effectiveness of the machining competency test certification program's performance. (1). Good is the category rating for the system assessment (2). Category grade for program planning: Good (3). Satisfactory rating for program implementation (4). Fair, (5) is the program improvement category score. Category score for program certification: Fair (6). tracking the Fair performance category score. An approach to show the effectiveness of the statements and questions in the competency test certification for the mechanical engineering machining program is to apply program evaluation using a combination of the CSE-UCLA model and Assessment Evaluability and Performance Monitoring (AEPM).

Keywords: Certification Program, Competency Test Certification, Development, Education, School, Teacher

INTRODUCTION

Outcome aspects are always used to evaluate the success of a program, but the quality of the process during program implementation is rarely considered in evaluation activities (Gunawan, 2011). Therefore, it is very

important to study the career potential and skill development chosen by the educational program to foster self-capacity and interest in career choices (Loan et al., 2019). According to Suyasa and Kurniawan (2018), the evaluation of the Alkin CSE-UCLA model program was conducted to identify several external dimension barriers to certification. In addition, Divayana evaluates the effectiveness of the CSE-UCLA evaluation application application using an evaluation model. Rusmulyani evaluates the graduates of the leadership training certification program by the CSE-UCLA evaluation model (Rusmulyani et al., 2022). and Priyanto is reviewing the program certification using the CSE-UCLA evaluation perfect (Priyanto et al., 2024). Another thing, to examine the performance and monitoring proposed by Joseph Wholey regarding program implementation. Abdul Aziz uses the AEPM model to evaluate the educational innovation learning program (Azis, 2017). Additionally, Garini uses the evaluation of the output impact of the Family Hope Program on the village community (Garini et al., 2023). Magulod observed how performance monitoring in the teaching system can help improve learning effectiveness and student motivation (Magulod, 2019).

Irfan established Kirkpatrick's assessment model in a training programme for the juvenile illegal fairness scheme at the Police Education and Training Centre (Abraham et al., 2024). Additionally, Simorangkir uses the Kirkpatrick evaluation model to assess the progress of literacy environment activities in schools (Simorangkir et al., 2024). Ibnu Salman established the Edwar III evaluation model to improve the educational quality of Raudhatul Athfal, based on the planned plan 2015-2019 of the Ministry of Religious Affairs (Salman et al., 2022). In addition, Priyanto. Using the evaluation approach of the evaluability and performance monitoring assessment model to measure the success of the competency test certification program (Priyanto et al., 2023). Suseno studies the evaluation of the impact of the internal security system on the quality of learning (Wartoni et al., 2023).

Combining program evaluation models to address research objectives is another subject of study being examined. In the assessment of the astronomy educator growth program, Muqorobin used a combination of Kirkpatrick and CIPP evaluations (Muqorobin et al., 2022). Wining Widiharti stated that to obtain the results of on-the-job learning activities and mentoring outcomes, a combination of the Kirkpatrick evaluation model and Stake's Countenance model will be applied (Widiharti et al., 2019). Yoga Budi Bhakti uses CIPP and Countenance to evaluate campus educational programs (Bhakti et al., 2022).

As mentioned earlier, many jobs in the field of education calculate the likelihood of dropping out as well as the ability to work. The current examination of VHS information is one of the basics for applying the new VHS policy, and perhaps more in the future. Between 2009 and 2016, a multi-criteria classification of the Spanish VHS program was carried out through several studies that used the TOPSIS analysis view (Cascón-Pereira et al., 2019). A study on decision-making approaches has been conducted by Wawan Firgiawan to determine the amount of single tuition fees (Firgiawan et al., 2019). In the Case Study of Bogor Technology Academy, Istiqoomatun determines the best educators Wibowo and Nisaa (2020), and Amaliyah Indah said how to choose the best supplier for medical equipment suppliers (Lestari et al., 2021). Elyazgi assesses among students the factors that influence knowledge of e-book technology through the topsis technique (Elyazgi et al., 2016).

