



ACEIVE 2017

PROCEEDING

**Faculty of Engineering
State University of Medan - Indonesia**

**The 1st Annual Conference
on Engineering, ICT and Vocation**

Empowering ACEIVE in 21st Century Learning Environment

Grand Mercure Medan Angkasa
November 26th 2017

The 1st Annual Conference on Engineering, ICT and Vocational Education

“Empowering ACEIVE in 21st Century Learning Environment”

The 1st Annual Conference on Engineering, ICT and Vocational Education (ACEIVE) is a scientific forum for scholars to disseminate their research and share ideas. This conference taking place at the Universitas Negeri Medan on 25 November 2017, with theme *Empowering ACEIVE in 21st century learning environment*.

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Development of Learning Devices Computer Aided Manufacture (CAM)

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Abstract : The purpose of this study is to develop learning tools that include syllabus, Semester Learning Design (RPS), Teaching Materials and Assessment for Computer Aided Manufacture (CAM) courses that have been tested accordingly. Needs analysis in the form of relating to the application of curriculum change of KBK to the KKNi-based curriculum necessarily requires adjustment in many respects. In its implementation the KBK curriculum uses the appropriate tools with the KBK curriculum. With the application of curriculum based on KKNi it is necessary to develop learning tools that support the application of KKNi curriculum. The development of this researcher uses a research procedure that adapts from the 4-D model. Based on the assessment of the material expert, it is shown that the RPS of the CAM and CAM course have met the criteria very suitable for CAM learning tools, then based on the students' assessment that the RPS CAM and CAM Study Materials have met the appropriate criteria to be used as CAM learning tools. The effectiveness of the learning device will be carried out in the second stage of the study and after all completed Dissemination will be carried out in the test of the effectiveness of the learning device.

Keywords : Learning Devices, RPS, Teaching Materials, CAM

Introduction

Research and scientific development is essentially an effort to achieve the vision and mission of the university. The direction of research and scientific development for the long term of the State University of Medan in particular the field of education, including the development of learning systems, educators and education, the development of character building based curriculum, management and leadership research, curriculum development, learning process and innovation, learning tool development, . Through the eminent field of educational and cultural research is expected to be the basis of a foothold in determining quality research on education and learning disciplines. According to KKNi, the curriculum of the Diploma 3 Mechanical Engineering Study Program states that, in the CAM course, graduates have competencies that are able to create CNC program listings generated from CAM program applications that can be installed / integrated into CNC machines. To achieve competence over the role of learning tools is very important.

Learning tools are a number of materials, tools, media, instruction, and guidelines used in the learning process (Suhadi, 2007: 24). This learning tool consists of teaching materials, assessment, and learning models used in learning. Development of learning tools has many benefits both for lecturers and for students. Given the importance of the use of learning tools in lectures in the Diploma 3 Mechanical Engineering course, researchers are encouraged to undertake development research

under the title "Development of Learning Tools of CAM Course of Mechanical Engineering Diploma 3 Faculty of Engineering State University of Medan. This research generally aims to develop CAM learning tools to improve the mastery of concepts and learning outcomes of students of Mechanical Engineering Diploma 3. The purpose of the research is to develop teaching materials according to KKNi that can support the implementation of CAM learning. Learning tools are a number of materials, tools, media, instruction, and guidelines used in the learning process (Suhadi, 2007: 24). Learning tools are used as guidance or guidance used by lecturers and students to meet the success of the learning process in the classroom. Development of learning tools in this research is the development of RPS, teaching materials, learning model, and assessment tool (assessment). Learning outcomes are something that students can do as a result of learning in terms of behavior, CAM learning outcomes include CAD, Define Material, Define Stock Size, Define Select Coordinate Location, Define Tooling, Determine Feeds Speeds, Simulate Machining, Post Process. Learning at the college level should refer to the standard rules of the learning process to gain graduate learning achievement. The process standard in question is one of the characteristics of the learning process. However, to achieve a good learning process required a learning device (teaching materials, assessment, and learning models) that suit the needs of lecturers and students in line with the application of KKNi curriculum.

Research and Methodology

The design used in the research of developing the device of learning using the steps of research design Define, Design, Develop, and Disseminate Four-D. The subjects of this study are students in S1 Mechanical Engineering Department and Diploma Mechanical Engineering Study Program 3. Data collected from this research are qualitative data in the form of assessment of material experts and students on CAM learning tool that is collected through questionnaire. Data analysis in research of development of device of learning is used to determine product development and product suitability. The analysis is done by doing a percentage.

