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# PROCEEDING INTERNATIONAL SEMINAR



**REFORMULATING THE PARADIGM OF  
TECHNICAL AND VOCATIONAL EDUCATION**

**NATIONAL CONVENTION VI - APTEKINDO  
THE XVII CONGRESS OF FT/FTK - FPTK - JPTK INDONESIA**

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Badan Penerbit UNM

**Fakultas Teknik  
Universitas Negeri Makassar**



**SAMBUTAN DEKAN  
FAKULTAS TEKNIK UNIVERSITAS NEGERI MAKASSAR**

Pertama-tama marilah kita panjatkan puji dan syukur kehadirat Tuhan Yang Maha Kuasa karena atas Taufiq dan HidayahNya maka Seminar Internasional yang merupakan rangkaian kegiatan Konvensi Nasional Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) VI, dan Temu Karya XVII FT/FTK/FPTK-JPTK Universitas se Indonesia telah berlangsung lancar dan sukses.

Kegiatan seminar international ini diselenggarakan pada Fakultas Teknik Universitas Negeri Makassar pada tanggal 4 Mei 2012, yang mengangkat tema utama "**Reformulasi Paradigma Pendidikan Teknologi dan Kejuruan**", dengan enam sub tema yaitu: (1) Pengembangan Kebijakan Pendidikan Teknologi dan Kejuruan, (2) Rekonstruksi Kurikulum Pendidikan Teknologi dan Kejuruan Berbasis Karakter dan Kewirausahaan, (3) Pengembangan Model Pembelajaran Pendidikan Teknologi dan Kejuruan, (4) Evaluasi Pelaksanaan Sertifikasi Guru Pendidikan Teknologi dan Kejuruan, (5) Pengembangan Pendidikan Profesi Guru Teknologi dan Kejuruan, dan (6) Pengembangan Kemitraan LPTK Pendidikan Teknologi dan Kejuruan.

Seminar Internasional ini menampilkan para pakar pendidikan kejuruan, baik dari dalam dan luar negeri. Oleh karena itu, seminar ini dapat lahir ide-ide dan pemikiran inovatif yang cemerlang, dalam usaha mengembangkan dan menggagas paradigma baru Pendidikan Teknologi Kejuruan. Semoga ide-ide yang telah dibahas dalam seminar ini terus menerus dikembangkan untuk memantapkan peran strategis pendidikan kejuruan bagi kemajuan bangsa dan Negara, khususnya dalam mempersiapkan tenaga kerja yang sesuai dengan kebutuhan dunia kerja.

Pada kesempatan ini saya atas nama Pimpinan Fakultas Teknik UNM dan selaku Ketua Panitia Penyelenggara Seminar International ini menyampaikan terima kasih dan penghargaan yang setinggi-tingginya kepada para nara sumber, khususnya Prof. Dr. Nor Aishah Buang dan Prof. Madaya, Dr. Rohizan Mohammad Yasin (Universitas Kebangsaan Malaysia) dan Dr. Ing. Joachim Dittrict (Jerman) yang telah hadir dan menyumbangkan pemikirannya dalam seminar ini. Saya juga mengucapkan selamat kepada peserta yang makalahnya telah dipilih untuk disajikan dalam seminar ini.

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kekurangan dan kelemahan yang terdapat dalam pelaksanaan kegiatan ini, kiranya kegiatan ini memberi makna bagi kita semua. Akhirnya, saya berharap semoga Prosiding ini dapat bermanfaat bagi kemajuan pendidikan kejuruan dimasa yang akan datang. Amin!

Wassalam

**Dekan FT-UNM,**

**Prof. Dr. H. Husain Syam, M.TP**

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## PENGANTAR

Syukur Alhamdulillah kami panjatkan kehadiran Tuhan Yang Maha Kuasa, karena atas limpahan Rahmat dan Karunia-Nya, maka penyuntingan (editing) dan pencetakan Prosiding yang merupakan kompilasi dari semua makalah Seminar International ini dapat diselesaikan dengan baik.

