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Theme:
“Revitalization of Technical and Vocational Education to Face
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Sub Theme 5: Technology and Vocational Education Management (TVEM)

1. STUDENT ANALYSIS CHARACTERISTIC IN THE EFFORT OF APPLYING TOTAL QUALITY MANAGEMENT (TQM) IN LEARNING PROCESS
   Wawan Purwanto, Bahrul Amin, Nuzul Hidayat, Sukardjo, Erzeddin Alwi
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2. MANAGEMENT AND OPTIMIZATION OF VOCATIONAL EDUCATION TECHNOLOGY (VET) AND DEVELOPMENT OF VOCATIONAL FIELD
   Legiman Slamet
   Universitas Negeri Padang

3. NEEDS ANALYSIS OF PRODUCTIVE SUBJECT TEACHERS OF CONSTRUCTION TECHNOLOGY AND PROPERTY PROGRAM
   Eko Nugroho Julianto, Soesanto, Fathur Rokhman, Heri Yanto
   Universitas Negeri Semarang

4. THE ACCELERATED LEARNING
   Dedy Irfan
   Universitas Negeri Padang

5. IMPLEMENTATION OF ISO CERTIFICATION IN EDUCATIONAL ORGANIZATION
   Sudjani
   Universitas Pendidikan Indonesia

6. VOCATIONAL EDUCATION MANAGEMENT IN DISRUPTION ERA
   Danar Susilo Wijayanto, Herminarto Sofyan
   Universitas Sebelas Maret

Sub Theme 6: Technology and Vocational Education Curriculum (TVEC)

1. FISH JOURNEY â€” INNOVATION EDUCATIONAL GAMES BASED ON PSYCHOMOTOR TECHNOLOGY AS IMPLEMENTATION CURRICULUM 2013 ON EDUCATION INDONESIA
   Dieta Wahyu Asry Ningtias, Muhammad Iqbal Fahrnain, Arimaz Hangga
   Universitas Negeri Semarang

2. IMPLEMENTATION OF INTERACTIVE MULTIMEDIA LEARNING BASED ON WEBSITE FOR DISTANCE AND GEOMETRY OF VOCATIONAL HIGH SCHOOL
   Moch. Sukardjo, Lipur Sugiyanta
   Universitas Negeri Jakarta

3. IMPROVING PRE TEACHERâ€™S SOFT SKILL THROUGH THE MIX AND MATCH LEARNING METHOD
   Anis Rahmawati
   Universitas Sebelas Maret

4. LEARNING METHOD FOR IMPROVEMENT THE QUALITY OF STUDENTS AS A MILLENNIAL GENERATION
   Veronika Asri Tandirerung
   Universitas Negeri Makassar

5. EFFECTIVENESS OF THE PROJECT-BASED LEARNING (PJBL) INSTRUCTIONAL MODEL ON POWER ELECTRONICS COURSE
   Ruslan, Lu’mutaris, Zulfiazi Syahirial, Basuki Wibawa
   Universitas Negeri Makassar

6. STRENGTHENING VOCATIONAL SCHOOL WITH RENEWABLE ENERGY COMPETENCY TO FACE GREEN JOB ERA
   i6.21-25
Implementation of Interactive Multimedia Learning Based on Website for Distance and Geometry of Vocational High School

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Abstract—Implementation of interactive multimedia learning based on website for distance and geometry on subjects of Mathematics in SMK (Vocational High School) used the multimedia product that was easy to learn, easy to use, and encourage students. This interactive multimedia was designed to replace the role of teachers in self-learning platform. It is the Multimedia Interactive Learning of Mathematics SMK which was compiled into a learning website. This prototype of this multimedia product had already been tested at SMKN 39 Jakarta in the middle of 2017 by using five usability criteria defined by WAMMI (Website Analysis and Measurement Inventory). From the prototype test result, it was obtained that the interactive multimedia prototype is very effective for self-learning of Mathematics at grade X. Based on the results, there is increasing interest and enthusiasm of students in learning mathematics. Therefore, the next practice of interactive multimedia product (released version) will measure of how effective and efficient self-learning can be implemented using this medium and the level of student satisfaction achievement while accessing the functionality of multimedia then calculate the effectiveness of the implementation of self-learning platform by using interactive multimedia learning based on website. The method used in this research is Research and Development (R & D) adopted from Borg and Gall. The assessment location is SMKN 39 Jakarta, with the duration implementation from end of 2017 until mid-2018. The sample of this research is the students of SMKN 39 grade X which follow the subject of Mathematics. There were significant differences in student learning outcomes between pre-test and post-test, i.e.: \( t_{calc} = 2.03 \) (9,42 = 2.04) with degree of freedom 29 and significant factor 0.05.

