Development of Multimedia Based Learning Modules for Information and Communication Technology Guidance at MAN 1 Bungo

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Abstract— *This research is motivated by the limited learning time for the guidance of ICT (Information and Communication Technology) classically to 45 minutes each week. The objectives of this study are: 1) Producing multimedia-based learning modules for ICT Guidance at MAN 1 Bungo. 2) Knowing the validity, practicality and effectiveness of learning modules for ICT guidance in MAN 1 Bungo. The type of development method used is Research and Development (R&D). The development model used is the Instructional Development Institute (IDI). The principle of the system approach applied by IDI consists of three stages, namely determination, development, and evaluation. The research subjects were students of class XI MAN 1 Bungo in the 2019/2020 academic year. The instruments used were validation questionnaires to measure validity, response questionnaires to measure practicality, and posttest questions in the form of multiple choice to measure effectiveness. The results of this study indicate that multimedia-based learning modules for ICT guidance are declared valid and practical for use by teachers and students. From the posttest results it can be concluded that the average value of the experimental group was higher than the control group meaning that the multimedia-based learning module for ICT guidance was "effective" to used.*

Keywords— *Learning Modules, Multimedia, Guidance, ICT.*

I. INTRODUCTION

The application of information and communication technology in accordance with the world of education is one of the main factors in improving the quality of education and human resources. Quality education and technology-based is a source of national progress that determines the nation's competitiveness in the era of globalization. Information and communication technology that is increasingly developing accelerates changes in the education sector. Changes in the education sector are needed to improve the quality of education in accordance with national education to improve abilities and to form the character and civilization of a nation that is dignified to develop the potential of students.

The development of education is dynamic and always changes are realized by the government with curriculum changes, namely by implementing the 2013 Curriculum. Curriculum 3013 began to be implemented for capable schools in the 2014/2015 academic year. Based on Permendikbud No. 69 of 2013, the 2013 curriculum aims to prepare Indonesians to have life skills as citizens who are faithful, productive, creative, innovative, and effective in order to contribute to society, the nation and the State. The role of Information and Communication Technology (ICT) has an impact on teachers

and students in finding, exploring, presenting, disseminating data and information so that the learning process runs smoothly.

To create an atmosphere and an active learning process, teachers can use all types of learning resources so that the potential of students can develop optimally in order to achieve educational goals. To realize the learning situation that supports the potential of students, learning in schools needs to be supported by the use of information and communication technology that can explore learning resources effectively and efficiently by maximizing the role of the learning module.

The education module is a basic element of pedagogy which will allow schools to renew their educational mission in basic literacy, namely the ability and skills of individuals in reading, writing, listening, speaking, counting and solving problems needed in daily life, including informing and communicate with their environment. The learning module is useful to clarify the delivery of messages and overcome the limitations of space and time, also to equalize the same experiences and perceptions for students. Munir (2008: 66) states that determining the learning modules for learning resources are used to make them effective.

One learning module that can be developed at this time is a multimedia-based learning module. The use of modules is very effective to be used as a learning resource for students to understand subject matter in skills development (Karla; 2006, Muhammad Rusli; 2017), besides the module also improves student learning outcomes and makes it easier for students to understand learning material to build competencies and learners can learn according to their individual learning characteristics (Omer; 2015, Hamonangan; 2016). Multimedia-based learning modules can reduce the passive atmosphere and are expected to make the learning process interesting, effective, and interactive that can increase student learning motivation.

Multimedia-based learning module is the use of computers to create and combine text, audio, graphics, moving pictures (video and animation) that serves to bridge the communication between teachers and students in achieving a learning goal that acts as a teaching aid or learning resource (module) so that learning is more effective. In general, multimedia learning can be grouped by function, namely to train skills (skill builder), (b) to explore knowledge (knowledge explorer), and (c) to enrich learning resources (reference works). Multimedia-based learning is a learning process that is carried out independently

by students. This means that multimedia-based learning allows teaching materials to be delivered to students using information technology and communication media in the form of computers. With multimedia-based learning modules, learning can be done anytime, anywhere, through any path and at any speed of access and the learning process takes place efficiently and effectively.