Result and Discussion

The first stage of development is Planning: To support the application of KKN-based curriculum it is necessary to develop KKN-based learning tools, then the Design stage: to formulate the learning achievement of CAM, to formulate CAM Learning Achievement Indicator. formulating CAM Learning Material, formulating the CAM Learning Dual Tasks and 6 student assignments. The third stage of development involves organizing Learning Tools including RPS CAM and CAM course, and Validation of Learning Devices and validation results are presented below:

1) RPS Validation Result CAM Subject by Expert Material:

Statistics Aspect Assessment RPS CAM subject reviewed from expert material presented figure 1 and figure 2 below,

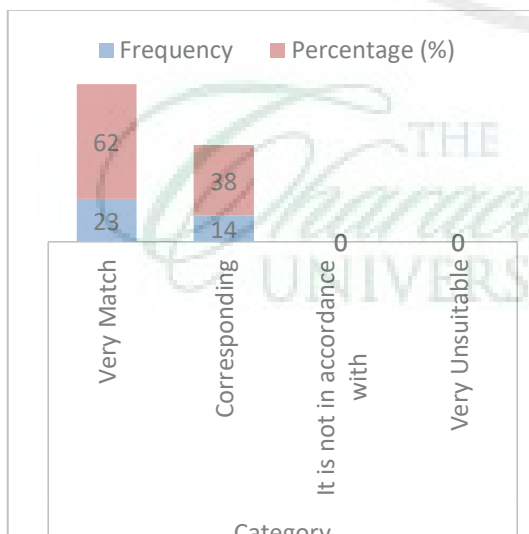


Figure 1: Summary of All Statistical Aspects of assessment Conformity of RPS Subjects CAM According to Expert Material

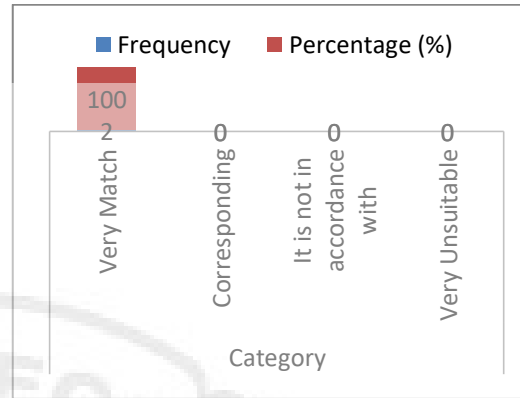


Figure 2: Level of Conformity of RPS CAM subject According to the Material Expert

Based on the above picture above, it can be interpreted that the RPS subject of the CAM subject is evaluated from the average of all aspects of the assessment indicating that from 37 aspects of the assessment, 23 points (62%) in the category are very suitable and 14 points (38%) in the appropriate category. Subsequently the score of the material expert 1 is 134, the material expert 2 is 130 and both (100%) of the material experts provide highly appropriate judgments. This indicates that the RPS of the CAM course meets very suitable criteria for CAM learning devices.

2) Results of CAM Material Validation by Expert of Material

The statistical conformity of the Lesson Materials and the level of inclination is presented in Figure 3 below.

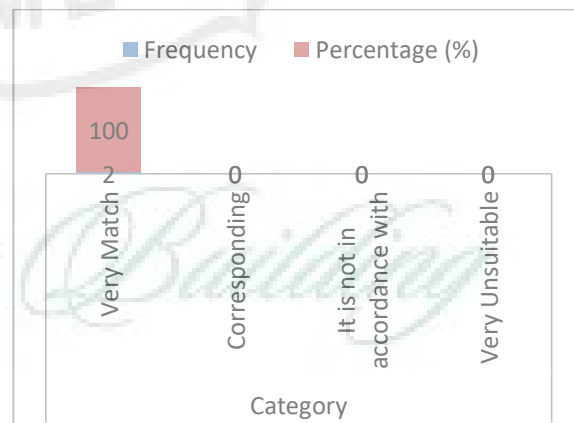


Figure 3: Statistics and Levels of Conformity of CAM Materials According to the Material Expert

Further Statistics of the Aspects of CAM Material Assessment Reviewed by Expert Material are presented in figure 4 below:

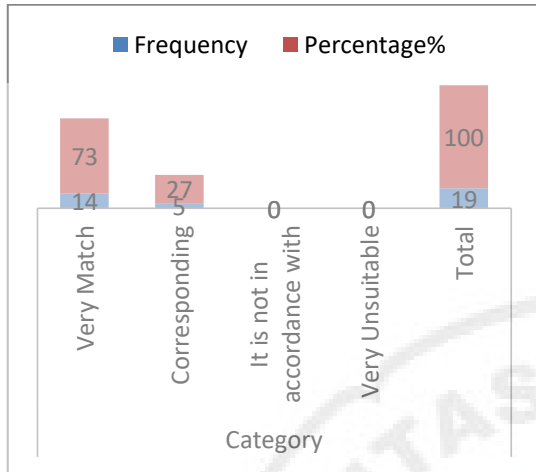


Figure 4 : Summary of All Statistical Aspects of assessment Conformity of CAM Materials According to the Material Expert

Based on the picture above, it can be interpreted that the subject matter of CAM is based on the average of all aspects of the assessment indicating that from 19 aspects of the assessment, 14 points (73%) in the category are very suitable and 5 points (27%) in the appropriate category. This suggests that CAM Instruction has met the criteria very suitable for CAM learning devices to use so based on the above material expert's assessment shows that RPS CAM and CAM Study Materials have met the criteria very suitable for CAM learning devices.

3) RPS Validation Result of CAM Subject by Student

Statistics of RPS Conformity Assessment Scores of CAM Subjects Student Lecture Review is presented in Figure 5 below:

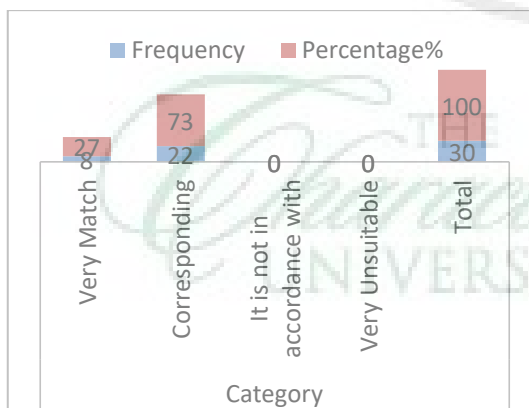


Figure 5 : RPS suitability Statistics and Levels CAM Course According to Student Lecture Participants

Based on figure 5 above it can be interpreted that the level of RPS subject matter CAM from 30 Students Participants Lecture 8 people (27%) included in very appropriate category and 22 people (73%) in the appropriate category. To further clarify the statistics and the overall extent of the assessment of

the appropriateness of RPS CAM subjects is presented in Figure 6 below.

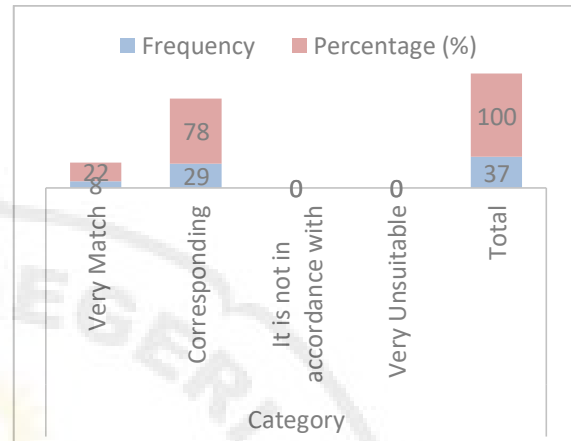


Figure 6 : Overall Trend of Assessment Aspects Conformity of RPS of CAM Based on the above figure, it can be understood that the

appropriateness of the RPS in the CAM subject is reviewed from the average of all aspects of the assessment of the lecturers, indicating that from 37 aspects of the assessment, 8 points (22%) in the appropriate category and 29 (78%) in the appropriate category. This indicates that the RPS of the CAM course meets the appropriate criteria for use of CAM learning tools according to the lecture participants.

4) The Result of Validation of CAM Course Subject by Student

The statistics and level of suitability of CAM materials according to the students are presented in figure 7.

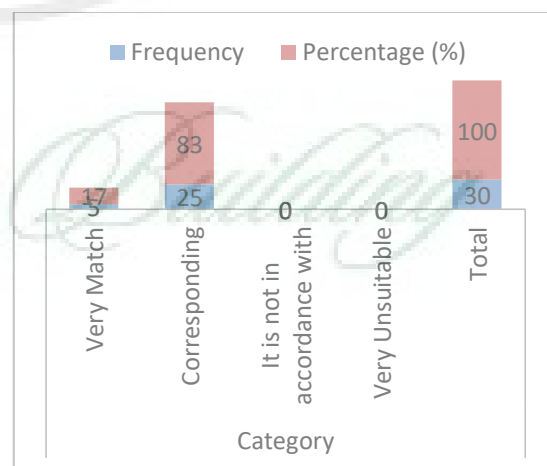


Figure 7 : Tendency Level of Conformity Score of CAM Materials Viewed From Student Participants Lecture

Based on figure 7 above it can be interpreted that from 30 students 5 lecturers (17%) say very appropriate and 25 people (83%) said accordingly. Furthermore the mean statistic score of total CAM

learner's assessment of the conformity of CAM Ingredients is 3.22 included in the appropriate category. Furthermore, in Figure 8 there are statistical aspects of CAM assessment, and assessment aspect trends.