Using the combination of CSE-UCLA and AEPM models as described, the VHS can provide an impression of the results of the assessment and the number of problems related to the implementation of CTC machining. A sampling technique was intentionally used to determine all subjects. The combination of evaluations from the CSE-UCLA and AEPM programs is used to evaluate the implementation of the VHS Competitive Test Verification Program. The purpose of using these two program evaluation models is to address and resolve issues related to the research objectives in order to obtain updates, recommendations, and suggestions to improve the CTC program.

MATERIALS AND METHODS

Research Subject

The CSE-UCLA and AEPM evaluation replicas are rummage-sale in program assessment research. A qualitative research methodology was also applied. Five State Vocational High Schools in Jakarta's Special Capital Region are the subject of this study. These educational institutions were chosen on the basis of their similar facilities and policies.
Participants include the director, assistant director of curriculum, industrial relations and infrastructure, machining program leader, shop manager, and machining master. A 54-question questionnaire was used to collect data. Getting thorough information is the aim. The TOPSIS technique was used to examine the qualitative numerical data obtained from the questionnaire. Understanding how surveys and interviews are used to collect data is the main goal of the research method. As a result, an adaptive survey was carried out to handle outliers and enhance the quality of the data by arranging and condensing the data using methods including multidimensional scaling, clustering, and ideal matching. The following are the dimensions and components of the study's questions:

1. The following resources are included in System Assessment: a) The importance of competency tests; b) The advantages of administering them; c) the need of support from capability test organisation staff; and d) All educational laboratory institutions (PLP) and teacher schools in preparing the required equipment, materials, examiners, and auxiliary components for skill competency tests.
2. The following materials are included in Program Planning: a) organizing the management of the competency test; b) organizing the human resource (HR) development and competency test program; c) organizing the workshop services for student preparation; and d) organizing the infrastructure and facilities to assist the organizers of the competency test.
3. Included in Program Implementation are the following resources: a) Spreading awareness of the unique features of the competency test workshop b) Partnering together with guarantee organizations b) Getting the measurement tools required for the Competency Test workshop socialized
4. Materials for Program Improvement include: a) Improving comprehension of applied knowledge ideas in tasks and jobsheets used as the foundation for technical work considerations b) Infrastructure and facility improvements for the capability test guarantee workshop. c) Increasing the quality of ongoing training programs in knowledge and machining techniques to improve human resources.
5. Among the requirements for program certification are: a) Quality of Competency Tests in accordance with the mechanical machining expertise program package standards b) The expertise package's conformance to the mechanical machining expertise program package's standards
6. Program Monitoring Performance comprises: a) Output showing the program's impact on job market absorption b) Assessment of Short-Term Outcomes in response to performance enhancements about the competency certification program graduates' outputs.

As indicated in Table 1, the questionnaire uses the growth criterion of the Likert scale for response possibilities.

Table 1. Weight of criteria scale model likert

Scale Classification	Answer
5	Very Suitable
4	Appropriate
3	Less Appropriate
2	Not Appropriate
1	Very Inappropriate

Source: Prepared by the author (2025)

Research Method

Questionnaire data acquired during the program evaluation design that combines the CSE-UCLA and AEPM models is evaluated using the TOPSIS approach in order to solve multi-criteria decision analysis problems. In vocational schools, this is done to ascertain the results, graduates, and influence of the CTC student application development program (Behzadian et al., 2012). The phases can be outlined as shadows:

Stage 1: The following formula is used to obtain the normalized decision matrix (R) from the normalized decision criteria matrix (r_{ij}):

$$rij = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \qquad (1)$$

Here r_{ij}: is the normalized matrix element of the problem's base matrix.

X_{ij}: The basic matrix to be normalized is the i-th row of the matrix, and j is the column of the matrix.

Object i = 1,2,3,......n

Criteria j = 1,2,3,.....n

Stage 2: Determining the normalized decision matrix Weighted values, resulting in normalized weighted ratings. Using the formula:

$$Yij = W_i \cdot r_{ij} \qquad (2)$$

Here:

Y_{ij} is an element of a weighted rank matrix

W_i is the weight of the i-th rating

r_{ij} is the result of matrix normalization in the first stage

(i=1,2,3... n and j = 1,2,3 ... n).