Erdogan (2008) revealed that multimedia-based learning modules have a positive effect on improving student learning outcomes. Nagarajan (2010) states that multimedia-based learning modules can improve the efficiency and effectiveness of the learning process because it can be implemented anywhere and anytime.

Based on observations and preliminary observations made on March 15-20 2018, MAN 1 Bungo is located in Bungo city, Jambi. MAN 1 Bungo has implemented the 2013 Curriculum from the 2016/2017 academic year. One impact of the implementation of the 2013 Curriculum is the limited time for learning for ICT Guidance (Information and Communication Technology). In the 2013 Curriculum, ICT Guidance is limited to face-to-face or classical meetings for 1 x 45 minutes each week. The teacher carries out tutoring on a scheduled basis in the form of classical / face-to-face tutoring conducted at least 5 (five) times in 1 semester, while individualized guidance is carried out according to the needs of students that are carried out outside the school's academic schedule, during the ICT Teacher working hours in school.

In the 2013 curriculum, ICT learning is provided through ICT guidance and services. ICT guidance and services aim to prepare students to be able to deal with the rapid development of technology, so that students can utilize information and communication technology properly and correctly according to their abilities. The scope of this guidance in the form of theory and practicum in its implementation taught at MAN 1 Bungo requires students to frequently repeat the material and conduct practices related to the basics of using computers and using data processing software, word processing, number processing, presentation processing, programming and graphic design.

With the limited time for face-to-face learning it is not sufficient for teachers to provide all material to students. ICT guidance material in class X is the use of data processing software, word processing, and number processing, in class XI is a processor for presentation and graphic design and in class XII is web programming. The lack of innovation in the use of technology-based learning modules makes students and supervisors have difficulty in carrying out learning individually. In addition to classical tutoring in class, ICT guidance is also carried out individually outside of class hours. Students are required to be able to study independently outside of class hours, because of the density of activities carried out after school hours. The learning process that has not been effective, tends to be monotonous and less attractive to students because face-to-face learning in the dominant class still uses lecture methods, practice and assignments by the supervising teacher influences the understanding of students that is not optimal. Learners do not understand deeply the substance of the material, how to connect between what is

learned with real life and how to use the knowledge gained to support his life.

Subjects of BK TIK class XI learning material is that graphic design cannot be done only once, but it needs to be repeated by students so that the subject matter can be mastered, while students are also required to be proficient in graphic design. Graphic design is widely used by students in supporting organizational and extracurricular activities, such as making poster designs, banners, magazines and yearbooks. But in schools students have limited time to learn and understand subject matter so as to make students less active in the learning process. The application of active learning requires the ability of teachers to design and develop learning devices in the form of multimedia-based learning modules that can help students and teachers in the learning process. But in its implementation the teacher has not yet developed a multimedia-based learning module that functions well in accordance with the learning material so that students are only given learning limited to the material in the books and modules, this condition makes students become bored and learning is monotonous.

To make learning more interesting it is necessary to develop mutimedia-based learning modules. The module which is developed based on multimedia with the delivery of material is strengthened with text, images, audio and video so that it becomes more interesting to use to practice skills, explore knowledge and as a learning aid on the competence of applying logic and basic operations of data processing.

Limitations of face-to-face learning time and the amount of material that must be mastered by students that are currently taking place do not meet the demands of student learning outcomes, because learning outcomes achieved by students are not in accordance with what is expected or the minimum completeness criteria. This can be seen from the percentage of students' mastery learning not yet fulfilling the Minimum Mastery Criteria (KKM) set for information and communication technology guidance that is equal to 80. Table Percentage of Final Test Score for ICT Guidance for Class X MAN 1 Bungo Students in 2017/2018 Academic Year

Kelas	Jumlah Peserta Didik	Persentase Nilai			
		≥ 80		< 80	
X MIA 1	33	25	75,75 %	8	24,25 %
X MIA 2	34	28	82,35 %	6	17,65 %
X MIA 3	34	26	76,47 %	8	23,53 %
X IIS	14	6	42,85 %	8	57,15 %

