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## Evaluation Process Dimensions To The Diploma In Mechatronics Engineering

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### Abstract

This study was conducted to determine the evaluation of the assessment process dimensions for the Diploma in Mechatronic Engineering. Focus of the study was the program elements (E-DEM program) dimension of the dominant processes. A total of 238 respondents have been participated, who was from Diploma in Mechatronic Engineering student at the Polytechnic Ibrahim Sultan (PIS), Ungku Omar Polytechnic (PUO), Merlimau Polytechnic and Polytechnic Sultan Mizan Zainal Abidin. The data was analysed by using descriptive method of Rasch model in Winsteps V36.5 software. The findings show that all elements of the program (E-DEM) in specified process dimensions has been agreed by the respondents that polytechnic students are in top level on the implementation of Mechatronic Engineering Diploma Program. The assessment process elements (E-MED program) is the dominant method of evaluation to measure the mean value and mean score of -0.88 / 4.28. Overall, according from researcher's opinion, most of polytechnic students agreed that the level of implementation of program elements (E-DEM) in the evaluation process are high and satisfactory. This result referred from dominant elements which is the method of assessment, teaching and learning process. However, elements of the use of facilities and equipment for teaching and learning at an unsatisfactory level. The institutions need to improvise and enhance the quality of facilities and infrastructure for students. The goal is to achieve more conducive of teaching and learning quality and improve students' creativity.

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## 1. Introduction

Evaluation is defined as a process of determining the extent of the objectives of the program that can be achieved (Tyler, 1950). For Alkin (1969), Cronbach (1963) and Stufflebeam et al. (1971), the assessment is the process of collecting and using information to make decisions. While Suchman (1967) stated that the assessment is an attempt to identify whether a program achieved its goals and objectives. The role of assessment refers to an action for responses that have been received through the collected data, including assisting in the progress of a program or to make a classification based on the overall quality of the program (Butterfield, 1995); (Yahaya, 1999). Evaluation process dimension refers to the performance of an activity (teaching). In this study, the lecturers evaluated to determine the extent to which they have been conducting their lessons, using facilities and equipment, and carry out the assessment in teaching and learning.

## 2. Problem statement

Accreditation Committee have made the monitoring program of Deemed Accredited to some polytechnics offering diploma program in Mechatronic Engineering. The findings of the evaluation report on the program for the monitoring audit at a polytechnic has identified the unequal distribution ratio of courses in the disciplines of mechanical, electrical, computer and control. Duplication of certain topics different courses and the ability to combine courses have taken place and reducing the number of courses offered. The number of contact hours (face to face) is not commensurate with the amount of credit as stated. Even the estimate to see the extent of learning outcomes and learning outcomes for each semester also criticized in the report. The researchers argue that a study should be conducted to assess the implementation of the program Diploma in Mechatronics Engineering. In this study, researchers used the model Stufflebeam valuation. Stufflebeam valuation model is a comprehensive model framework that can serve as a guide for evaluating a program (Stufflebeam, 1971.2003). The impact of this study, the researchers were able to identify the elements which need to be streamlined and focused in the dimensions of the process.

## 3. Research objective

This study aims to evaluate the implementation of the program in Mechatronics and identify elements that could form a model for the assessment of the implementation of the program in Mechatronics. The results of this study will be used as a validate data sources for assessing the implementation of the program Diploma in Mechatronics Engineering where research results are pattern-performance implementation of the Program. The objectives of the study are listed below:

- Assess the implementation level of program elements (E-DEM) in the evaluation process that has been set.

## 4. Research methodology

This study is a survey that assesses Diploma in Mechatronics Engineering Stufflebeam dimensional process model. In this study, the population of this study is 480 students pursuing Diploma in Mechatronics Engineering (DEM) is offered at the Polytechnic Ibrahim Sultan (PIS), Ungku Omar Polytechnic (PUO), Merlimau Polytechnic and Polytechnic Sultan Mizan Zainal Abidin. Based on the table for determination of sample size (Krejcie & Morgan, 1970), for a population of 480 students, the required sample size is about 238 student. The sampling method for the sampling is conducted the using study group (cluster sampling).

