DEVELOPMENT OF INTEGRATED AUDIO VISUAL MODULE FOR LEARNING ANIMATION PRINCIPLES AT MULTIMEDIA VOCATIONAL SCHOOL

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Abstract: Vocational High School aims to produce graduates who have certain skills so that they can improve their quality of life. One of the important competency to be mastered is in 2 Dimensional Animation Engineering subjects in multimedia Vocational School is the application of the principles of animation. The principle of animation will deliver the audience to be able to understand and enjoy an animated product. Competence in applying the principle of animation is important to be owned by vocational students majoring in multimedia, but in 2016 the results of practical tests showed that only about 25% of students achieved minimal completeness in the competence of applying the principle of animation. The lack of practical learning materials in applying the principles of animation and lack of learning hours in school are some of the problems that exist in the animation learning lack of student competence. The results of interviews with teachers showed that the teaching materials available were insufficient for teaching needs, so they felt the need for additional teaching materials. The three animation teachers hoped for an integrated learning module with audio visual to support the learning process in the classroom. The researcher intends to provide solutions to problems by developing learning resources in the form of learning modules that are integrated with audio-visual media, which will be used as material for learning carried out by teachers in the classroom. Audio visual modules and media were developed with Lee and Owen's multimedia development methods, namely through a series of stages starting from needs analysis, final preliminary analysis, design, development, implementation and evaluation. The results of the effectiveness test from the use of integrated audio visual media modules by 30 students, showed a significant increase based on the results of the t-test with a significance level of 5%

Keywords : Module, Media, Animation, Audio, Visual

INTRODUCTION

Animation competencies in multimedia Vocational Schools are divided into two subjects, the 2-Dimensional Animation Technique and the 3-dimensional Animation Technique. One of the important competencies to be mastered in 2 Dimensional Animation Engineering subjects is the application of the principles of animation. The principle - the animation principle is used by the animators as the main guide or guide for moving images to be more alive. The principle of animation will deliver the audience to be able to understand and enjoy an animated product. This research stems from the low competency of students in the application of the principles of animation in multimedia Vocational Schools.

The results of interviews and questionnaires that were filled on November 16, 2016 by 25 students of class XII in SMKN 2 Cikarang Barat Multimedia expertise program, although 85%, namely as many as 21 students stated that they liked 2 Dimensional Animation lessons, and assumed that teachers mastered the material 2 Dimensional Animation, but only 23%, namely as many as 6 students stated that they were able to apply the principle of animation. Furthermore, 62% of the 15 students stated that the teacher did not convey the learning objectives at the beginning of the meeting, 85% of which 21 students felt that the teaching materials used by the teacher were not interesting, and only 35% of the 9 students stated that animation learning 2 dimensions take place pleasantly. The time used for practicing students is also insufficient according to 21 students. As a result of the above problems, 100% of students who became respondents admitted to having difficulty learning the principles of animation.

This condition, if left unchecked, will result in students experiencing difficulties when facing a national examination of vocational practice which is one of the graduation requirements of vocational students. The researcher intends to provide solutions to problems by developing learning resources in the form of learning modules that are integrated with audio-visual media, which will be used as material for learning carried out by teachers in the classroom.

Parraguez stated, that a module not only explained competencies and sub-competencies to be achieved, but also had other elements such as learning outcomes, evaluation strategies, prerequisite competencies, materials, and references for further learning. The module is a book written with the aim that students can learn independently without or with the guidance of the teacher. The use of modules is proven to be able to improve thinking skills in geography subjects in a study in Sabah, Malaysia, in 2013, "The CSAA Teaching Module can improve students' thinking skills." The use of modules can improve learning outcomes because allows students to repeat according to their own pace and learning style.

Learning materials for the principles of animation that will be developed are expected to overcome the difficulties experienced by students to understand and apply the principles of animation. In addition, modules that are integrated with audio visual media are expected to help teachers in providing effective learning resources to achieve learning goals, namely students will be able to apply the principles of animation. By achieving this, it is expected that the results of practical learning in the competence of the application of the principle of animation will increase and students are ready to face competency tests or competition in the world of the animation industry. This article will discuss the stages of developing modules and audio-visual media with the development model of Lee and Owen, as well as the results of testing the effectiveness of these teaching materials on improving student competence in applying the principles of animation.