Source: ICT Guidance Teacher Leger

In the table above, the percentage of completeness of ICT guidance learning outcomes is 69.36% or 85 students who have passed the Minimum Mastery Criteria (KKM) limit. From research observations and data on completeness of learning outcomes there are actually a number of factors that make learning outcomes of students less meet KKM standards,

one of the causes is multimedia-based learning modules that have not been used optimally. Especially the guidance of ICT dominated by practical learning. Multimedia-based learning module is one of the learning modules that has advantages such as being flexible (can choose the material according to the wishes and use of time when it will be used), is content-rich (provides enough information in accordance with the material presented) and is interactive (two-way communication between media and users). Multimedia-based learning modules make it easier for students to learn independently and can choose materials according to their respective desires. By using multimedia-based learning modules students can learn wherever and whenever. Students can also learn independently both in class and outside the classroom.

MAN 1 Bungo currently does not have multimedia-based learning modules that support the learning process. Because the utilization of multimedia-based learning modules has not been accommodated in the learning process, it is therefore necessary to conduct research on "Development of Multimedia-Based Learning Modules for Information and Communication Technology Guidance in MAN 1 Bungo".

II. REVIEW OF LITERATURE

A. The Essence of Learning Modules

Modules are program packages as a means of measuring goals used for learning purposes (Cece Wijaya, 1988; Djanji Purwanto, 2014). Specifically the module can be interpreted as learning material that contains learning material, designed so that students can understand the learning material independently because the module is equipped with instructions for use (Asyhar, 2012; Daryanto, 2013). Modules can be interpreted as learning programs that can be learned by students with minimal assistance from educators (teachers, instructors, mentors and lecturers) including planning objectives to be clearly achieved, providing learning material, equipment, media or technology, and assessments to measure success learners in learning (Muhammad Yaumi: 2018).

Learning modules are intact learning materials specifically designed (referring to clear and measurable learning objectives), systematic (containing learning objectives, materials, and activities to achieve learning objectives), which are studied by students themselves individually or taught by students to themselves itself (selfinstructional) as an independent learning material (Sofan Amri, 2013; Winkel, 2009). So the learning module is an independent learning package that is arranged systematically to facilitate the learning experience of students to achieve the learning objectives. The student module contains learning activities carried out by students and the teacher module contains teacher instructions.

Based on the description of some opinions it can be concluded that the Module is a programmed teaching material containing a package of programs for learning purposes that is equipped with instructions for use so that students can learn independently. While the learning module is a learning material that can be used by students independently arranged systematically, and clearly. Modules can be used anytime and anywhere according to student needs. To produce learning modules that can meet learning needs, module development must pay attention to the following required characteristics (Djanji Purwanto: 2014): a. Self instructional, b. Self contained, c. Stand alone, d. Adatif, e. User Friendly.

B. The Essence of Multimedia-based learning modules

The use of facilities (media) in the delivery of learning material forms the process of communication between students, teachers and teaching materials. Learning media is an intermediate tool in the form of hardware or software or the introduction of a message from the message provider to the recipient of messages in the form of stimulus such as human relations or interactions, reality, moving or not images, written text and sound and technology the computer serves to convey the message of learning so that learning will be more optimal (Arsyad, 2010; Rusman, 2012).

Based on the description of the learning media it can be concluded that learning media is a tool in the form of software and hardware that serves to bridge the communication between teachers and students in achieving a learning goal that acts as a teaching aid or learning resource so that learning is more effective.

The benefits of learning media in the learning process include (Kempt & Dayton, 1985; Rusman, 2012; Daryanto, 2016): Clarifying messages to be more meaningful so that students can better understand and achieve learning goals, overcoming limitations in space (time energy and sense power) , raises the attention of students' learning because it is more interesting so that it can foster motivation to learn, allows students to learn independently according to their talents and abilities (visual, auditory, and kinesthetic), students do more learning activities because they are equipped with instructions so that students do not only hear teacher's description, but also other activities such as observing, doing, and so forth.