Stage 3: Determining the optimistic and undesirable perfect solution matrices by Eq. (3) and Eq. (4). Founded on the normalization of sorting weights, a optimistic ideal answer and a undesirable ideal solution can be defined. In addition, to control the ideal solution it is necessary to determine whether the attributes are benefits or costs.

$$A^+ = (y_1^+, y_2^+, ...y_n^+) \qquad (3)$$

Here, if j is the cost attribute

$$y_1^+ = maks_i \; y_{ij} \; is \; an \; attribut \; of \; profit$$
$$min_i \; y_{ij} \; if \; j \; is \; the \; cost \; attribute$$

A^+ is an ideal positive solution

$$A^- = (y_1^-, y_2^-, ...y_n^-) \qquad (4)$$

$$y_1^- = \begin{cases} min_i \; y_{ij} \; is \; an \; attribute \; of \; profit \\ maks_i \; y_{ij} \; if \; j \; is \; the \; cost \; attribute \end{cases}$$

Here

A^- is the ideal negative solution

Stage 4: Calculation of the degree determination among the values of each substitute by the matrix of the optimistic ideal solution and the matrix of the undesirable ideal answer.

$$D_i^+ = \sqrt{\sum_{j=1}^n \left(y_i^+ - y_{ij}\right)^2} \; (=1,2,3.....n) \qquad (5)$$

$$D_i^- = \sqrt{\sum_{j=1}^n \left(y_{ij} - y_i^-\right)^2} (= 1,2,3 ... n) \qquad (6)$$

Stage 5: Calculating the Value Determination of Each Alternative Option.

$$V_i = \frac{D_i^-}{D_i^- - D_i^+} \qquad (7)$$

Here V_i is the value of each alternative option

A validity score is created from the efficiency values of each aspect assessed.

Table 2. Effectiveness categories refer to guilford's validity classification

Effectiveness range	Category
0,80 – 1,00	Very good
0,60 – 0,79	Good
0,40 - 0,59	Enough
0,20 – 0,39	Less
0,0 – 0,190	Very Poor

Source: Prepared by the author (2025)

Results and Discussion

One of the main dimensions of the model is System Assessment, which is similar to the context dimension of the AEPM program evaluation. The data obtained are analyzed to determine the efficiency of the application of the Proficiency Test Certificate in the Mechanized VHS Program, including institutional policies and learning climatic conditions. The first stage of the calculation is carried out using Equation (1), to obtain the normalized data value, namely the data R_{ij}. After the calculation, the normalization values are entered into the matrix. The data elements of the weighted rank matrix are then entered using equation (2). Equations (3) and (4) are used in the third stage to calculate the values of the positive ideal solution (+) and the negative ideal solution (−). Equations (5) and (6) are then used to calculate the values of + and −. (5) and formula (6). After determining the values of + and −, the preference value is calculated in order to order it according to its value.
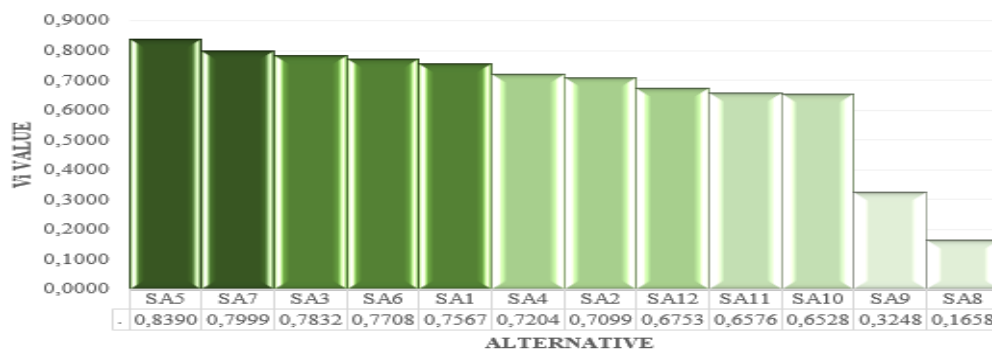
Figure 1. Preference values for each alternative in the system assessment