Seminar Internasional ini merupakan rangkaian kegiatan dalam rangka Konvensi Nasional Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) VI, dan Temu Karya XVII FT/FTK/FPTK-JPTK Universitas se-Indonesia yang diselenggarakan pada Fakultas Teknik Universitas Negeri Makassar pada tanggal 3-5 Mei 2012.

Seminar Internasional ini dengan tema ***“Reformulasi Paradigma Pendidikan Teknologi dan Kejuruan”*** merupakan sarana komunikasi ilmiah yang bertujuan untuk mendapatkan konsep-konsep ilmiah dalam rangka mengoptimalkan peran Pendidikan Teknologi dan Kejuruan dalam Pembangunan Nasional dimasa datang.

Prosiding ini merupakan himpunan makalah utama dan makalah paralel, namun karena kesulitan teknis, maka yang dibukukan hanya halaman pertama dari masing-masing makalah yang berisikan judul dan abstrak, sedangkan prosiding lengkap disiapkan dalam bentuk CD yang telah dijadikan dalam format PDF. Kepada bapak-bapak dan ibu-ibu yang memerlukan makalah cetaknya secara lengkap untuk keperluan tertentu, dapat mencetak makalahnya sendiri dan melampirkannya beserta prosiding ini.

Penyuntingan terhadap prosiding ini telah diupayakan sebaik mungkin, namun kami menyadari sepenuhnya bahwa masih terdapat kesalahan dan kekurangan dalam penyusunannya. Karena itu, kritik dan saran sangat kami harapkan guna perbaikan pada masa yang akan datang.

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Semoga penerbitan Prosiding ini bermanfaat bagi kita semua.

Panitia,

Sie Makalah/Prosiding

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## **SELF-ASSESSMENT MODEL BASED ON QUESTIONING SKILLS OF MATHEMATICS LEARNING IN ENGINEERING FACULTY OF MACASSAR STATE UNIVERSITY**

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### **Abstract**

The main problems in this research is the unavailability of a model of mathematics instruction assessment in Engineering Faculty of Makassar State University which is able to give accurate, sufficient and appropriate fact information that undergone student with give motivation for teacher and students. The objective of this research is a developing self assessment model base graphic organizer on mathematics instruction. Its can develop of harmonious relation between teacher and pupils. Besides that, can be give sufficient and accurate information of the pupil problems and to explore the student strength, weakness, and misconceptions of the subject matter. The orientation of the model is to use of assessment data throughout feedback so that teacher and pupils motivate for prepare and improve the quality of learning. This research is research and development with adopted development model of the R, D, and D model from Hopkins and Clark. The stage research covers: research, development, and diffusion. In stage research, activity that done to consist of preliminary research, research results study, curriculum analysis, arrangement model prototype, and expert validation. Stage development, activity that done to cover model validation, model legibility test, train teacher, limited try out, and expanded try out, until found effective and efficiency of model. Latest, stage activity diffusion covers dissemination, training and demonstration. The results in stage research compiled a model prototype complete with its equipment. Its consists of practices guide lines of model, model instrument covers behave observation sheet, student self-assessment, two stages task, and scoring rubrics.

**Keywords:** *Self-Assessment, Questioning Skills, Mathematics Learning.*

### **Preface**

Assessment is an integral part of the educational process. Efforts to improve the quality of education can be reached by improving the quality of learning and quality assessment. Learning and assessment is an integral and inseparable. The quality of learning can be seen from the results of assessment. Conversely, a good assessment system, will encourage teachers to determine a good strategy and motivate students to learn better. Therefore, in an effort to improve the quality of education needs to improve the quality of the assessment system.

Assessment of student success that now happening in schools in general are still carried out by the lecturer. As a result, the information obtained is not appropriate and do not show the true condition of the student (Mansyur, 2009; Mansyur & Hamda, 2007). Observations of researchers in several classes at the UNM School of Engineering shows that there are many professors of mathematics using insufficient information is inaccurate even as a basis for decision making. As a result, the decision give unfavorable effects, both for students and lecturers themselves. In the perception of lecturers, the decisions made are correct, but the perception students just the opposite. In this context, a lecture has neglected aspects of student's skills and competencies.