Learning media are designed in various forms, some in the form of visual media, audio, video, multimedia, and so forth. Multimedia is a collection of computer-based media in the form of text, images, sound, animation and video and communication systems that have a role to build, store, deliver and receive information synergistically and symbiosis which provides more beneficial results for users than individual media elements and then distributed through digital equipment (Gayeski, 1993; Tay Vaughan, 2010; Reddi, 2003; Yulyani Arifin, 2015). Based on the views of several experts, it can be concluded that multimedia is the merging of elements (text, sound, images, animation, and video) into a unit to distribute information through computers (digital equipment).

Multimedia can develop sensory abilities and attract attention and interest. Computer Technology Research (CTR), states that a person's memory can be measured by only 20% by what is heard, 30% by what is seen. But one can remember 50% of what is seen and heard and will be 80% by what is seen, heard and done at once. Multimedia can present information that can be seen, heard and done, so multimedia is very effective to be a complete tool in the learning process. The effectiveness of multimedia can be seen in the advantages

of multimedia, namely the use of several media that enhance the quality of presenting information (attracting attention and interest) and is multisensory because it stimulates many senses (a combination of views, sounds, and movements), which is strengthened with text, sound, images, video, and animation, thus creating interaction in accessing needed information (Munir: 2012).

Based on the description of the learning modules, instructional media and multimedia in learning it can be concluded that the multimedia-based learning module is the use of computers to create and combine text, audio, graphics, moving images (video and animation) that serves to bridge the communication between teachers and students in achieve a learning goal that acts as a teaching aid or learning resource (module) so that learning is more effective. In general, multimedia learning can be grouped by function, namely to train skills (skill builder), (b) to explore knowledge (knowledge explorer), and (c) to enrich learning resources (reference works).

The strengths of this multimedia are the selection factors for developing multimedia-based learning modules. One of the multimedia applications that can be used to create modules is the flipbook maker application. Flipbook maker is software that is designed to convert PDF files to digital publishing pages. This software can change the appearance of PDF files to be more attractive like a book. Flipbook maker can also make PDF files into a magazine, digital magazine, flipbook, company catalog, and digital catalog (Istiyanto: 2013).

Flipbook maker software can help produce learning media with a more varied appearance, not only in the form of text but also images, videos, and audio can be embedded in this media. (Sugianto, 2013). According to Wijayanto (2011) flipbook maker is a software that has the function to open every page into a book. Flipbook maker software can create and convert PDF files, images / photos into a physical module or album when we open per page. Flipbook maker can be used to convert PDF files into digital turning pages. In addition this software also allows users to insert videos, images, audio, hyperlinks, hotspots and other multimedia objects. The publication of this software produces digital flash modules that can be used on computers.

C. Learning Module Assessment Aspects

An assessment of a learning module is needed to see the extent to which the module can support learning activities. The assessment module has several specific aspects and criteria. Some of these aspects and criteria must be included in the learning module that will be used.

Aspects and criteria of learning media assessment namely from the material aspects by adapting the learning aspects and aspects of the material substance, including the following (Wahono, 2006): a. Learning Aspects, b. Material Substance Aspects. Measurement of the quality of the media there are several aspects that need to be considered in assessing learning media, namely (Wahono: 2006): a. Software Engineering Aspects, b. Visual Communication Aspects. The other aspect used to measure all kinds of learning modules used is the standard LORI (Learning Object Review Instrument). Aspects

considered in the LORI standard proposed by Nesbit et al 2007 include: content quality, learning goal alignment, feedback and adaptation, motivation, presentation design, interaction usability, accessibility, reusability, and standard compliance. Each of these aspects has self-assessment components .

D. The Essence of ICT Guidance Learning

ICT has a huge ability to change all aspects of education in schools to achieve the desired learning goals. Therefore, the role of ICT teachers needs to be optimized in implementing the 2013 curriculum.