Figure 1 shows the change in the score of the effectiveness category for each item of the question, in the evaluation dimension of the system. Each question element's average score generally falls into the "good" category; questions SA7, SA3, SA6, SA1, SA4, SA2, SA12, SA11, and SA10 all earned scores in the "good" category, while question SA5 was given a "very good" conformance standard score. These outcomes ought to be preserved and enhanced. Additionally, because the SA9 question element has a "poor" category score, the school's CTC program implementation team oversees participants and industry sector partners, while the industry sector implementation team provides the infrastructure that the participants require. In this regard, Priyanto stated that within the Context dimension, support related to infrastructure is needed for participants and partners from the industry. According to Hendra Divayana, the substructure needs of the contributors and the need to improve the cluster to implement the business and industrial sectors need improvement (Divayana et al., 2022). In line with Garini's main investment in fulfillment, it includes device access policies, facilities, and partner conveniences, programs, and Human Resource competencies. In addition, Salman has responded that today's teaching must be able to adapt to the changing stresses of the world.

Planning Program

In the planning program dimension that has similarities with the Inputs dimension. Table 6 shows the initial control level based on Eq. (1). As soon as the calculation is complete, the normalized value is entered into the matrix. The second step is to enter data using the equation. Table 6 shows the normalization results of data collection at point (2) to obtain the weighted rank matrix element. In the third stage, equations (3) and (4) are used to determine the values of the positive ideal solution + and the negative ideal solution −. Equations (5) and (6) are then used to calculate the values of + and −. After the values (+) and (−) are obtained, the results are analyzed to determine the preferred value () so that the values can be ranked.

The findings of the planning dimension are displayed in Figure 2, where each question element's effectiveness category scores are grouped in the input dimension. The "very good" category score was given to the elements of questions PL11, PL12, PL10, PL1, PL3, PL5, PL2, PL7, and PL8. The PL9 question element's "very poor" category score relates to training programs and the learning process, whereas the "good" category scores on the PL4 and PL6 question elements require improvement. The input dimension must be completed prior to CTC. This is done in order to satisfy the PL9 question's first standard element, which is about the training program and learning process. Giving an explanation of applied knowledge pertaining to the application of work performs in the workspace is the aim. It is necessary to first modify the policy and change the rating from "very poor" to "fairly good." Therefore, according to planning standards and organizational assessment engagement are necessary for sustainably conducted program initiatives. Planning requires a goal-based programming approach, according. In addition, Salman said that planning provides an opportunity to examine the standards of the planned programs from the efforts and priorities of future programs within the institutional structure. Agreeing with Rusmulyani, that planning includes aspects such as educators, organizational tasks of the institution, facilities and infrastructure, as well as financing, which need to receive primary attention.
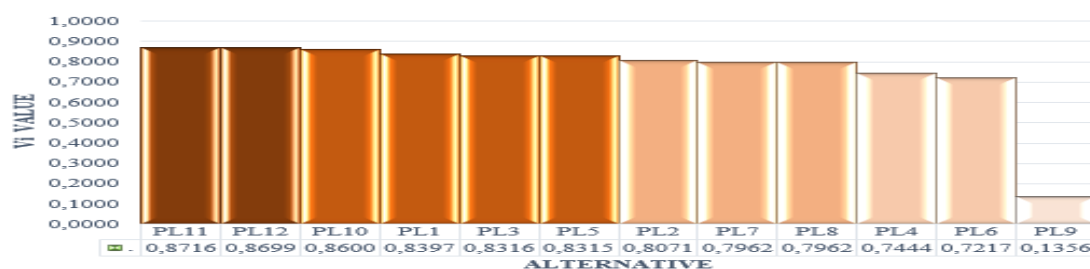

Figure 2. Preference values for each alternative in the planning dimension

Implementation Program

Based on nine different questions, the "Activities" dimension is comparable to the "Implementation" dimension. The first calculation step can be based on equation (1). Normalized values are entered into the matrix. They are based on the results of the calculation to obtain the normalization results from data collection on. The second step is to enter the data using the equation. (2) to obtain the weighted ranking. In the third step, equations (3) and (4) are used to evaluate the values of the positive ideal solution + and the negative ideal solution −. Equations (5) and (6) are then used to calculate the values of + and −. To determine the preference value, the values + and − are determined. This allows them to be ranked based on the values obtained.

