The Assesment of Media Feasibility at Vocational School

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Abstract: This study is aimed at evaluating the feasibility of instructional media which is a determinant of the learning quality, particularly in the field of vocational technology. The study was carried out at Vocational School of Technology of North Sumatra Province involving 218 teachers as respondents in three groups namely BS, CS, and ES. Media feasibility analysis refers to the criteria of Alessi and Trollip. The results of the study indicate that SB teachers used the most media in comparison with SC teachers and SE teachers, and the most widely used form of visual media compared to video, media miniatures and animation. The overall media usage only fulfilled 46% of ideal requirements, and the animation medium was considered to be the least adequate miniature media, video and visual media. From the feasibility aspect, supplementary information is the lowest compared to other aspects while the pedagogy aspect is the highest. The overall average media feasibility is low. The findings of this study reinforces the results of previous studies that lack of instructional media leads to lower learning outcomes. The study recommends greater attention to develop instructional media as needed, especially animation for the effective learning process and the improvement of education.

1 INTRODUCTION

Vocational education as mid-level workers producer receives great attention by the government particularly in developing countries (Pavlova, 2009; Mustapha, 2014). Vocational education plays a role in developing science as well as providing vocational skills to the students as a provision to enter the work field (Abdullahi and Ehsanyar, 2014; Pavlova, 2009). Therefore, the quality of vocational education will determine the quality of the workers.

As a part of vocational education, vocational school that serves to produce mid-level workers in Indonesia have faced chronic problems due to the graduates' low competence (Ridwan, 2014; Kamdi, 2012). Various efforts have been made to overcome these problems, but the results achieved are not suitable (Ridwan, 2014; Sriadhi, 2015). Therefore, it is necessary to conduct in-depth study related to the low quality of graduates so that the low ability problem of the workers can be addressed.

There are many factors which lead to poor quality of vocational school graduates. The results revealed that the low student learning outcomes is caused by either lack of learning media and laboratory facilities (Sriadhi, 2016; Malloch and Helmy, 2014) and teacher professionalism (Ratnata, 2014). The low abilities of vocational school graduates lead to the addition of unemployment and the decline of people's welfare. This problem must be addressed immediately to avoid even worse damages. However, multimedia-based learning is the most appropriate alternative to improve students' learning outcomes. These problems include Availability of media in comparison with the lesson needs; Types of media used by teachers in teaching; Feasibility of teaching media used by teachers and What the impact of media-based learning on student learning outcomes. This study is aimed at analyzing the adequacy of media, type and feasibility of teaching media and effect of media used by teachers.

1.1 The Role of Media in the Learning Process

Teaching media is a tool that improves the effectiveness of learning process. The use of various media is also called multimedia. It contains a series of teaching materials in the format of text, images, graphics, audio, video or animation and is arranged in a systematic way to create an effective learning environment (Mayer, 2014). The use of teaching multimedia has been proven to overcome the students' low learning outcomes. Eyup and Kemal

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(2013) proved that multimedia courseware can improve students' attitudes and learning outcomes. Research Bicen and Fezile (2014) proves the use of multimedia teaching can improve student learning outcomes both in online learning and blended learning. Truong (2014) has also proved in his research that learning using multimedia managed to improve learning outcomes in the field of engineering. Similarly, Moore (2014) who managed to improve learning outcomes in the field of electromagnetic through the use of multimedia module.

Students' difficulties in understanding abstract subject can be facilitated by using multimedia (Sriadhi, 2015). This is in accordance with the characteristics of multimedia that can visualize abstract and conceptual events into concrete in order to be easily understood (Wouters & Merriënboer, 2008). Effective teaching multimedia should be developed in accordance with applicable rules and theories, especially Cognitive Theory of Multimedia Learning combined with Cognitive Load Theory (Sweller, 2005), Dual Code Theory (Paivio, 2006), and Working Memory Model (Baddeley, 2009).

In addition to the theory, the process of multimedia development should be based on the principles of the form, namely: multimedia principle; split-attention principle modality principle; redundancy principle; signalling principle; coherency principle; spatial contiguity principle; temporal contiguity principle; segmenting and pre-training principle; personalization principle (Mayer, 2014). The principles of forming multimedia will support the creation of a viable instructional medium. Furthermore, the feasibility of instructional media includes nine criteria, namely subject matter; auxiliary information; affective considerations; interface; navigation; pedagogy; invisible features; robustness; supplementary materials (Alessi & Trollips, 2001).