ICT teacher workload is in accordance with Minister of Education and Culture Regulation No. 68 of 2014 is to provide guidance that is carried out for each student, a minimum of 5 meetings each semester in a classical / group, and carry out individual guidance on working days according to a schedule determined by the teacher and school. In order for the learning process to run smoothly, teachers must utilize ICT starting from preparing, implementing, and evaluating learning to be more effective. So, there needs to be guidance and facilities from ICT teachers to teachers of other subjects in order to be able to utilize the available technology to the maximum and so that other subject teachers can get experience in using technology in accordance with the times. Facilities for teachers and education personnel, with a minimum of 2 meetings each semester, classically / in groups and carrying out individual facilities on weekdays in accordance with the agreement with the teacher and administrative staff.

Information and Communication Technology (ICT) is one of the subjects in the MAN / SMA level in the 2006 Curriculum, then removed as a subject in the 2013 curriculum. According to Permendikbud Number 45 of 2014 concerning the Role of Information and Communication Technology Teachers (ICT) in implementation The 2013 curriculum states that the role of ICT teachers is to provide ICT guidance and services to students, educators, and education personnel. In the 2013 curriculum, ICT learning is provided through ICT guidance and services. ICT guidance and services are provided by the tutor and ICT services. Guidance and ICT services are provided by the supervising teacher classically 1 x 45 minutes each week during school hours. ICT guidance and services aim to prepare students to be able to deal with the rapid development of technology, so that students can utilize information and communication technology properly and correctly according to their abilities. The scope of this guidance in the form of theory and practicum in its implementation taught at MAN 1 Bungo requires students to do repetition of material and conduct practices related to the basics of computer use and use of data processing software, word processing, number processing, presentation processing, programming , and graphic design. This research will develop multimedia-based learning modules in class XI at MAN 1 Bungo with competence using CorelDraw graphics maker software.

The learning process that is not yet effective, tends to be monotonous and less attractive to students because face-to-face learning in the dominant class still uses lecture methods,

practice and assignments by the supervising teacher influences the understanding of learners who are not optimal. Learners do not understand deeply the substance of the material, how to connect between what is learned with real life and how to use the knowledge gained to support his life.

Graphic design learning cannot be done only once but it needs to be repeated by students so that the subject matter can be mastered, while students are also required to be proficient in graphic design. Graphic design is widely used by students in supporting organizational and extracurricular activities, such as making poster designs, banners, magazines and yearbooks. But in schools students have limited time to learn and understand subject matter so as to make students less active in the learning process.

Through ICT guidance services, in addition to helping students can also help educators and education staff in the use of ICT as a learning aid tool. Material or teaching changes in broad subjects make students get a different understanding from other students in the learning process. Therefore, through ICT guidance services are expected to help teachers to explain the material using multimedia-based learning modules.

III. DEVELOPMENT METHOD

This type of research is development research that produces a product that is multimedia-based learning modules for Information and Communication Technology subjects. The development model used is the Instructional Development Institute (IDI) development model. The principle of the system approach applied by the Instructional Development Institute (IDI) consists of three stages, namely determining (developing), developing (developing), and evaluating (evaluating) (Gustafson and Branch, 2002: 59). The initial stage is the determination (define) which consists of steps - problem identification and background analysis. The second stage is the development (develop) which contains the preparation of the initial design and product validation. Then the third stage is the evaluation (evaluate) which contains the steps of the trial and analysis of the results of the trial.

The Instructional Development Institute (IDI) model was chosen because the system approach is in accordance with the stages of research development that researchers do. Starting with the determination step, which is observation to get a picture of the conditions in the field and analyze the needs and conditions of existing school facilities to develop learning modules. The Instructional Development Institute (IDI) model has also been validated by a consortium of four tertiary institutions. Michigan State University, Syracus University, The United States International University, and The University of Southern California that can be used to develop learning modules and solve problems in learning. To maximize development, the Instructional Development Institute (IDI) model is expected to be used to produce valid, practical and effective learning modules and can be used in the learning process.