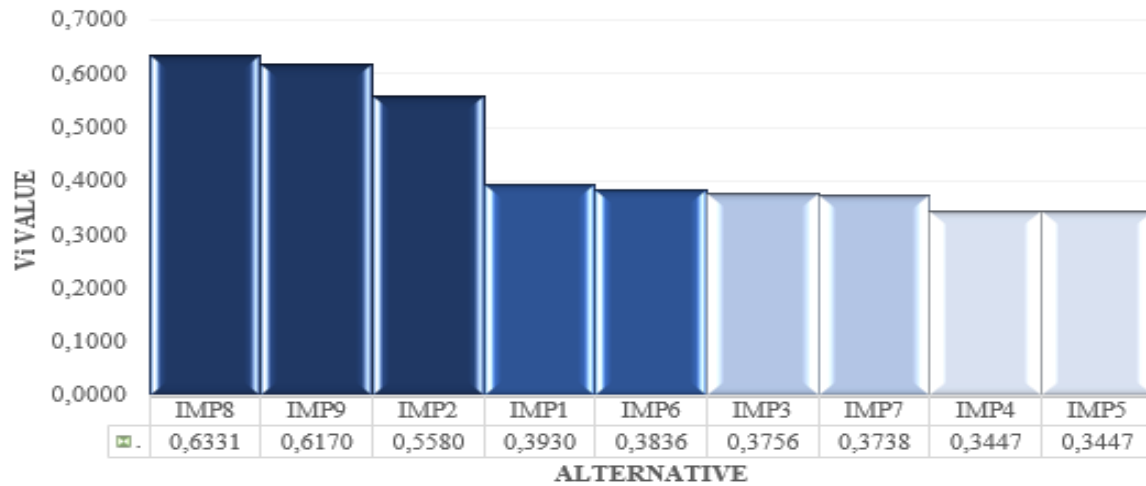|	IMP8	IMP9	IMP2	IMP1	IMP6	IMP3	IMP7	IMP4	IMP5
	0,6331	0,6170	0,5580	0,3930	0,3836	0,3756	0,3738	0,3447	0,3447

Figure 3. Preference values of each alternative in the program implementation dimension

The results of the implementation dimension as shown in Figure 3 indicate that the IMP2 question element needs further improvement when implementing the CTC program; however, the IMP8 and IMP9 question elements received a "good" category rating. Preparing the job sheet up to the processing stage allows for the improvement of the machining process. Additionally, the question elements IMP1, IMP6, IMP3, IMP7, IMP4, and IMP5 received a "poor" category rating. Question elements with a "poor" category rating must be further improved to achieve a better category rating. Therefore, the value categories must be improved for every aspect of program implementation P. Wayan Arta Uyasa stated that several obstacles in the implementation and execution of the program must be periodically addressed to meet adequate standards. Sumbodo recognizes the need for quality improvements, theory, and practice based on the needs of industry partners and in line with the curriculum (Sumbodo et al., 2019).

Improvement Program

Data on the dimension of program improvement is assessed based on nine different questions. In the initial phase of the calculation, Eq. (1) To obtain the normalization results from the data collection to the value, the normalized data values from the calculation are also entered into the matrix. Inserting the data elements into the weighted rank matrix j using an equation is the second step (2).

In the third step, the values of the positive ideal solution (Equation 5) and the negative ideal solution (Equation 4) are determined. Equations (3) and (4) are then used to calculate the values of D_i+ and D_i-. They can be ranked according to the data values by using the obtained values D_i+ and D_i- to determine the preference value V_n.