The decisions taken by the lecturers above, do not reflect the attitude as a professional. To be able to realize that professional educators in terms of assessment, teachers need to think of a way or a new assessment strategies, by inviting students as partners in the assessment process. In a

sense, students are involved in the assessment themselves. Self-assessment conducted by the students on their work was a major factor in the learning process (Black, Horison, Lee, Marshall, & Wiliam, 2004). Opinion was corroborated by Davies (2000) who said that: when the students assess their own work, then when they built it well to learn their own insights. When students are involved in self-assessment, the lecturers can see the fit between what has been taught with what has been mastered by students. By knowing these gaps, teachers can modify teaching strategies in accordance with actual and accurate information from their students learning so that quality can be improved.

## **Theoretical Framework**

### **Self Assessment**

Self-assessment (self assessment) is a method of assessment that gives students the chance to take responsibility for their own learning. They were given the opportunity to assess their ability to work and in accordance with the experience they feel. Students are directed to reflect on the knowledge they have learned and identify the needs that they need to plan the next stage of learning.

Reys, Suydam, Linqvist, & Smith (1998: 56) says that the student is a good evaluator (the best assessor) to the feelings and their own work. When students assess their own work, the responsibility for learning on their own. Therefore, the teacher can begin the process of self-assessment gives students the opportunity to validate their own thoughts or answers to their work.

Weeden, Winter, & Broadfoot (2002: 73) define a self-assessment as a process that involves learners in review: (a) reflect past experience, (b) remember and understand what is associated with learning experience, and (c) try add a clearer idea about what was learned or accomplished. Definition, illustrates that the process student assessment is a transfer of responsibility to assess the process of faculty to students, in an effort to improve the quality of information related to student learning needs.

AAIA (2001a: 2) defines self-assessment for all activities conducted within and outside the classroom that allows students to reflect on what has been taught and compare it to a set of criteria. Definition, self-assessment illustrates that students can do well in class and outside the classroom. Then, self-assessment will be run well, if the student has to know clearly the assessment criteria or success criteria that serve as the basis for that judgment. Therefore, before carrying out the task of learning faculty need to establish assessment criteria or success criteria, then informed the students on early learning.

De Lange (1999: 34) defines a self-assessment as an essential part of any program that aims to help students be more responsible for their own learning. The students should reflect their understanding of themselves and how to alter their understanding, and self-assessment is a good tool to achieve this. The opinion of De Lange, illustrates that the self-assessment is an attempt to help students be more responsible for their own learning, so students are aware of the need to improve and enhance learning.

Wiggins (De Lange, 1999: 34) states that authentic education center is the self-assessment. The practical implications of this opinion, requires students to submit a self-assessment of their work sheet. Feedback from faculty will help students understand how teachers assess in relation to their own perceptions. Wiggin's opinion is supported by Black and Wiliam (1998), who concluded that a focus on self assessment by students is not common practice, even among teachers take seriously.

Dikel (2006: 2) defines self-assessment as a process that causes people to learn better about themselves, what kind of likes, dislikes, and how the tendency to react to certain situations. By knowing this, may help to determine the type of job and employment situation which is more suitable. According to Dikel opinion, the involvement of students in the assessment process is an essential part of a balanced assessment. When students become partners in the learning process, they gain a better understanding of themselves as readers, writers and thinkers. The students reflect on what they have learned and how they learn, they build (develop) tools to become more effective learners.

