A Need Analysis in Developing Tutorial Video to Improve Computer Assembling Skills of TKJ Students in Vocational High Schools

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Abstract. Technological developments in the current era make use of various media for learning. Learning media can facilitate and support practical activities to improve skills, one of which is by using video tutorial media because the video tutorials show the natural form of real objects to follow the instructions easily. This initial research aims to determine the need to develop video tutorial media used by teachers and students in the learning process to assemble computers at the Muhammadiyah 3 Yogyakarta vocational high school. This study used a descriptive-qualitative method by conducting interviews with one teacher and distributing needs analysis questionnaires to 30 students of class X TKJ as research subjects. The results obtained from the statement questionnaire given to students, 93% agreed to develop a video tutorial to facilitate understanding of the material to assemble a computer used for independent or group study wherever and whenever. This research can be used as a criterion for developing instructional media for video tutorials following the material's characteristics for assembling computers.

1. Introduction

Vocational high schools are secondary level education in Indonesia, aiming to produce skilled and competent graduates to be ready to work following their respective fields of expertise. The skill aspect is one of the essential things for vocational high school students to ensure that students have a prosperous professional career after they graduate [1]. However, the reality in the field is that most vocational high school graduates do not get jobs following their areas of expertise; it is evident that vocational high school graduates still dominate Indonesia's unemployment rate by 10.42% in August 2019 [2]. The number of productive teachers is still less than the number of adaptive or normative teachers [3]. The lack of productive teachers in expertise competency prevents students from getting good teaching according to their competency program.

One of the efforts to improve student skills so that graduates can compete in the world of work, by using learning media [4] as a tool to make it easier for students to understand the material. Learning media aids can be adapted to the characteristics of the material and students; the media that are often used in learning are text, audio, visual, video, engineering tools, and message delivery intermediaries [5]. The learning process in vocational schools is different from other general secondary schools, most of them are doing practical learning 70%, and the rest is theory. Learning-related to practice to improve skills, the model, media, or tools used can be adjusted [6] so that learning media can make it easier for students to understand the material and the practical process.

Learning media can facilitate and support practical activities to improve skills, one of which is by using video tutorial media because the video tutorials show the natural form of real objects to follow the instructions easily. Students have the freedom to see and study the material presented by the teacher, so using video tutorials, the material can be viewed or played over and over again to
help understand the learning process. Video media is a combination of audio and visual, contains sound and images, presents messages in the form of facts or fiction, and is informative, educative, and instructional [7]. Learning with the help of video tutorials using electronic devices such as computers, tablets, or smartphones as teaching media in the classroom, which in recent years has increased in the millennial era with 21st-century learning; the existence of this media has made it easier for students and teachers in the learning process and education [3].

Video tutorials illustrate activities from start to finish in a process to be studied, usually consisting of a series of instructions described verbally through the different steps required to complete a particular task and accompanied by a manual demonstration of how each step should be performed [8]. The advantage of video tutorials is to show a demonstration of the movement and the context of the movement [9]. Various studies have also reinforced that video tutorials can increase audience motivation to learn [10], with the user's reason to be persuaded to change or overcome a behavior. The use of video tutorials in learning has many advantages in training, information, and motivation. Training tells someone how to do something like how to assemble a hardware product [11].

The Muhammadiyah 3 Yogyakarta vocational high school by researchers became a place of initial observation to analyze the needs of learning media used in assembling computers majoring in TKJ. Computer assembly material is a fundamental competency that must be taught to students to understand the material and carry out computer assembly practices following the computer hardware industry's procedures. Assessment of computer assembling skills starts from preparation, component installation sequence, assembly results, time, and neatness. The need to use learning media in practical activities to assemble computers will impact student learning processes and outcomes. Practical exercises provide a large enough role as a learning experience and prepare students to improve their skills.

The results of the researchers' preliminary observations were that the material for assembling computers still used conventional learning media using student textbooks so that students had difficulty understanding the procedures for assembling computers and yet difficult to memorize the names of computer components and their functions so that the score results for computer assembling skills had not reached the standard value graduation. This is what motivates researchers to develop instructional media in the form of video tutorials to assemble computers. So it is necessary to analyze the needs of learning media to identify possible learning gaps and learners' knowledge, instructional problems, and instructional products that will be developed according to student needs [12]. The purpose of this study is to analyze the needs of learning media used by students and teachers so that researchers can develop learning media that can support and support students' skills in assembling computers.