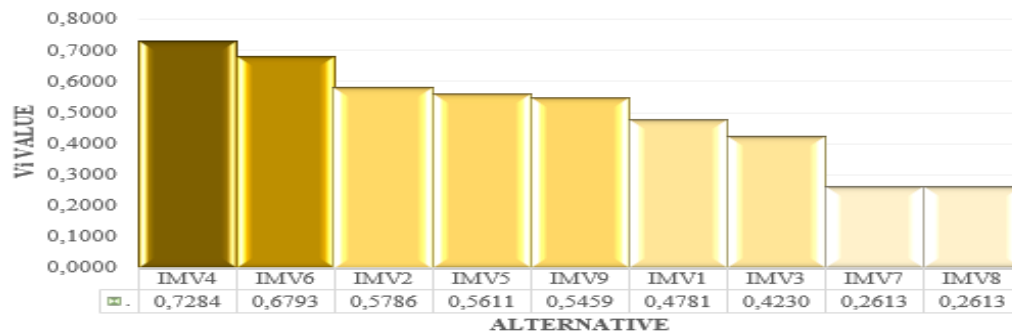|	IMV4	IMV6	IMV2	IMV5	IMV9	IMV1	IMV3	IMV7	IMV8
	0,7284	0,6793	0,5786	0,5611	0,5459	0,4781	0,4230	0,2613	0,2613

Figure 4. Preference values for each alternative in the Improvement program dimension

Figure 4, the question elements indicate the program improvement dimension. The alternative ranking values indicate a Good rating category for the IMV4, IMV6, and IMV2 question components. The Adequate values on the IMV5, IMV9, and IMV1 question components. The Adequate scores also need to be improved to the Good or Very Good category in future programs. In addition, there is a Poor rating category in the IMV3, IMV7, and IMV8 question components. Therefore, according to Santosa and Dwi (2018), teachers guide training in productive fields and conduct real work competency tests using external assessors to evaluate students. According to Priyanto, the competency certification implementation team must conduct accurate competency tests to ensure the validity of the training program in terms of theory and practical skills state that competency certification has been carried out, however, in order to meet the requirements of industry partners and to adapt to the curriculum, quality, theory and practice must be improved. This is demonstrated by Loan that training programs are very important to enhance potential and professional skills to improve self-efficacy and increase interest in career choices.

Certification Program

Dimension Certification data uses six alternative assessment questions. At the initial stage of calculation, Eq. (1). The normalized data values, which are the result of the calculation, are entered into the matrix to obtain the normalization results from data collection. In the second step, the data elements are inserted into the weighted rank matrix using equation (2).

The third stage determines the values of the positive ideal solution y_j^+ and the negative ideal solution y_j^- using Equation (3) and Equation (4), followed by calculating the values of D_i^+ and D_i^- using Equation (5) and Equation (6). After obtaining the values of D_i^+ and D_i^- this is done to find the preference value V_n so that they can be ranked based on the data values.

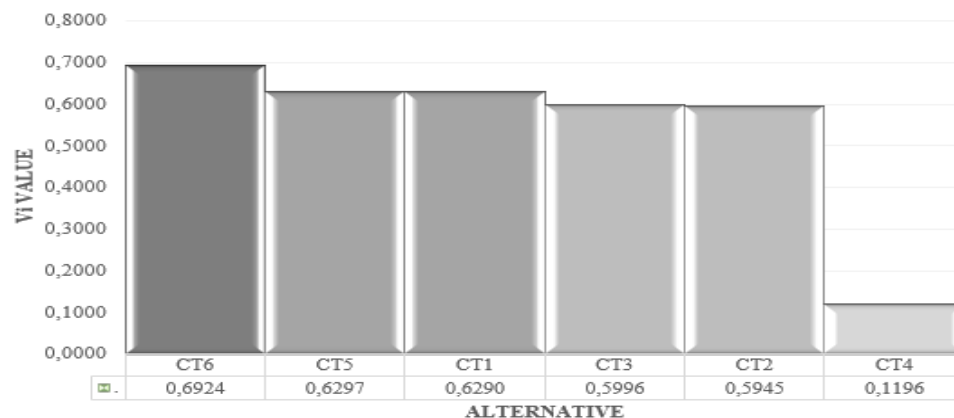|	CT6	CT5	CT1	CT3	CT2	CT4
	0,6924	0,6297	0,6290	0,5996	0,5945	0,1196

Figure 5. Preference values for each alternative in the certification program dimension

Alternative category value ranking score Good on the CT6, CT5, and CT1 question components indicates the certification program dimension, which should be maintained and improved to the Very Good category in the upcoming certification program. The rating of the Fair category for the CT3 and CT2 question components should also be improved to the Good category for the implementation of the upcoming program. The ranking score in the Poor category for the CT3 and CT2 question components also needs to be improved to the Good category. Every aspect of the questions in the certification program must be improved. This is reinforced by Pereira, who argues that the competency certification process should be transformed into knowledge and competency development with an emphasis on the labor market context and its sectors. In addition, Muharam has assured that it will have an impact on the performance of the students who have participated in the program to guarantee competitive tests, so it is necessary to develop a system of exploration of the performance of the graduates (Muharam et al., 2022).