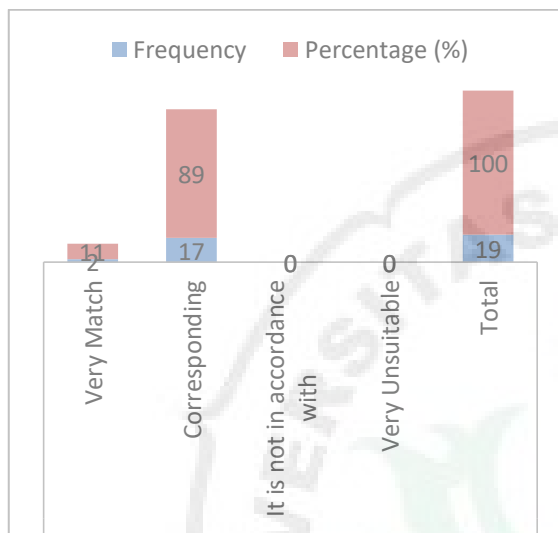


Figure 8 : Statistical Score Aspects of Material Conformity assessment CAM Teaching According to Students Lecture Participants

Based on figure 8 above it can be interpreted that from 19 aspects of assessment 2 aspects (11%) are in very suitable category and 17 aspects (89%) are at the appropriate level. To further clarify the statistics and level of awareness of aspects of CAM Subject course are presented in Figure 9 below.

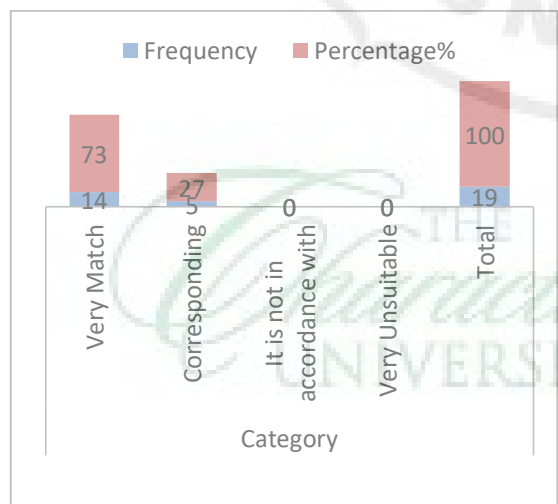


Figure 9: Summary of All Statistical Aspects of assessment Compatibility of CAM Materials According to Student Participants Lecture

Based on figure 9 above, it can be understood that the aspects of CAM Core Material Appraisal evaluated from the average of all aspects of the assessment show that from 19 aspects of assessment, 5 aspects (26%) in the category are very suitable and 14 items (74%) in the appropriate category. This

indicates that CAM Instruction has met the criteria very suitable for CAM learning devices. From the above description based on the material expert's judgment shows that RPS CAM and CAM Study Materials have met the criteria very suitable for CAM learning devices, then based on the student's assessment that the RPS CAM subject and CAM Materials have met the appropriate criteria for use as a device learning CAM. From the above description based on the assessment of material experts and college students showed that the RPS CAM and CAM Study Materials have met the criteria very suitable for CAM learning devices, then based on the assessment of student participants that the RPS CAM subject and CAM Materials have met the appropriate criteria to be used as a CAM learning tool. The next step will be to test the effectiveness of instructional devices in the second stage of this study and after all completed Dissemination.

Conclusion

Based on the above description concluded:

Based on the assessment of material experts and college students showed that:

1. RPS CAM subject has met the criteria very suitable for CAM learning devices,
2. CAM Instruction materials have met the appropriate criteria to be used as CAM learning tools

Acknowledgements

Based on the results of research, discussion and conclusion above, then the suggestion

which can be given in this study are:

1. In accordance with the results of the study, that RPS CAM and CAM course subject matter based on testing of the results of the material experts and lecturers is appropriate can be applied in the CAM learning process.
2. It is expected that further research on the effectiveness of the use of learning tools so as to improve the results and quality of learning CAM course.

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