METHOD

a. Place and Time for Research

This research was conducted at SMK Negeri 2 Cikarang Barat on multimedia competency. Pre-study was carried out since December 2016, namely in the even semester of the 2016-2017 school year. The research was carried out in September 2017 until November 2018.

b. Research Approached

The research was conducted with a Research and Development approach following the multimedia design development method presented by Lee and Owens, with some adjustments that followed the research needs. The method will be used to develop

learning modules for the application of animation principles that are simultaneously integrated with web-based multimedia. The material contained in the module, designed as enrichment material for learning the application of the principles of animation. The principle of animation contained in the module consists of 6 types, namely squash and strech, anticipation, staging, slow in and slow out, arcs, secondary action, timing, exaggeration, and solid drawing. Meanwhile, the audio visual media designed is a visual display with audio based on the material described in the module. The learning material developed was intended for Vocational High School students in multimedia expertise programs. The characteristics of the module adapts to the characteristics of the curriculum aimed at Vocational students namely supporting the implementation of interactive, inspirational, fun, challenging, motivating students to actively participate, and providing sufficient space for initiatives, creativity, and independence according to their talents, interests, and physical and psychological development of students

c. Development Steps

The development was carried out using Lee and Owen's multimedia development model, namely through a series of stages ranging from needs analysis, final preliminary analysis, design, development, implementation and evaluation. At the stage of the needs analysis a comparison is made of the expected conditions with the actual conditions that have existed at this time. The expected conditions can be known from the study of curriculum curriculum learning 2 Dimensional Animation Techniques, while the current conditions can be known by studying the learning outcome assessment documents, conducting interviews with animation subject teachers and by distributing questionnaires to students. As the final result obtained at this stage is the result of an analysis of the gaps that exist between current conditions and expected ideal conditions. Front-end analysis is carried out by analyzing student conditions, technology analysis, task analysis, analysis of learning objectives and media analysis. The final result of the initial analysis phase is a list of possible solutions that can be applied to overcome the gap between the current conditions and the expected ideal conditions. The design phase resulted in the Course Design Specification (CDS) which included the development activities schedule, the development team members, as well as the specifications of the teaching materials developed. The stages of development include preproduction, production and post-production. Pre-production is the stage of collecting material needed in the development of teaching materials. The production stage is the main stage that produces the product, including the preparation of modules and the development of audio-visual media uploaded on the media website. The post-production stage is the stage of quality study carried out by experts, including module experts, experts learning design and media experts. The final revision results that have been validated by experts are products that will be tested at the implementation stage. The final results of the revision of teaching materials were finally applied to large groups of 30 students who were also module effectiveness tests. This stage is a summative evaluation stage which aims to measure the effectiveness of the module on increasing student competence in the application of the principles of animation.

RESEARCH RESULTS AND DISCUSSION

a. Definition of Module and Audio-visual media

1. Understanding module

Parraguez defined that a module not only explains the competences and sub competences to develop. As part of a study plan, it has other elements such as: learning outcomes, evaluation strategies, input competences, contents, references etc. something

much like a subject in traditional educational plans. The module is a book written with the aim that students can learn independently without or with teacher guidance, so that the module contains at least: 1) learning instructions (student / teacher instructions), 2) competencies to be achieved, 3) content or material content, 4) supporting information, 5) exercises, 6) work instructions, can be in the form of worksheets (LK), 7) evaluations and 8) reply to the evaluation results.

A module will be more useful if it is understandable, interesting and easy to use. Modules can support learning for students, by providing material and enrichment to strengthen understanding. Exercise is useful for measuring the extent to which students understand the material being studied, and homework is useful for motivating students to actively learn independently. This means that the module is a set of teaching materials that are presented systematically so that their use can learn with or without a facilitator or teacher and require the module to have all the features that support student learning independently.