In this study, quantitative data were obtained using a questionnaire. This questionnaire uses Likert scale with five possible answers options. The selection level Likert scale is an adaptation of the Bahari(2008) study. This selection uses five stages because it can represent accurate answer compare to respondents with only four stages. To answer the research question, to what extent the implementation level of program elements (E-DEM) in the evaluation process that has been established? Data were analyzed using Rash model analysis and mean measure, mean score

analysis.

**5. Findings**

To see the dominant element within the dimension of the implementation process of Mechatronics Engineering Diploma Program, data were analyzed referring to the mean measure and mean score. Data were analyzed using the Rasch model and software Winsteps V3.69. Based on the interpretation of the score adapted from Landell (1997) suggests there are three levels, namely low, medium, and high. Mean score 1:00 to 2:33 interpret the low level; 2:34 - 3.68 decipher the level is moderate; and a mean value of 3.69 - 5.00 decipher the level is at a high level. Interpretation of mean scores are shown in Table 1.

Table1. Interpretation of mean scores

Group	Range	Level
1	1.00 – 2.33	Rendah
2	2.34 – 3.67	Sederhana
3	3.68 – 5.00	Tinggi

The negative mean value measure indicates that element is dominant among the respondents. For a positive value means the element is at least difficult to answer and disagreed by the respondent. Data were analyzed according to three key elements in the process dimension method of assessment, teaching and learning processes and the use of facilities and equipment for teaching and learning. All elements of the program (E-DEM) specified in dimensions process has been agreed by the respondents that polytechnic students at a high level on the implementation of Mechatronics Engineering Diploma Program. Referring to the table 2, the evaluation method had the highest mean score of -0.88 log it and the mean score of 4.28. For learning process element, the mean score is -0.34 log it with a mean score of 4.03. There are elements of the use of facilities and equipment for teaching and learning, the mean size was 0.69 and the mean score logit 3.40. This finding shows that the average level at which the student is not satisfied with the facilities and equipment for teaching and learning at the university. The mean negative measure indicates that element is dominant among the respondents. For a positive value means that these elements are difficult to answer and not agreed to by the respondent (Hasan, 2012).

Table2. Analysis of the Agreement on Implementation of respondents Element Program (E-DEM) in Evaluation Process

Label	Elements Dimension Process	Mean Measure (logit)	Mean Score	Level
DS	Assessment methods	-0.88	4.28	High
BS	Teaching and learning process	-0.34	4.03	High
CS	Use of facilities and equipment for teaching and learning	0.69	3.40	Moderate

*5.1. Element Method evaluation*

Respondents to the implementation stage of approval Element Assessment Process Assessment is the highest compared to other element, ie they agreed with the assessment of the performance attributes quiz (mean size = -1.27 logit; the mean score = 4.43) as the most dominant attributes as the size of negative readings min is the reading that was agreed upon and the most dominant. Attributes assessment of the final examination (mean size = -0.93 logit; the mean score = 4.30) is much less dominant dimension as the lowest mean value measurement. The findings show that polytechnic students evaluate each implementation method of valuation is very good and meet the criteria.

Table3. Analysis of the Agreement on Implementation of respondents Elements Assessment in Evaluation Process

Label	Elements Assessment	Mean Measure (logit)	Mean Score	Level
DSB	Quiz	-1.27	4.43	High
DSC	Assignment / Course	-1.02	4.34	High
DSA	Test 1	-0.93	4.30	High
DSD	Practical	-0.93	4.30	High
DSE	Final Examination	-0.93	4.30	High

### 5.2. Elements of Teaching and Learning Process

Referring to Table 4, the level of agreement on the implementation of elements of polytechnic students teaching and learning process in the assessment process is high, that they agree with the attribute values of professionalism involving the competence and professionalism of the lecturers (mean size = -0.66 logit; the mean score = 4.18 ) is the most dominant attributes as the size of negative readings mean a value that is agreed upon and the most dominant. Attribute formative assessment (mean size = -0.14 logit; mean score = 3.93) is the least dominant attribute as a mean of measurements showed the lowest reading and less agreed. The findings show that polytechnic students evaluate the professionalism of lecturers very well during the process of teaching and learning in the classroom.