2. Methods

The research method in the early stages of developing this tutorial video is descriptive research using qualitative data analysis techniques. A descriptive study is a method used to describe the situation as it is [13]. Data processing is presented in descriptive analysis. Data collection was carried out through observation, questionnaires, and interviews. The type of comment carried out was unstructured observation and interviews with one teacher by giving questions orally. Distribution of the questionnaire to 30 student questionnaires, which contain several statements regarding the availability and use of learning media in schools. Interview data analysis is presented descriptively about learning materials to assemble computers, media, and methods as needed. Meanwhile, the student questionnaire's data is expressed in the form of a percentage of the total dominance of students in answering the statements given.
3. Result and Discussion

The preliminary analysis results, the researcher conducted an oral interview with the head of the TKJ expertise at SMK Muhammadiyah 3 Yogyakarta by asking several questions about the media used, the learning atmosphere, student characteristics, and the results of the value of learning to assemble computers. From the interview results, it was found that most of the learning process for necessary competency materials in assembling computers was still teacher-centered and only used books/modules as learning media. Students in the learning process receive passive information from the teacher so that students feel bored quickly and are not optimal in mastering the subject matter for assembling computers. The teacher stated that students’ performance and skills in assembling computers during practice did not match the expected results. There were still many who had not reached the maximum value standard in computer assembling skills.

Table 1. The results of students’ statements about the needs analysis for learning media to assemble computers

| No. | Statement                                                                 | Student Response (%) | Yes | No |
|-----|---------------------------------------------------------------------------|----------------------|-----|----|
| 1   | Learning materials to assemble computers are difficult to understand, especially when practicing assembling. | 80%                  |     | 20%|
| 2   | The teacher delivers the material for assembling a computer using a variety of learning media. | 27%                  |     | 73%|
| 3   | The learning media used now are sufficient to support the learning process to assemble computers and understand how to assemble computers. | 33%                  |     | 67%|
| 4   | The use of media in learning will make learning more fun. | 83%                  |     | 27%|
| 5   | Students need other learning media to understand better the material and how to assemble computers. | 80%                  |     | 20%|
| 6   | If developed learning media that uses audio, visual, text, or animation in the form of video tutorials for learning to assemble computers | 93%                  |     | 7% |
| 7   | The media developed is a video tutorial media with a demonstration model. | 77%                  |     | 23%|

A needs analysis questionnaire consisting of several statements was addressed to 30 students with a percentage of the results obtained: 1) 80% of students had difficulty understanding the learning material to assemble computers, especially during practice because they did not understand following the assembly steps listed in the book / module and it was also challenging to memorize names of computer components; 2) 73% of students stated that the teacher did not use a variety of learning media to deliver material on assembling computers only with books and lectures, so that learning felt bored and monotonous; 3) 67% of students think that the existing and used media are not sufficient to support the learning process to assemble computers and help understand how to assemble computers; 4) 83% of students agree to use media in learning so that it makes learning more fun; 5) 80% of students need additional learning media so that the learning process does not get bored quickly and to better understand the material and how to assemble computers; 6) 93% of students strongly agree that learning media for video tutorials to assemble computers are developed so that they can understand the procedure for assembling the right computer on the grounds that the media can be used repeatedly, can be used for independent or group study wherever and whenever; and 7) 77% of students agreed that the contents of the tutorial video were in the form of demonstrations so that they could see real and detailed procedures for assembling computers.
Video tutorial media was supported by technological developments, where almost all students have smartphones to be used for learning through video tutorials. Also, video tutorial instructional media displays audio and visuals that can attract students' attention to watch, with unlimited time and place before practicing computer assembling. The development of this video tutorial is supported by Gonzalves' research that video tutorials make it possible to retain the knowledge learned during instruction by simulation or demonstration [14]. Instructional video tutorials can make it easier for users to understand the material and analogously [15].

The results of the preliminary research findings of interviews and student need questionnaires are that the media used by the teacher is still limited to books so that students always have difficulty understanding the material and how to assemble the right computer; as a result, the students' computer assembly skills still have not reached the expected maximum value standard. Students need different learning media to see the shape of the computer components before doing direct practice. Learning media that can support this material is video tutorial media because can directly see the computer assembly procedure. The result of this stage is knowing the need to develop instructional media in the form of video tutorials following the material and students' characteristics. Following the analysis of instructional video tutorial media's needs to improve computer skills, students and teachers strongly agree and support video tutorial media development. A tutorial is generally described as a transfer method that can be used as part of the learning process. The results of this study were obtained by giving questionnaires to students.