Monitoring Performance Program

In the dimension of the monitoring data of the program's activity, it is necessary to identify the components to be improved in the mechanical engineering program to increase the effectiveness of the implementation of the CTC and it is assessed founded on six another queries. The first phase of the cunning uses Eq. (1) to obtain the normalization results from the data collection to R_{ij}. The cunning consequences, the regularised data values, are arrived hooked on the R_{ij} medium. The additional phase is to supplement the data elements hooked on the weighted ranking matrix y_{ij} using Equation (2).

The third stage can determine the values of the optimistic perfect answer y_j^+ and the undesirable perfect answer y_j^- using Equation (3) and Equation (4), shadowed by scheming the values of D_i^+ and D_i^- using Equation

(5) and Equation (6). Once the values of D_i^+ and (D_i^-) are obtained, this is done to find the favourite value V_n so that they can be sorted based on data values.
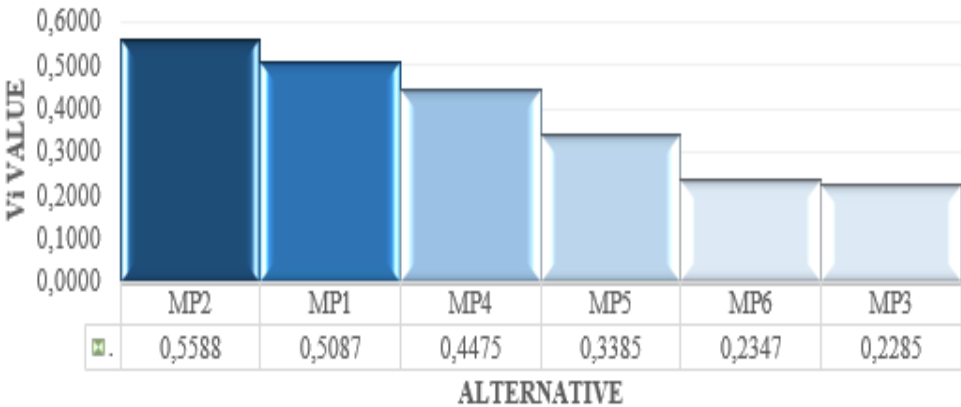

Figure 6. Preference values for each alternative in the Monitoring Performance program dimension

Figure 6 of the question elements shows the extent of the performance monitoring program. The question elements MP2, MP1, and MP4 show alternative ranking values with a sufficient value category. The MP5, MP6, and MP3 elements indicate that the value category of future programs should be upgraded to the category of good or very good. Lauro stated that the integration of all existing systems is necessary to determine the level of competency show. This includes the results of competency test certification for graduates and feedback from employers regarding future input (Estecomen et al., 2019). The study of tracking graduate competency certification should be initiated and developed to obtain data on graduate employability. Wahyuni stated that emphasis is needed in the context of knowledge and competency development and competency-based performance tracking (Wahyuni et al., 2020). In consultation with Muharam, the purpose of the certification program for aptitude tests is to determine how this affects doctoral students' performance.

CONCLUSION

The evaluation recommendations for the competency test certification program show the necessary results for future follow-up related to the competency test certification program. These results were obtained based on the effectiveness of using the combination of the CSE-UCA model and Evaluability and Performance Monitoring (AEPM). In addition, they can precisely amount the gradation of effectiveness of the elements of the question in each of the dimensions of the package. Therefore, the combination of CSE-UCLA and AEPM assessment models can be used indirectly to test the success of the aptitude test certificate for the mechanical engineering machining program.

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