Table 4. Analysis of the Agreement on Implementation of respondents element of teaching and learning process in Evaluation Process

Label	Element of teaching and learning process	Mean Measure (logit)	Mean Score	Level
Competence and Professionalism Lecturer				
BSI	Professionalism	-0.66	4.18	High
BSH	Possession in the field	-0.49	4.11	High
Instruksional				
BSF	Feedback Lecturer	-0.41	4.07	High
BSC	The use of educational resources	-0.30	4.01	High
BSG	Conclusions	-0.19	3.96	High
BSD	Student-Centered Learning	-0.26	3.99	High
BSA	Induction set	-0.16	3.94	High
BSB	The content and delivery time	-0.17	3.94	High
BSE	Formative Assessment	-0.14	3.93	High

### 5.3. Use of Facilities and Equipment element of teaching and learning

Referring to Table 5 above, the level of agreement on the implementation of elements of polytechnic students use facilities and equipment for teaching and learning is simple, that is to say they agree with the attribute Islamic centers (mean = -0.32 logit size; the mean score = 4.03) is the most dominant attributes because of the negative readings mean size is excellent value agreed upon and the most dominant. Attribute wifi (mean size = 2.43 logit; mean score = 2.11) is much less dominant attributes as the mean size of the positive reading indicates the reading is less agreed. Wifi consumption level is low, which gives the findings of polytechnic students are dissatisfied with the quality of wifi, which was provided by the institution of the university.

Table 5. Analysis of the Agreement on Implementation of Respondent's use of facilities and equipment elements of teaching and learning in Evaluation Process

Label	Use of facilities and equipment elements of teaching and learning	Mean Measure (logit)	Mean Score	Tahap
CSF	Islamic Center	-0.32	4.03	High
CSJ	Campus Security	-0.03	3.87	High
CSD	Library, Resource Centre	0.13	3.78	High
CSB	Articles, Journals, Reference books, Course file	0.64	3.47	Moderate
CSC	Lecture Hall, Classroom, Lab Workshop	0.67	3.45	Moderate
CSE	Sports Complex, Gym, Tennis Sports	0.74	3.39	Moderate
CSH	Hostel	.79	3.37	Moderate
CSG	Cafeteria	1.24	3.04	Moderate
CSI	Parking	1.23	3.04	Moderate
CSA	Wifi	2.43	2.11	Low

## 6. Conclusion

The study shows the level of implementation of the Diploma in Mechatronics Engineering program elements (E-DEM) in the evaluation process dimension is at a high level. According to Stufflebeam and Shinkfeid (1985), the evaluation process is an assessment of the activities used to achieve the objectives and goals of the program. Among the elements involved in this study is the process of teaching and learning, use of facilities and equipment, and methods of evaluation. Based on the analysis, the polytechnic student respondents gave high approval ratings to the element method, followed by the process of teaching and learning and the use of facilities and equipment. The findings are in line with Syed Ali (2012) and Abu Bakar (2011).

Elements of the program (E-DEM) method of valuation were approved by the highest of the respondents. The study is in line with the requirements specified in Standard Program: Engineering and Engineering Technology. Evaluation of student achievement is a crucial aspect of quality assurance because it can enhance student learning. The results of this evaluation also constitute the basis for the award of qualifications (Malaysian Qualifications Agency, 2011). Job evaluation methods used in polytechnic courses is to measure the advancement of knowledge, assess the level of achievement of practical skills and soft skills assessment. The results clearly show polytechnic students strongly agree with the methods adopted by the lecturers. Therefore, the relationship between assessment and learning outcomes are reviewed periodically through the analysis of continuous assessment review and analysis of final examination results. Mustaza, Hussain, Hussain, and Mokri (2012) describe the measurement and continuous assessment should also be carried out periodically and systematically, as well as the integration of learning.

The result of element analysis program (E-DEM) teaching and learning process also received the highest approval level. Level Values Professionalism and proficiency in the field showed the highest mean score which represents the competence and professionalism of lecturers. This finding is consistent with case studies Zakaria, Zulfazli, Khan, and Othman (2013) at the Polytechnic Banting, Selangor stating the level of competence and professionalism on average is good and lecturers who teach are professional in addition to having a sufficient level of knowledge in ensure Lesson Learning Outcomes (LLO) is reached. Therefore, the values of professionalism should be practiced throughout the process of teaching and learning to walk.