The Directorate General of Teachers and Education Personnel,explained that the training module is the substance of training material that is packaged in a planned learning program unit to help achieve increased competencies designed in the form of printed materials. From that understanding, the module is part of planning learning in printed material form. Modules are essentially media that can be compiled and used for conventional learning and independent learning. In short the module can be interpreted as the smallest unit of learning material that contains a whole concept so that it can be studied separately from other parts without reducing its meaning. Modules are developed because they have several advantages including, using modules the students follow learning activities in accordance with their own speed and abilities, because the abilities of students in one class are different. In addition, the module can be used anytime and anywhere, can measure the level of success and can repeat the competencies that are felt less mastered.

The modules developed nowadays, not only can support conventional learning, but are also designed to be able to support independent learning used for various learning systems such as distance learning, open learning, individual learning and programmatic learning. One of the fundamental differences between independent learning and conventional learning is regular and scheduled interactions that apply to conventional learning. This is different from independent learning, where students rely on independent learning resources which are provided as the main source in the learning process, due to the limited interactions that occur between students and teachers. Modules for independent learning provide opportunities for learners to learn independently according to their own learning speed and adjust to their time.

From several opinions that have been described, it can be concluded that the module is part of learning planning in the stages of instructional design, which is designed to support learning in the classroom, and so that students can do independent learning. A good module includes instructions on how to use the module, learning objectives to be achieved, learning material, training (enrichment) as well as worksheets that can improve students' mastery of learning

2. Understanding audio-visual media

Gagne said that media has a very broad meaning. Media is a tool or "vehicle" for instructors to achieve the instructional objectives that have been designed. Media can include oral speech from the teacher, or with printed text, as well as with more complex technical materials such as sound and video recording. Ellsworth defined that

media is part of the pedagogic method, where the learning process is how to incorporate knowledge into one's mind. Pedagogy consists of qualitative practices and processes that change the way a person thinks and acts. It offers educators to develop media that attract attention and explore curiosity, which changes with experience. Heinich and Molenda defined that media is connector for communication. Derived from Latin which means "between", media can be interpreted as everything that carries information, from the source to the recipient. Instructional media and learning technology are tools that can provide a great influence for students in the learning process. Media that carries information or learning messages is referred to as learning media. Instructional media and learning technology, provide tools that can bind students strongly during the learning process. Today, there are many types of media and quality materials that can be used by educators. An educator must prepare the best tools for students who have learning abilities and different situations. Media, according to Henry Jenkins, is a method used by educators by utilizing technological sophistication both through networks, multimedia, digital documents, or utilizing various new resources that can involve the participation of many students throughout the world.

Based on its function, media is a tool used to stimulate students' cognitive thinking skills. This is reflected in the research on the development of problem-based learning media-cognitive tools implemented by Min-Liu to level 6 students in Texas. The function of the media is as a means of sharing thoughts, supporting the process of cognitive thinking, supporting activities that are difficult to do on their own, also supporting the taking of analysis and conclusions and testing. Djamarah in Hadi classifies media into several types namely, 1) audio media, namely media that only rely on sound capabilities, such as tape recorders, 2) visual media, namely media that only rely on visual senses in visual form, 3) audiovisual media, namely media that have sound elements and image elements. This type of media has a better ability because it optimizes the sense of sight as well as the sense of hearing. This type of media is divided into two types: silent audiovisual and audiovisual motion. Silent audiovisuals are media that display silent sound and visuals such as sound slides, while audiovisual motion, which is media that can display elements of sound and images that move like a video.

Dale in Azhar said that audio visual media is a type of teaching media that will activate students' hearing and vision in the learning process. The advantage of audio visual media is that it can clarify the presentation of messages so that they are not too verbalistic, overcoming the boundaries of space, time and sense power, can also play a role in tutorial learning. The conclusion that can be drawn is that audio-visual media is a medium that will stimulate the sense of sight as well as the senses of hearing students, through the display of images and sounds, so that the presentation of learning messages to students can be more clearly not only through verbal language. The use of audio visual media is very suitable to be used for learning animation principles. This is related to the material character of the principles of animation that are not enough if only described by verbal presentation, but also require the existence of examples that can be seen and heard. With the use of audio visual media learning the principles of animation will be more valuable and easily understood by students.