A good instructional medium can improve the achievement of understanding of what is learned, while reducing the cognitive load in students' thinking processes. Technological and vocational subjects require instructional multimedia that is able to visualize abstract events concretely and accurately for students so that they can understand more easily (Gilbert, 2008). For the reason aforesaid, the use of multimedia in technology and vocational schools is importantly needed to improve students' learning outcomes.

2 METHODOLOGY

This research was conducted at Vocational School (VS) in North Sumatra Province, which is limited to VS of Technology and Engineering. The study took a sample of 218 teachers proportionally random, consisting of teachers who taught subjects group Basic Skills (SB), Competence Skills (SC) and Expertise Skills (SE) used proportional sampling technique. There were four studied variables, that is media quantity (X1), media form (X2) and media feasibility (X3) and effect of media (X4). Media feasibility assessment instrument was developed with reference to nine criteria by Alessi and Trollip (2001), Subject matter, Auxiliary information, Affective considerations, Interface, Navigation, Pedagogy, Invisible features, Robustness, and Supplementary materials. The effect of media assessment instrument used ARCS Model (Keller,1987). Data analysis applied descriptive and comparative used Anova.

3 RESULTS AND DISCUSSION

The study involved 218 respondents from 82 vocational schools. The results of data processing from three groups of respondents namely teachers Basic Skills (SB), Skills Competence Skills (SC) and Expertise Skills (SE) states the availability of instructional media such as Table 1.

Table 1: Media availability level.

Teacher Group	Availability of Instructional Media				Mean
	Model	Visual	Video	Animation	
SB	0.42	0.92	0.53	0.26	0.53
SC	0.31	0.86	0.52	0.22	0.48
SE	0.26	0.74	0.34	0.17	0.38
Mean	0.33	0.84	0.46	0.22	**0.46**

The availability of media by teacher group is obtained by mean of 0.53 in SB group of teachers. It means only 53% instructional media are available from the appropriate requirement. The type of widely used media is the visual media form of power point that reaches 92%. Animation and video media have very few in number although it is most needed by students. This not only happened to the SB teacher group but also the SC and SE teacher groups. From the three types of media used, the overall use of animation media only meets 22% of the needs, while the most widely used media is the visual type in the form of a power point slide. The smallest group of teachers using the media is the SE teacher group

which uses only 38% of the needs, while the SB teacher group is the most 53% of the needs.

The lack of media and the low ability of teachers are the cause of the low level of feasibility of instructional media used. Teachers tend to use only makeshift media obtained from others that are not developed according to the needs of the subjects as well as the rules and principles of the required form. The media form data used by the teacher.

Table 2: Source of instructional media.

Teacher's efforts	Media Types			
	Model	Visual	Video	Animation
Adoption	0.82	0.27	0.61	1.00
Adaptation	-	0.48	-	-
Self Creation	0.18	0.25	0.39	-

Table 2 shows that the media used by teachers is largely the adoption of existing media, both on model (82%) and video (61%), and animation (100%), whereas adaptation is developing from existing media only 48% on visual media form a power point slide. Media made by teachers is very small, that is only 18% for media type model, 25% visual media and 39% media video, while animation does not have adaptation or artificial by the teacher. This fact becomes reasonable if the level of media feasibility is low, because teachers do not have sufficient ability to develop their own media according to the needs of the subjects they develop, while the school and government do not pay proper attention to the weaknesses of this media.

The absence of media in the teaching process is caused by the difficulty of getting media models, videos and animations, while the ability of teachers to develop such media is very low. This also causes less effective learning so that the results of learning in vocational high schools become low. Lack of training activities in media development makes teachers unable to make their own teaching media on their subject matter. Some teaching mediums obtained from others are largely inconsistent with the teachers' lesson needs.

Based on the media feasibility level which is measured by using the feasibility instruments referred to Alessi and Trollip (2001), it is generally low except on the robustness aspects of the media model, subject matter on visual media, interface and pedagogy aspects of the animation media. Table 2 below presents the results of data processing media appropriateness used by 218 vocational teachers.

Table 3: Feasibility of instructional media.