IV. DEVELOPMENT AND DISCUSSION RESULTS

A. Presentation of Trial Data

1. Validity Test Data

Data retrieval of the validity of Multimedia-Based Learning Modules in ICT Bimbibingan subjects is by using a questionnaire (questionnaire). In this case the researcher gave questionnaires to three media validators and three material validators who validated the modules developed. The aspects of validity used include: aspects of software engineering, aspects of visual communication, and aspects of learning. The results of the study of each aspect given to the validator were analyzed using Aiken's V. statistical formula. The results obtained were validation values of the product design produced. The following details the results of the validation of multimedia-based learning modules in the ICT Guidance subjects seen in table 1:

Table 1. Results of Multimedia based Learning Module Validation from the aspect of visual communication

No	Validation Aspects	Validator Rating Score			$\sum$s	Aiken's V	Information
		V1	V2	V3			
1	Communicative	14	14	13	32	0,89	Valid
2	Visual	20	18	18	44	0,92	Valid
3	Layout	19	17	19	43	0,90	Valid
	Total Number	53	49	50	119	0,90	Valid

Based on the table above can be taken the average validation of the communication aspects of three validators is 0.90 so that it can be concluded included in the category of "Valid".

Furthermore, the results of multimedia-based learning validation on the learning aspects by three validators, the multimedia-based learning module validation on the learning aspect consists of 3 aspects, namely the aspect of conformity of the material to the competency standards, the aspect of material presentation and aspects of language use. The results of multimedia-based learning validation on the learning aspects are obtained from the assessment of each aspect of the indicator given by the validator, then analyzed using the Aiken's V. formula. The following details of the results of the material validation are shown in Table 2:

Table 2. Validation Results of Multimedia-based Learning Modules on Aspects of Learning

No	Validation Aspects	Validator Rating Score			$\sum$s	Aiken's V	Information
		V1	V2	V3			
1	Material Compatibility with Basic Competency	24	22	25	56	0,93	Valid
2	Material Presentation	23	23	25	56	0,93	Valid
3	Use of Language	25	21	25	56	0,93	Valid
	Total Number	72	66	75	168	0,93	Valid

From table 2, it can be taken the overall average of the validation of multimedia-based learning modules in the learning aspect is 0.93 so that it can be concluded that the

multimedia-based learning module in the learning aspect is included in the "Valid" category.

Furthermore, the results of the validation of multimedia-based learning modules in the aspects of software engineering from three validators, the validation of multimedia-based learning modules in the aspects of software engineering consist of five aspects, namely aspects of effectiveness and efficiency, aspects of ease, aspects of compatility, aspects of reuse and aspects of reliability. The results of the validation of multimedia-based learning modules in the aspects of software engineering are obtained from the assessment of each aspect of the indicators provided by the balidator, then analyzed using the Aiken's V. formula.

Tabel 3. Validation Results of Multimedia-based Learning Modules on Aspects of Software Engineering

No	Validation aspects	Validator rating score			Σs	Aiken's V	Inform ation
		V1	V2	V3			
1	Effectiveness and efficiency	10	9	9	22	0,92	Valid
2	Ease	13	14	13	31	0,86	Valid
3	Compatibility	9	10	8	21	0,88	Valid
4	Reuse	14	13	14	32	0,89	Valid
5	Reliability	9	8	10	21	0,88	Valid
	Jumlah Total	46	54	54	127	0,88	Valid

From Table 3 it can be taken that the overall average of the validation of multimedia-based learning modules in the aspects of software engineering is included in the "Valid" category.