3.   Animated Engineering Subjects 2 Dimensions

An understanding of the principles of animation is part of the 2-Dimensional Animation Engineering subject, which is one of the required subjects of the Multimedia expertise package. Based on the structure of the subject curriculum, 2D Animation Techniques are delivered in class XI in semester 1 and semester two, each of 4 lesson hours. Based on the 2-dimensional animation subject syllabus for Vocational Schools

in the 2013 curriculum, the learning material in semester 1 covers material topics basic principles of animation, traditional animation, computer animation, stopmotion animation, storyboard, clean up and insert images, animated key drawings and animation techniques frame. While the learning material in the second semester topics emphasized on tweening animation, object creation in 2-dimensional animation applications, scene use, giving audio effects to animation and 2-dimensional animated product formats. On the map of the position of teaching materials, 2-Dimensional Animation is in the C3 group, namely the compulsory group of expertise package subjects. The position map of teaching materials is a diagram that explains the structure of subjects and the interrelationships between subjects in a group of expertise studies. Figure 1 describes the position map of teaching materials for software engineering expertise study programs. Group C1 is a compulsory subject group based on expertise. C2 is a compulsory basic group of expertise programs and C3 is a compulsory group of expertise package. 2-dimensional animation technique is a type of animation that is flat visually, with the technique of making use of computer assistance (software) while still relying on drawing skills. The software that is taught in this subject is Flash software, with various series starting from the Macromedia Flash 8 series, Macromedia Flash 8 Professional, Adobe Flash CS3, Adobe Flash CS4, to Adobe Flash CS6

a. Rights Principles of Animation

Animation can present a complex matter to be visually and dynamically attractive so that animation can continue to grow today. The basic principle of animation is the principles that an animator uses to know and understand how an animation is made in such a way that it gets interesting, dynamic and not boring animation results. The main function of the principle of animation is that every animation that is made looks attractive, dramatic with natural movements.

An animator must understand and be able to apply twelve basic principles of animation. Twelve basic principles of this animation were discovered by Disney animators named Ollie Johnston and Frank Thomas. This principle is important to understand and immediately applied as needed when an animator works making animated movements. The principle of animation consists of twelve types.

1) Squash and strech

This principle will give the impression of a flexible or flexible image but at the same time has an object's weight and volume.

2) Anticipation

This principle will lead to the main movement that is ready to be received by the audience, namely square off before the main movement occurs.

3) Staging

This principle aims to attract the attention of viewers while at the same time explaining what scenes occur, including actions, reactions, behavior, personality or mood.

4) Straight Ahead Action and Pose to Pose

Straight ahead action means that the initial frame image to the final frame shows a series of very clear intentions and objectives. Whereas pose to pose is a series of planned animations with several key drawings or key animated images, so that changes in volume, size and proportion are well planned.

5) Follow Through and Overlapping Action

This principle will make the animation movement more natural, namely by showing a part of the body still moving when the character stops.

6) Slow in and Slow out

This principle regulates the amount of frame density in animation so that the animation movement feels more natural and realistic.

7) Arcs

This principle states that almost all movements of living things use curved lines, except for mechanical devices including robots.

8) Secondary Action

This principle states the need for supporting movements to enrich the main movement, to add to the impression of life when making animations.

9) Timing

Timing is a calculation of time that depends on the number of frames in animation.

10) Exaggeration

This principle aims to clarify the movements that occur by overstating the details of the movement.

11) Solid Drawing

Solid drawing means that the description of each object must appear to have a dimension that has a shape and volume

12) Appeal

This principle shows that each character in the animation has a soul or personality that can be directly seen from the character's design drawings.

a. Development of integrated audio visual media modules

The Competence of the Application of the Principles of Animation Based on the Analysis of the Implementation of the Animation Principles in the XI level of the Multimedia Vocational School is described in table 1.