Criteria of Feasibility	Model	Visual	Video	Animation	Mean
Subject matter	0.41	0.92	0.55	0.28	0.54
Auxiliary information	0.58	0.86	0.18	0.25	0.47
Affective considerations	0.72	0.72	0.53	0.86	0.71
Interface display	0.84	0.65	0.76	0.92	0.79
Pedagogy aspect	0.75	0.58	0.84	0.94	0.78
Invisible features	0.38	0.26	0.37	0.66	0.42
Robustness	0.94	0.59	0.65	0.57	0.69
Sepplementary material	0.24	0.64	0.16	0.27	0.33
Mean of Feasibility	0.54	0.58	0.45	0.53	0.59

The feasibility of the instructional media from the subject matter aspect averaged only 54% of the suitability of the learning needs. Visual media has the highest feasibility of subject matter that is 92% of the teaching needs while the animation media has the lowest feasibility of 28%. In the aspect of auxiliary information video, the lowest feasibility rate of 18%, although overall media type has an average suitability of 47%. Of all media types, effective consideration aspect has the highest feasibility (79%) followed by pedagogy aspect. However, the supplementary material aspect is the lowest level of feasibility (33%) followed by invisible features (42%) and auxiliary information (47%).

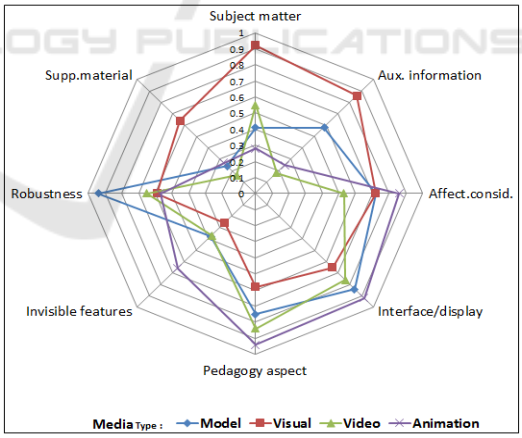

Figure 1: Feasibility of media.

This implies that instructional media used by teachers has a low level of eligibility with an average of 59%. The feasibility of instructional media in some aspects is still very far from the requirement as shown in Figure 1 shows that the lowest level of media feasibility is video and animation. The biggest disadvantage of the video media lies in the supplementary aspects of material that has only 16%

feasibility of the need. This is caused by the video used is the work of others. It does not contribute much to the teaching materials as required in curriculum. This also makes the instructional media form of video less feasible to use. Animated media is also very low in the feasibility aspects of supplementary materials so it is less effectively used. The weakness in this aspect causes the media failed to provide teaching materials to broaden students' insight so that the contribution towards understanding improvement is very low.

Eligibility from the pedagogy aspect for video and animation media is very large with 84% eligibility rate on video media and 94% in animation media. However, because the feasibility of these two media types is low, the students' learning outcomes also do not increase significantly.

Furthermore, media influence on student satisfaction (ARCS) by comparison test using Anova presented in Table 4.

Table 4: Anova of teacher group ARCS.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	40.09	2	1.29	2.33	.00
Within Groups	103.21	186	.55		
Total	143.30	217			

The test results, $F = 2.33$ and $p < .00$ which gives meaning significant difference on student's satisfaction level (ARCS) based on the three groups of teachers. Mean score of SB group 53.22; SC 60.66 and SE 51.72. Thus it is concluded that the level of student satisfaction in the Competence Skill learning group is higher than the Basic Skill and Expertise Skill. This satisfaction caused by the representation of learning materials in the media. Although the SB group achieved the highest adequacy mean score compared to SC and SE (.53> .48> .38) but the representation of lesson content was more important than the quantity of media adequacy in determining the level of student satisfaction. Therefore, media development should consider the relevance of the content with the competencies to be achieved according to the curriculum. This is in accordance with the rules of media development as confirmed by Mayer (2014), Alessi and Trollip (2001).

Referring to the processing of research data, the quality of the media becomes a high determinant of the low effectiveness of learning. Students find it difficult to achieve optimal learning outcomes by using inappropriate media. This fact supports some previous research which proves that instructional media is the cause of the low learning outcomes of students in technical subjects in vocational schools (Sriadhi, 2015; Ridwan, 2014; Kamdi, 2012). The difficulty of students in understanding the abstract and conceptual learning materials should be avoided by using appropriate media. However, the low level of using instructional media (which only meets 46% of the requirement), and media feasibility (56%) of ideal conditions cause the students' problem is unavoidable. This is relevant to theoretical studies of roles and functions and the advantages of instructional media in learning (Mayer, 2014; Sweller, 2005; Baddeley, 2009). The low understanding of teachers about the media, the inability to create instructional media, and the lack of attention of schools and governments brings about the chronic problem in vocational schools improvements.