2. *Practicality Test Data*
a. *Practicality Test Based on Teacher Response*

Practicality is related to the ease of use of multimedia-based learning modules in ICT Guidance subjects. Practicality data was obtained through a questionnaire filled out by one ICT tutor. From the questionnaire contents can be seen the practicality of multimedia-based learning modules from the aspects of efficiency, attractiveness, ease of use of modules, and quality of media content. The results of the assessment of practicality are summarized in the following table 4:

Table 4 Teacher Response Questionnaire Results

No	Aspect	(%)	Category
1	Media Content Quality	97	Very Practical
2	Ease of Use Module	95	Very Practical
3	Attractiveness	95	Very Practical
4	Efficiency	95	Very Practical
	Average Teacher Response		95,53
	Aspect Category		Very Practical

From Table 4 the average practicality rating of 95.53% can be drawn, so it can be concluded that the multimedia-based learning module is included in the "Very Practical" category.
b. *Practicality Test Based on Students Response*

The results of the student questionnaire responses were obtained from ICT guidance participants included in the experimental group. Learners give an assessment score in filling out the questionnaire which includes aspects of the quality of media content, ease of use of modules, attractiveness, and efficiency and the following are details of the results of the questionnaire responses of students summarized in Table 5:

Tabel 5. Questionnaire Results of Student Response

No	Aspect	(%)	Category
1	Media Content Quality	86,55	Very Practical
2	Ease of Use Module	88,52	Very Practical
3	Attractiveness	87,35	Very Practical
4	Efficiency	87,05	Very Practical
	Average Teacher Response		87,37
	Aspect Category		Very Practical

From Table 5 it can be taken that the average practicality is 87.37%, so it can be concluded that the multimedia-based learning module is included in the "Very Practical" category.
3. *Effectiveness Test Data*

To see the effectiveness, a posttest was given to the two sample groups, namely the experimental class and the control class in the form of multiple choice questions. Posttest questions compiled using 31 sola items out of 40 test items that have been tested for validity, reliability testing, difficulty level test and different power test problems. 31 valid items for the posttest were used for the final ICT guidance exam as an evaluation of the results of the guidance to measure the effectiveness of the multimedia-based learning module developed.

Comparison of posttest results between the control group (those who were not treated) and the experimental group (those who were treated) to determine the level of effectiveness using multimedia-based learning modules in ICT guidance.

From the data obtained that the average posttest results of the experimental group was much higher at 94.18 compared to the control group 75.00. Then the maximum value achieved by the experimental group is much higher at 100 and the maximum value is 88. And the maximum value achieved by the control group is 88 and the minimum value is 59. It is known that all students from the experimental group have completed (100%). Meanwhile in the control group 5 students were incomplete (29.41%). It can be concluded that the results of the experimental group's post-test were better than the control group, so the use of multimedia-based learning modules had a significant influence on ICT guidance learning outcomes.
B. *Data analysis*
1. *Analysis of Validity Test Data*

The validation of the development of multimedia-based learning modules for ICT guidance subjects was obtained from the validator's response to the validity of the multimedia-based learning module that was developed. The validator

consisted of 3 lecturers of Postgraduate FT UNP as validators and 1 teacher of the guidance of ICT MAN 1 Bungo. The validation results can be seen in the following Table 6:

Tabel 6. Module Validation Results

No	Indicator	Assessment	Category
1	Learning	0,93	Valid
2	Software Engineering	0,88	Valid
3	Visual Communication	0,90	Valid
	Average	0,90	Valid

Based on Table 6 shows that, the average validation assessment score obtained from the six validators is 0.90. With the category "Valid". This proves that multimedia-based learning modules are appropriate to be used as learning modules in ICT guidance subjects. Thus it can be concluded that the development of multimedia-based learning modules that are developed already meets all aspects of the required criteria.

2. Practicality Data Analysis

The data of the practicality of multimedia-based learning modules were taken through a limited trial conducted at MAN 1 Bungo in class XI which was determined randomly from 4 existing classes. This trial aims to see the feasibility of learning by using multimedia-based learning modules. Evaluation of the practicality of multimedia-based learning modules is obtained from a questionnaire filled out by the teacher / practitioner and the results obtained can be seen in table 4.4, multimedia-based learning modules developed are in the very practical category with an average percentage of 95.53%.