Table 1. Results of analysis of competency curriculum applying the principle of animation.

Basic competencies : Understand the principles of animation	
Sub competence	Indicator
1) Defines the definition of the principle of animation	1.1. Defines the principle understanding of Arc animation 1.2. Defines the notion of the principle of animation Slow in slow out 1.3. Defines the notion of the principle of Squash and stretch animation 1.4. Defines the notion of the principle of animation Anticipation 1.5. Defines the notion of the principle of animation Timing 1.6. Defines the principle understanding of Solid Drawing animation 1.7. Defines the definition of the principle of secondary action animation 1.8. Defines the notion of the principle of follow-through animation and overlapping action

	1.9. Defining the notion of principle animation Straight ahead and pose to pose 1.10. Defines the principle understanding of animation Appeal 1.11. Defines the definition of the principle of animation Exaggeration
2) Explain the purpose of applying the principle of animation	2.1. Explain the purpose of applying the Arc animation principle 2.2. Explain the purpose of the application of the principle of animation Slow in slow out 2.3. Explain the purpose of applying the principle of Squash and stretch animation 2.4. Explain the purpose of applying the Anticipation animation principle 2.5. Explain the purpose of applying the principle of animation Timing 2.6. Explain the purpose of applying the Solid Drawing animation principle 2.7. Explain the purpose of applying secondary action animation principles 2.8. Explain the purpose of implementing the principle of follow-up animation and overlapping action 2.9. Explain the purpose of applying the principle of animation Straight ahead and pose to pose 2.10. Explain the purpose of applying the animation principle of Appeal 2.11. Explain the purpose of applying the Exaggeration animation principle
3) Applying the principle of animation to the animation made	3.1. Apply the principle of animated Arc 3.2. Applying the principle of animation Slow in slow ouT 3.3. Apply the principle of Squash and stretch animation 3.4. Apply the principle of animation Anticipation 3.5. Apply the principle of animation Timing 3.6. Apply the Solid Drawing = animation principle 3.7. Apply the principle of secondary action animation 3.8. Applying the principle of followthrough animation and overlapping action. 3.9. Apply the principle of animation Straight ahead and pose to pose 3.10. Applying the principle of animation Appeal 3.11. Apply the principle of Exaggeration animation
4) Create computer animations that apply the principles of animation.	4.1. Create animations using 2-dimensional animation application software 4.2. Animations that are made interesting and understandable

Data obtained from question no. 14 which is about difficulties experienced by students shows that 5 people (17%) students find difficulty in character drawing material, 2 people (7%) students find it difficult to make images inbetween material, 2 (7%) people students feel difficulties in the principle of animation analysis material, 20 people (66%) students find difficulties in the application of the principle of animation and only 1 (3%) students who feel no difficulty in learning 2-Dimensional Animation Engineering. The results of the interview indicated that the teacher had constraints on the lack of available teaching materials in learning the principle of animation. The teacher wants a module that helps teachers and students to understand how to apply the animation principle to the animation made. Graduates who have worked in the creative industries world find it difficult to apply the animation principle to the animation they make. All data obtained at the needs analysis stage shows a gap between the expected ideal conditions and current conditions.

The lack of principle animation learning material is reflected in the results of interviews with teachers who want a module that contains worksheets for students' practical activities that support learning in applying the principles of animation. The learning observation results conducted by researchers also showed that students and teachers did not use modules in classroom learning, but only used power point media made by teachers, also principle animation videos that were randomly displayed by teachers through youtube facilities accessed on the internet. . Data from interviews with graduates also indicate the need for additional learning materials to improve the skills of applying the animation principle. The results of the needs analysis bring researchers to the decision to develop learning modules that are integrated with audio-visual media to support learning the application of the principle of animation.