4. Conclusion

Based on the explanation from the results of the needs analysis, it can be concluded that 1) the lack of learning media to support the material for assembling computers makes students quickly bored and has difficulty practicing assembling computers because they do not understand the procedures and assembly steps, 2) Students find it challenging to memorize names computer components so that students' computer skills are still below the maximum standard value, and 3) Teachers and students need learning media in the form of video tutorials that can help students understand the material and improve computer assembling skills.

Following these conclusions, it is necessary to develop instructional media for video tutorials that can be used as alternatives and solutions to the limited facilities and infrastructure in schools, where students first see the video tutorials before practicing assembling computers. A video tutorial can display the natural shape of the object directly and in real terms so that students can follow the instructions easily.

5. References

[1] S. Baharom, M. A. Khoiry, R. Hamid, A. A. Mutalib, and N. Hamzah, “Assessment of Psychomotor Domain in A Problem-Based Concrete Laborotary,” J. Eng. Sci. Technol., vol. 10, no. Spec. Issue 1 on UKM Teaching and Learning Congress 2013, June 2015, pp. 1–10, 2015.
[2] BPS, “Berita Resmi Statistik - Keadaan Ketenagakerjaan Indonesia Agustus 2019.pdf,” BADAN PUSAT STATISTIK, 2019. https://www.bps.go.id/pressrelease/2019/11/05/1565/agustus-2019--tingkat-pengangguran-terbuka--tpt--sebesar-5-28-persen.html (accessed Feb. 05, 2019).
[3] D. S. Hadam, N. S. P. Rahayu, and A. N. S. P. Ariyadi, Strategi Implementasi Revitalisasi SMK (10 Langkah Revitalisasi SMK). Jakarta: Direktorat Pembinaan Sekolah Menengah Kejuruan Direktorat Jenderal Pendidikan Dasar dan Menengah Kementerian Pendidikan dan Kebudayaan, 2017.
[4] G. P. Cikarge and P. Utami, “Analisis dan Desain Media Pembelajaran Praktik Digital Sesuai RPS,” vol. 3, no. May, pp. 92–105, 2018, doi: 10.21831/elinvo.v3i1.20509.
[5] S. E. Smaldino, J. D. Russell, R. Heinich, and M. Molenda, *Instructional Technology And Media For Learning*, 9th ed. NJ: Pearson Education Inc, 2011.

[6] M. B. Triyono, “The Indicators of Instructional Design for E-learning in Indonesian Vocational High Schools,” *Procedia - Soc. Behav. Sci.*, vol. 204, no. November 2014, pp. 54–61, 2015, doi: 10.1016/j.sbspro.2015.08.109.

[7] A. S. Sadiman, *Media Pendidikan*. Jakarta: PT Raja Grafindo Persada, 2009.

[8] T. Heinemann and R. L. Moller, “The virtual accomplishment of knitting: How novice knitters follow instructions when using a video tutorial,” *Learn. Cult. Soc. Interact.*, vol. 8, pp. 25–47, 2016, doi: 10.1016/j.lcsi.2015.11.001.

[9] K. Lu, “User comments to video instructions : the effects of Kanmaku on usability, motivation and self-efficacy,” pp. 1–42, 2015. [Online]. Available: http://essay.utwente.nl/68172/.

[10] E. Bravo and B. Amante, “Video as A New Teaching Tool to Increase Student Motivation,” *IEEE Glob. Eng. Educ. Conf.*, pp. 638–462, 2011.

[11] A. R. Nasir and H. J. Bargstadt, “An Approach to Develop Video Tutorials for Construction Tasks,” *Procedia Eng.*, vol. 196, no. June, pp. 1088–1097, 2017, doi: 10.1016/j.proeng.2017.08.066.

[12] R. M. Branch, *Instructional Design: The ADDIE Approach*. New York: Springer.

[13] F. R. Sari and Usmeldi, “Needs Analysis In The Development of Natural Science Teachers’ Book of Junior High School Based On Local Wisdom of West Sumatra,” *2018 Int. Conf. Res. Learn. Phys.*, vol. 1185 (2019, p. 15, 2019, doi: 10.1088/1742-6596/1185/1/012101.

[14] A. Gonzalves, C. Verhaeghe, P. E. Bouet, P. Gillard, P. Descamps, and G. Legendre, “Effect of the use of a video tutorial in addition to simulation in learning the maneuvers for shoulder dystocia,” *J. Gynecol. Obstet. Hum. Reprod.*, vol. 47, no. 4, pp. 151–155, 2018, doi: 10.1016/j.jogoh.2018.01.004.

[15] V. Williams and J. M. Gil, “Using Video Tutorials to Augment Online Teaching,” *Teach. Journal. Mass Commun.*, vol. 8, no. 1, p. 28, 2018.