In addition to the assessment of the teacher / practitioner, the development of multimedia-based learning modules is also assessed based on student responses through questionnaires and the results of the assessment can be seen in Table 5 with an average percentage of student responses to the practicality of multimedia-based learning modules at 87.24% with the Very Practical category . The conclusion that can be drawn from the questionnaire responses of teachers and students to the practicality of multimedia-based learning modules is included in the category of very practical to be used as a learning module on ICT guidance subjects.

3. Analysis of Effectiveness Test Data

To see the effectiveness, a posttest was given to the two sample groups, namely the experimental class and the control class in the form of multiple choice questions. From the data obtained that the average posttest results of the experimental group was much higher at 94.18 compared to the control group at 75.00. Then the maximum value achieved by the experimental group is much higher at 100 and the minimum value of 88. And the minimum value achieved by the experimental group is much higher at 88 and the minimum value of the control group is 59. It is known that none of the experimental group has a value below 80. While it was in the dick group that there were still scores below 80. All students from the experimental group had finished (100%). Meanwhile

the control group of 5 students had not been completed (29.41%). It can be concluded that the results of the experimental group's post-test were better than the control group, so the use of multimedia-based learning modules had a significant influence on ICT guidance learning outcomes.

After being given treatment in each group then given a posttest to determine student learning outcomes after the learning process is completed. From the results of the final test activities of the two sample groups, the average learning outcomes of the experimental group was 93.93 and the average learning outcomes of the control group was 75. Following the description of the control group and the experimental group:

Table 7. Statistical Description of Control Group and Experiment Group

	N	Mean	Std. Deviation	Minimum	Maximum
Kontrol	17	75.00	8.29	59.00	88.00
Eksperimen	17	94.17	3.89	88.00	100.00

Based on Table 7, it can be seen that student learning outcomes in the experimental group that were treated using multimedia-based learning modules were higher than student learning outcomes in the control group that were not treated using multimedia-based learning modules. Testing the effectiveness of multimedia-based learning modules is done by comparing student learning outcomes with Minimum completeness criteria (KKM). KKM for information and communication technology guidance is 80. Based on student learning outcomes data there are no students with grades below the KKM in the experimental group. Thus the percentage of students who reach KKM is 100%. So it can be concluded that the multimedia-based learning module is "effective" to improve student learning outcomes.

Multimedia-based learning modules provided to students are valid and practical to use, then based on the results of the posttest it is concluded that the multimedia-based learning module has a positive influence on the results of ICT Guidance. There were differences in the posttest results between the control group and the experiment. All participants in the experimental group had 100% completeness while in the control group they had only 5 completeness out of the 15 control group participants or 29.00%. This proves that the learning module is effective for use in the guidance of ICT, and provides practical benefits in the learning process in accordance with what Arsyad (2015: 27) states that learning media in addition to clarifying the presentation of information can also facilitate and improve the process of learning outcomes.

V. CONCLUSION

Based on the results of research on the development of multimedia-based learning modules for ICT guidance subjects that have been carried out, the following conclusions are

obtained: 1) This development research produces multimedia-based learning modules for ICT guidance subjects that are in accordance with the needs of students. Multimedia-based learning modules are presented in the format of material according to the competencies that students must achieve. Multimedia-based learning modules that help students to receive learning in class in accordance with the existing learning time. Multimedia-based learning modules that can be used by students anytime and anywhere when students want to repeat the lesson (learn independently). 2) Research on the development of multimedia-based learning modules for ICT guidance subjects revealed that the media and material contained in multimedia-based learning modules are valid, practical, and effective. The validity of media and multimedia-based learning module material is expressed from various indicators namely learning indicators, software engineering indicators and visual communication indicators. The practicality of media and multimedia-based learning module materials related to the ease of use of the modules developed is seen from the aspect of the quality of the module content, has an appeal, ease of use and efficiency. The effectiveness of multimedia-based learning modules developed seen from the use of modules in the learning process has improved student learning outcomes. This can be seen from the increase in student learning outcomes taught using multimedia-based learning modules higher than students who are taught without multimedia-based learning modules. The results of the analysis show that there are significant differences between student learning outcomes taught with multimedia-based learning modules and student learning outcomes without using multimedia-based learning modules.

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