4 CONCLUSIONS

The quality of the media will determine the quality of learning. Technology and vocational secondary schools require instructional media especially for engineering subjects. Media types are widely used is visual media, while students need more video and animation. The media feasibility level used by teachers is also low, because teachers do not have the ability to create good instructional media. On the other hand, the school and government give no serious attention to the lack of learning media in vocational schools. This makes the learning process less effective so that student learning outcomes are still far from being expected.

There are several steps that need to be done to overcome the problem of low student learning outcomes due to lack of instructional media. The improvement of teachers' ability to develop instructional media should be improved, through workshops and specialized training on media development. Information technology facilities should also be upgraded to support an effective learning process. The school and government should pay serious attention to address the lack of instructional media both in quantity and quality or eligibility. These three main efforts are expected to minimize the existing weaknesses in order to improve the quality of technology and vocational education.

REFERENCES

Alessi, S. M., Trollip, S. R., 2001. *Multimedia for Learning: Method and Development,* Allyn & Bacon, Inc. Boston, 3rd edition.

Abdullahi, S., Ehsanyar, A. S., 2014. Relevance of current vocational curriculum in Afghanistan to market. *3rd UPI International Conference on Technical and Vocational Education and Training.* Bandung, Indonesia, November 12-15

Baddeley, A., Eysenck, M. W., Anderson, M. C., 2009. *Memory*, Psychology Press. New York.

Bicen, H., Fezile, O., Bicen, U. 2014 Online and blended learning approach on instructional multimedia development courses in teacher education. *Interactive Learning Environments.* 22 (4), 529-548.

Eyup, Y., Kemal, O., 2013. The effect of multimedia software coursware on student attitudes. *Journal of Theory and Practice in Education.* 10(2), 31633.

Gilbert, J. K., 2008. *Visualisation: An emergent field of practice and inquiry science education*, Springer. Netherlands, John, K., Gilbert edition.

Kamdi, W., 2012. Integrating academic and vocational education in Indonesia. *International Seminar: Reformulating The Paradigm of Technical and Vocational Education.* Makassar, Indonesia.

Keller, J. M., 1987. *IMMS: Instructional materials motivation survey*, Florida State University. Florida.

Mayer, R. E., 2014. *Multimedia Learning*, Cambridge Univ. Press. New York, 2nd edition.

Malloch, M., Helmy, A., 2014. TVET teachers, a comparison of trends in Indonesia and Australia. *3rd UPI International Conference on Technical and Vocational Education and Training.* Bandung, Indonesia, 12-15 November.

Moore, J. C., 2014. *Efficacy of multimedia learning modules as preparation for lecture-based tutorials in electromagnetism*, Department of Chemistry and Physics, Coastal Carolina University. Conway, Physics edition.

Mustapha, R., 2014. TVET personnel professional development in the asia pacific: challenges and prospects. *3rd UPI International Conference on Technical and Vocational Education and Training.* Bandung, Indonesia, November, 12-15.

Paivio, A., 2006. Dual coding theory and education. *Pathways to Literacy Achievement for High Poverty Children.* The University of Michigan School of Education, September 29-October 1.

Pavlova, M., 2009. Technology and vocational education for sustainable development, empowering individuals for the future. *International Centre for Technical and Vocational Education and Training.* Australia: Griffith University.

Ratnata, I. W., 2014. Effort to enhance the TVET teachers competencies through apprenticeship approach pattern in industry. 7*th National Convention of the Indonesian Association of Technical and Vocational Education.* Bandung, Indonesia, 12-15 November.

Ridwan, 2014. Application of component display theory in the design and development of technology and vocational education in electrical subjects. *7th National Convention of the Indonesian Association of Technical and Vocational Education.* Bandung, Indonesia, November 12-15.

Sriadhi, 2015. The Effect of Exploratory Multimedia Learning Towards Learning Outcomes of Electrical Power Generation Based on Difference of Students' Spatial Ability. *Journal of Education Science.* 1(1).

Sriadhi. 2016. Multimedia Learning: Inovasi dan Peningkatan Mutu Pendidikan Teknologi Kejuruan. *Konvensi Nasional VIII Aptekindo.* 8 Juli 2016. Universitas Negeri Medan, Indonesia.

Sweller, J., 2005. *Implication of cognitive load theory for multimedia learning*, Cambridge University Press. New York.

Truong, M. T., 2014. Multimedia teaching methods in positive course of engineering. *3rd UPI International Conference on Technical and Vocational Education and Training.* Bandung, Indonesia, 12-15 November.

Wouters, P. F. P., Jeroen J. G. M., 2008. How to optimize learning from animated models: A review of guidelines based on cognitive load. *Review on Educational Research.* 78, 645.