### **Benefits of Self-Assessment**

Lecturers and students will benefit by involving students in assessing themselves. That is, due to the self-assessment, students and faculty will get the appropriate and accurate information about the strengths and weaknesses they have. When the information is used as a basis to plan and establish next steps to improve and enhance learning, the results achieved its maximum. This is in accordance with that presented in AAIA (2001a: 6) that the self-assessment can provide benefits to students and lecturers. The advantage for students is:

- a. Students become responsible for their own learning
- b. Students can determine the next steps in learning
- c. Students feel safe about something is not right
- d. Enhance self-esteem and into something positive
- e. Students are actively involved in the learning process
- f. Students become more independent and motivated

Then the benefits for the lecture are:

- a. There is a shift in responsibility from teacher to student
- b. The lesson is more efficient if students are motivated and independent
- c. Feedback to help teachers identify students' progress
- d. Lecturers can identify, prioritize next steps for a group / individual
- e. Occur in perception between students and faculty, the students then the teacher explains the strategy identifies the thinking process
- f. The lesson is more efficient to allow a greater challenge

### **Self-Assessment Strategies in The Classroom**

AAIA (2001b) developed a strategy to implement self-assessment in the classroom, which consists of four stages: stage identification, implementation, reflection, and review policy. Elaboration of each stage is presented below

#### **Identification**

At this stage, 6 (six) identified strategies that are a combination of research and practice in the classroom, namely:

- 1) Sharing learning goals with students
- 2) Helping students to know and understand the standards that they want to accomplish
- 3) Involve students in self assessment
- 4) Provide feedback
- 5) Having the belief that all students can be improved
- 6) Involve faculty and students in reflection and information review

**Implementation strategies**

This stage, an implementation strategy that is obtained in practice in the classroom effectively.

**Reflection**

At this stage, the activities carried out are encouraging faculty to identify and reflect on their daily activities in the classroom, to help students learn by clarifying expectations, constructive feedback, and identify the next learning stage.

**Review Assessment Policy**

At this stage, the activities carried out related to the results obtained from the three previous stages. Based on these results, the revised school assessment policy and school improvement plans.

**Methods of The Research**

This research is the development by adopting a model developed by Hopkins & Clark Isthe R, D & D model "(Havelock, 1976).

At this stage of research, there are 5 (five) activities carried out, the preliminary research, the results of research studies, analysis of curriculum, preparation of the prototype model, and validation experts. At this stage of development, there are 4 (four) stages of the activities carried out, namely: readability test, train teachers, limited trials, and trials expanded. At this stage of diffusion, there are 3 (three) the activities carried out, namely dissemination, training, and demonstration.

**Developing Procedure**

Model development-PDQS procedure refers to the design that has been presented above. Operationally, the development of procedures carried out are:

- a. Constructing the model, which is a practical guide the use of models, the effectiveness of assessment instrument model, student self-assessment instrument, instrument of assignment of two stages, the criteria and scoring rubrics, and plan the implementation of learning.
- b. validation of expert
- c. revision
- d. Readability of devices in mathematics lecturers and students
- e. validation of expert
- f. legibility
- g. Revision (repeat process)
- h. Train faculty
- i. Tryouts are limited
- j. revision of the model
- k. expanded trials
- l. Model-PDQS found

Steps a, b, and c is a stage made during the first year, during the research phase. Then, steps d through l will be conducted in the second year, the stages of development.

**Subject of The Research**

The subjects of this study consists of three categories, which are the subject of research at the research stage (the first year of study), in the pilot phase is limited, and expanded on the pilot phase (development stage). In the first year, at the first stage of research subjects is a lecturer in mathematics at the Faculty of Engineering, UNM.



**Finding and Discussion**

The results of this development for first year formed a prototype model of assessment is called the self-assessment model based on questioning skills (Model-PDQS). The model is equipped with a device comprising: a model syntax, practical usage guidelines, assessment of the effectiveness of the instrument model, the behavior of the student observation sheet, complete with a two-stage assignment criteria and scoring rubrics, and student self-assessment instruments. Model and its tools have been validated by 3 (three) education experts and educational measurement, all of which give good results for the tested and fit for use. The results of expert assessment can be seen in the research report.

**Syntax Model-PDQS**

Model-PDQS syntax are the steps that must be done by professors or other education practitioners who want to apply it in education in class. To that end, the sequence of steps that have been defined in the syntax is recommended to be followed, so that it will obtain maximum results.