Front-end analysis tells about characteristics of thirty students age around 15th to 17th years old. Seven students like to learn from book, while twenty students enjoy learning from tutorial video rather than read books, and least like to learn from a jobsheet. Most of students think that they have less time to learn animation principles at school. Technology analysis showed that the school have 3 from 5 technology that is needed to learn principles animation. Task analysis objective is to classified tasks that connected with jobs after school. According to the curriculum, tasks is classified to three category that are cognitive psicomotoric, and affective. Cognitive competencies in learning principles animation are abilities to explain the definition and objectives of 12 animation principles. Psicomotoric competencies that students should have are the abilities to draw key and inbetween drawing, using the animation software, while the affective demand student to have a safe workplace and using the tools safety.

In design step, learning module and audio-visual media are design based on the nine learning steps from Gagne:

No	Step	Parts in modul and media
1)	Gaining attention	A Picture in big size placed in front of every summary
2)	Informing the learner of the objectives	In front of module and media written the learnig objectives of every summary
3)	Stimulating recall of prerequisite learning	In the beginning of the lesson at every summary starts with the recalling of the previous lesson

4)	Presenting the material	The main parts of the module describe about definition and objectives of animation principles, include examples of every principle
5)	Providing learning guidance	The instructions for using the module and media
6)	Eliciting the performance	The module provides the jobsheet, while the media shows the explaination videos and tutorial videos about principles
7)	Providing feedback	The module provides the formative tes completed with the answers and explaination at the end of the books.
8)	Asessing the performance	The module provides the performance appraisal guidelines
9)	Enhancing retention and transfer	The module provides the exercise and formative test

The development step divided into two steps, production step and quality study (expert judgement and one to one). Expert judgement done by four expert categories: module expert, instructional learning design expert, media expert and lesson expert.

1) Animation expert

Ardiansyah Mardani, ST, experienced working in animation studios as an animator or consultan for years, including working the project of Kampung Edu animation, and teacher of vocational high school SMKN 2 Cikarang Barat majoring in animation, is the expert that validate the lesson in module. He gives note to the error in picture in age 182 from module, suggest to exchange pictures in 1st chapter and to enrich the vocabulary in the glossary.

2) Module expert

Dr. Ika Lestari, journal secretary in University of Jakarta, which gain her doctoral in education technology and had wrote books and many education journals, is the expert that validate the module. The percentage of eligibility judgement for module is reach 90% with valid criteria. The suggestion given by the module expert is to exchange the books cover, repair the language so that its more communicative like common module, and add the feedback in the form of the answer key of the formative test.

3) Instructional design expert

The instructional design expert is Dr.Ir. Rusmono, the secretary of LPPM and the lecturer of postgraduate Educational Technology. The percentage of eligibility judgement for module is reach 85% with valid criteria. The suggestion given by the instructional design expert is to insert the competency map and to adjust the objectives that written at first page of every summary, so that equal with the competency map.

4) Media expert

Dr. Prasetyo wibowo, ST, lecturer of faculty of engineering majoring in Information and Communication technology, validate the audio-visual media that is built in a website with url address www.animasi2dimensi.wordpress.com. He was criticize the formative test system which is built with google form. He also recomend to put together pictures within the lesson description.

The suggestion and recommendation from experts become the foundation of revision that done to modules and audio-visual media, before it tested to one to one. The first responden in one to one implementation, think that the module's cover is not interesting and some the description in module is not easy to understand, such as page 46 the word "parabola", age 47 the word "pergerakan mekanik" and word "garis maya"in page 49. The second responden like the cover of the module, and found the difficulties to understand the word "acceleration" in page 59. Both responden agree that they are interested in using the module and media to learn about animation principles. Words that founded difficult for respondens then be corrected, replaced or deleted from the module. The design of module's cover also replaced by another design.

The implementation of module and media, started with the trials to small group consist of 10 students. They are given the questioner almost the same with the questioner given to one to one responden. The conclusion of small group trial is the needed to replaced the cover design of module and to put more picture and colors to modul and media.