Keywords—interactive multimedia, website, distance and geometry, SMK

I. INTRODUCTION

Law No. 14 of 2005 on teachers and lecturers Article 10 states that teacher competence includes pedagogic competence, social personality competence, and professional competence. One of the demands of a professional teacher is the mastery of pedagogic competence, covering 7 competencies. One of them is mastering learning theories and principles of educational learning and educational learning activities.

In the learning process, teachers should be able to create a fun learning process and an inviting environment. To create the atmosphere, then multimedia has a very big role. Multimedia can change a person's mindset in learning and make it easier for students to get information, adjust information and empower information. Therefore, multimedia is used by teachers to develop learning techniques that can improve student learning outcomes.

For students, designed interactive multimedia will provide the ease and completeness of the contents in such a way that students can learn independently both at school and at home. Students will be easier to determine what will be learned and how students choose, absorb information, and follow the evaluation quickly and efficiently.

[1] uses the term environment invitation for an interesting and inviting learning environment for students. With multimedia, material can be presented more attractively through a combination of two-dimensional and three-dimensional images, interactive text display, animated effects (motion picture), attractive color compositions and audio aids.

The product of website-based interactive multimedia for distance and geometry math subjects of SMK students was a multimedia design that is easy to learn, easy to use and encourages users to use it as a tool and can even use the teacher's function when designed for self-learning. Testing usability on that product in the form of website has been done using WAMMI criteria (Website Analysis and Measurement Inventory) [1].
Components tested consist of components of Attractiveness, Controllability, Efficiency, Helpfulness, and Learnability. The test results show that the usability weight of 78.4% and 91.1%, so the device is suitable and convenient to use. The next target is to improve student learning outcomes by using the product.

As the next research, the use of that product will be compared with the size of student learning outcomes. This research does usage testing on Website containing Multimedia Interactive Learning Based in Mathematics for SMK by using field observation method. The paired t-test will be applied to 1 (one) class X through comparison the class without intervention and class treatment with interactive multimedia usage intervention.

II. METHOD
The testing methods in this research started with a test of data normality, then continued with parametric test of Paired Sample T-Test. Paired sample t-test was used to test the difference between two paired samples. Paired samples are defined as a sample with the same subject but have two different treatments in the pre- and post-process situations. The tool used was SPSS.

III. RESULTS AND DISCUSSION
Data processing of pre-test and post-test results using SPSS obtained statistical description (Fig 4.1). The mean pre-test results < from the mean post-test results, so it can be said that this interactive multimedia can improve student learning outcomes. The distribution of pre-test and post-test results can be seen more fully in Figure 4.2 and Figure 4.3. From the two images it is known that after the material with interactive multimedia no more students get score 30 (figure 4.2), the lowest student score is 50, and most students get the value between 60 - 90.

![Fig 2. Distribution statistic for pre-test.](image)

![Fig 3. Distribution statistic post-test.](image)

![Fig 4. Paired T-test result.](image)

The results of t test above shows that interactive multimedia can improve student learning outcomes in the field of Mathematics, especially for distance and geometry math subjects.

IV. CONCLUSION
There were significant differences in student learning outcomes between pre-test and post-test, i.e.: \( t_{\text{calculated}} > t_{\text{table}} \) (9.42 > 2.04) with degree of freedom 29 and significant factor 0.05. This results showed that interactive multimedia can improve student learning outcomes in the field of
Mathematics, especially for distance and geometry subjects.

References