**Student Self-Assessment Sheet**

Student self-assessment in this model using the strategy of questioning skills in which students are given the opportunity to assess themselves in terms of their experience during the learning of mathematics. Strategic questioning is a skill that is easy and fast method for students to record their assessment of learning based on learning objectives have been set.

**Student Behavior Observation Sheet**

Observations of student behavior in this model is the behavior of students during the learning takes place. Observable behavioral indicators that include listening to the teacher, noting the important things that explained a lecturer, asked the professor, lecturer answering questions, express opinions, and concentration. Elaboration of each indicator behavior can be seen in the report. Behavior observation sheet format which is one of the models presented in the figure-PDQS following table.

**Student Behavior Observation Sheet**

Subject : ..... Time of Meeting : .....  
Date : ..... Time : .....

Directions:

1. This observation sheets filled lecturers and observers during learning activities.
2. Lecturers and observers were asked to fill the sixth column of student behavior
3. Assessment criteria:  
Very good = 4 Good = 3 Fair = 2 Poor = 1
4. Indicators for assessment of student behavior is attached.

No	Name of Student	Student Behavior					
		Listening	Note-Taking	Asking Questions	Answering Questions	Add an Opinion	Concentration

.....  
Lecturer/Observer  
(.....)

Then, to facilitate education teacher or practitioner in making observations, then the table 3 below presents the guidelines for charging for each criterion.

Guidelines for Student Behavior Observation Sheet

Score	Description
4	Such behavior appears more than 5 in more than 3 minutes
3	Such behavior appears 3-5 times in 2-3 minutes
2	Such behavior appears 1-2 times in 1-2 minutes
1	Such behavior never appears

**Format Task Two Stage**

Task two stages in this model is a set of questions that are designed according to the subject matter of mathematics Odd and Even semesters, according to plan the implementation of learning. Two-stage task in this case, the task of stage-1 and stage-2. Phase-1 is given the task to be completed during student teaching ( $\pm 15$  min) and then returned to be examined and given a note by the teacher according to the level of student work. Stage-1 assignment is returned to the student to be repaired or re-learned professors within their records. Phase-2 given after completion of learning to do at home then collected at the next meeting along with the task of stage-1 the improvement.

**Rubric Scoring**

Criteria or rubric is a scoring guide or performance of the work of learners. Given the criteria, the subjective judgments or unjust can be avoided or at least reduced, it becomes easier to assess teacher performance can be accomplished learners, and learners will be encouraged to achieve their best performance for clear assessment criteria. Rubric consists of two things are related. The first is the score and the other thing is the criteria that must be met to achieve that score. The extent of grading scores (e.g. 5, 4, 3, 2, 1) depending on the type of rating scale used and the nature of the performance to be assessed.

Rubric is a tool that was created or made or designed by the teacher or educator to help them in assessing the performance of students to be more reliable, objective, and consistent. In particular, the rubric useful in situations where the answers are not always right or wrong, or where the provision of grading by assessors can be subjective. Rubrics also provide instructions for students to understand what will be assessed in a process of learning so that students learn to focus and as a guide for lecturers to provide a consistent assessment. When creating a task, the general faculty to consider what should be displayed by their students to complete these tasks. Rubrics are also useful to ensure that the learning tasks are consistent with the purpose of learning.

To avoid the subjectivity of assessors (teachers) in their assessments using the Model-PDQS, then given scoring guide or rubric for each of the questions given the task of two stages. The general format is presented below proficiency level rubric.

**Conclusion**

Model-PDQS found in this study still needs to be done further testing, testing in a broader context, in order to obtain improvement and constructive feedback. Application of Model-PDQS does not depend on the context of the formal curriculum and learning models. In addition, it also does not depend only on the subjects of mathematics. The concept underlying the

model, suitable for all curricula, teaching strategies, and subjects. To support these conclusions, test-pilot is still required on a limited scale and widespread. Therefore, the application of this model is expected to provide benefits to improving the quality of education in general, and the quality of math education in particular.

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