After repair the module and media, they are then implemented to big group consist of 30 students of second level of SMKN 2 Cikarang Barat majoring in multimedia. They were first given the pretest to measure their current ability, and then students were given modules and link of the website and studied them for about two weeks. After two weeks they have been given a posttest.

The final module is arranged as:
1) Cover
2) Foreword
3) Table of content
4) Preliminary which consist of : Description, learning objectives, relevance and benefit, learning instructions, and pre competences.
5) Competencies map
6) Chapter 1: Key drawing and inbetween drawing
7) Chapter 2: Animation principles of Arcs
8) Chapter 3: Animation principles of Slow in slow out
9) Chapter 4: Animation principles of Squash and stretch
10) Chapter 5: Animation principles of Anticipation
11) Chapter 6: Animation principles of Timing
12) Chapter 7: Animation principles of Solid drawing
13) Answer keys and explanation
14) Glossary
15) Bibliography

Within every chapter we will find the learning objective of the chapter, material description of animation principles include definition, aim of principle and example, jobsheet, exercise, formative test and feedback and follow up. Module that have been developed is in the picture 1.
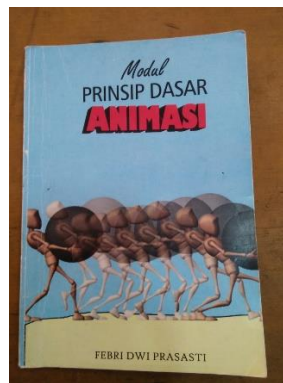
Picture 1. The display of module

Final step of developing teaching material of animation principles is evaluation. In this step, pretest scores of students in big group is compared with the posttest scores, using the t test, by formula

$$t = \frac{\bar{x} - \mu_0}{S/\sqrt{n}}$$

With t   = t value by counting
      $\bar{x}$ = Average of first group
      μ_0 = average of second group
      S   = deviation standard
      $\sqrt{n}$ = number of samples

T value from counting is bigger than t tables for both cognitive test and psychomotor test, which means the increase of score is significant. The t value for psychomotor is 3,781 while the t table is 2,045. All student scores enhances although only 5 student reach the score of mastery learning

CONCLUSION

Based on the result and discussion, it can be deduced as follow :
1. The urgency for students to mastering the animation principles lesson is how they can create an interesting and well understood animation. Animation principles give life to the animation that created. That is why it is important to solve the problem in learning animation principles.
2. Development of teaching material using Lee and Owen development method, which step is need analysis, front end analysis, design, development, implementation and evaluation, is useful to give information such as learning objectives, what teachers need, students's current abilities, characteristics of students, current condition of technology and media, and what are needed for improving learning outcomes. Expert judgements in development step give advantage to improving the qualiy of teaching materials that been developed. One to one and small group implementation also can be source to ensure that module and media that been developed is well accepted by students as consumen.

3. The module that created is consist of seven chapter that discussed about :
    A. 1st chapter : How to create key drawing and inbetween drawing in animation
    B. 2nd chapter : Animation principles of Arcs
    C. 3rd chapter : Animation principles of Slow in slow out
    D. 4th chapter : Animation principles of Squash and stretch
    E. 5th chapter : Animation principles of Anticipation
    F. 6th chapter : Animation principles of Timing
    G. 7th chapter : Animation principles of Solid drawing
    In the beginning of module we wil find the preface, description, competency map, learning objectives, learning instruction, and pre competence. Within every chapter we will find the learning objective of the chapter, material description of animation principles include definition, aim of principle and example, jobsheet, exercise, formative test and feedback and follow up. At the end of the module there are answer keys for formative test, and glossary.
4. Audio visual media that been develop is upload into a website with url www.animasi2dimensi.wordpress.com. The website contains materials as module has, completed with picture and videos to support explanations about animation principles, link to get jobsheet and formative test. The score of formative test will sent to student through email, as the feedback.
5. Evaluation for module and media in implementation to 30 students in vocational high school majoring multimedia, shows significant improvement in learning outcomes. It means that the using of module integrated with audio visual media give benefit to improve the learning outcomes of animation principles lesson.

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