On the whole, the respondents gave their approval to the average level in the use of facilities and equipment elements of teaching and learning. However, the attributes attribute the wifi is less dominant and show the readings less agreed.

Wifi consumption level is low, which gives the findings of polytechnic students are dissatisfied with the quality of wifi, which was provided by the institution of the university. They are supported by Mohamed Zainuddin (2012) argued that the facility lacks wifi provided help students to make references via the internet. According to Royo and Mahmood (2011) affected student learning facilities and educational institutions disesebuah environment. Therefore, the lack of educational facilities will affect the learning process.

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## References

- Abu Bakar, M. N. (2011). *Penilaian Mata Pelajaran Vokasional (MPV) bagi bidang pertanian di sekolah menengah harian di semenanjung Malaysia*. Universiti Kebangsaan Malaysia.
- Agensi Kelayakan Malaysia, M. (2011). *Standard Program: Kejuruteraan dan Teknologi Kejuruteraan* (p. 48). Agensi Kelayakan Malaysia. Retrieved from [www.mqa.gov.my](http://www.mqa.gov.my)
- Alkin, M. C. (1969). Evaluating theory development. *Evaluation Comment* 2:2-7.
- Butterfield, S. (1995). Educational objectives and rational assessment. Philadelphia: : Open University Press.
- Cronbach, L. J. (1963). Course improvement through evaluation. *Teacher College Record* 64:672-683.
- Mat Saad, A., Nik Yusoff, N. M. R., & Mohammad Yassin, R. (2011). Penilaian Kemudahan Pembelajaran, Peruntukan Kewangan dan Kursus dalam Perkhidmatan bagi Kursus Pendidikan Islam di Politeknik Malaysia. *Journal of Islamic and Arabic Education*, 3(1), 123–134.
- Mohamed Zainudin, S. A. (2012). Faktor yang mempengaruhi kelulusan pelajar dalam kursus termodinamik 1 (JJ207) di politeknik sultan azlan shah. In *Seminar Kebangsaan Penyelidikan Dan Inovasi* (Vol. 1, pp. 376–389).
- Mustaza, S. M., Hussain, A., Husain, H., & Mokri, S. S. (2012). Keberkesanan kaedah pengukuran dan penilaian hasil pembelajaran - hasil program (CO-PO). *Jurnal AJTLHE*, 4, 61–68.
- Royo, M. A., & Mahmood, H. (2011). Faktor-Faktor Kelemahan Yang Mempengaruhi Pencapaian Cemerlang Dalam Mata Pelajaran Reka Cipta. *Journal Of Education Psychology And Counseling*, 2, 145–174.
- Stufflebeam, D. L. (1971). The relevance of the CIPP evaluation model for educational accountability. In *The relevance of the CIPP evaluation model for educational accountability* (pp. 1–30). doi:ED 062385
- Stufflebeam, D. L. (2003). The CIPP model for evaluation. In *The Annual conference of the Oregon program evaluators network (OPEN)*. Portland, Oregon.
- Stufflebeam, D. L., Foley, W. J., Gephart, W. J., Guba, E. G., Hammond, R. I., & Merriman, H. O. (1971). *Educational evaluation and decision-making*. Illinois: Peacock. Suchman.
- Suchman, E. A. (1967). *Evaluative research*. New York: Russel Sage Foundation. Talmage,.
- Syed Ali, S. K. (2012). *Pelaksanaan Kurikulum Pendidikan Jasmani Tingkatan 4 bagi Tunjang Kecerdasan fizikal berdasarkan Model Penilaian STUFFLEBEAM*. Universiti Pendidikan Sultan Idris: Tesis Ph.D.
- Tyler, R. W. (1950). *Basic principles of curriculum and instruction*. Chicago: University of Chicago Press. Wallace.
- Yahaya, A. (1999). *Keberkesanan pelaksanaan program kemahiran hidup di sekolah-sekolah menengah di Malaysia berdasarkan model penilaian konteks, input, proses dan produk*. Universiti Putra Malaysia: Thesis Ph.D.
- Zakaria, N., Zulfazli, M., Khan, R., & Othman, M. A. (2013). Tahap Implementasi Outcome Based Education Dalam Proses Pembelajaran dan Pengajaran di kalangan Pensyarah Politeknik, (Isqae), 359–364.