DEVELOPMENT OF TEACHING MATERIALS FOR WRITING SCIENTIFIC WORKS BASED ON *DIGITAL LEARNING* FOR STUDENTS OF THE INDONESIAN LANGUAGE EDUCATION STUDY PROGRAM, FACULTY OF TEACHER TRAINING AND EDUCATION, UNIVERSITY OF MUHAMMADIYAH BONE

Andi Srimularahmah
Makassar State University
andisrimularahmah@gmail.com

Mantasiah R²
Makassar State University
19mantasiah@gmail.com

Abstract

This research belongs to the type of R&D (Research and Development) development research that aims to produce prototypes, to assess the feasibility, practicality, and effectiveness of teaching materials for writing scientific papers based on *digital learning* for students of the Indonesian Language Education Study Program, Faculty of Teacher Training and Education, University of Muhammadiyah Bone. In this study, the *Dick and Carey* development model was adapted into five stages, namely: (1) preliminary study stage; (2) design stage; (3) development stage; (4) evaluation and revision stage; and (5) dissemination stage. The test subjects were teaching material experts, learning media experts, and students of the Indonesian Language Education Study Program. To get data on the feasibility of teaching materials, a feasibility sheet of materials and learning media is needed. Furthermore, to get data on the practicality of teaching materials, student response questionnaire data is needed. Effectiveness data is obtained from student *pretest* and *posttest* learning outcomes, before and after using *digital learning-based* scientific writing materials. The data analysis technique used is quantitative data analysis for the feasibility, practicality, and effectiveness of teaching materials. Then descriptive statistical data analysis and polygon analysis to analyze student *pretest* and *posttest* learning outcomes. The results showed that each topic on learning resources and learning activities in the first stage M = 3.5 and the second stage M = 4 were in the very feasible category ($3.5 \leq M \leq 4$). The total average value of the percentage of student responses in the second stage is M = 4 in the very feasible category ($3.5 \leq M \leq 4$). The total percentage value of student responses who agreed in learning to write scientific papers based on *digital learning* was 98.5%, in the very practical category, namely (86%-100%). The average value of *posttest* students in learning obtained is 83.7 in the range ($\geq 75 - \leq 100$). Based on the results of the data analysis, it can be concluded that the development of teaching aids for writing scientific papers based on *digital learning* is feasible, practical, and effective in use by students of the Indonesian Language Education Study Program, Faculty of Teacher Training and Education, Muhammadiyah Bone University.

Keywords: Development, teaching materials, learning to write, scientific work, *digital learning*.

Introduction

Adaptation to the latest technology that is developing today is a necessity to avoid being left behind. Attitudes and mindsets must be constructed to see opportunities and create creative innovations that can advance all aspects of life, including education. This is what is often recommended by various researchers and practitioners of modern education (Leo, et al., 2021; Mian, et al., 2020). Humans must be able to dive into technology, the same context can be interpreted that humans must be able to master technology and use it for the benefit of improving the quality of life. In the education sector, technology is an important pillar that can build the quality of education both internally and externally (Collin and Harverson, 2018).

Valtonen, et al (2019: 24) and Malik (2018: 11) in their writings explain that educators in the current era are required to behave and think critically in order to advance the education curriculum. Thinking and being critical should have become a culture or habit for them. However, all of this will be successful if the orientation of educators is in line with the education curriculum development policy (Huliatunisa, et al (2022: 3); Nuraini, et al (2019: 5); and Gerdruang, et al (2021: 5). Not with an indifferent attitude towards the curriculum and the development of its students. As stated by Rahardja, et al (2018: 183) and Syakur, et al (2020: 1328) that the problem until now is the state of lecturers or educators who do not understand and understand well their duties and functions as described in the law.

One form of quality development of educational units that can be carried out by lecturers is the development of teaching materials as one of the curriculum tools that is very important and determines the success of achieving educational goals (Romlah, et al (2021: 29); Simanjuntak, et al (2022: 79); and Usmanova (2022: 14). The task of developing teaching materials for lecturers is also regulated in Government Regulation (PP) Number 19 of 2005 Article 20 that lecturers are expected to develop learning materials or teaching materials and other supporting devices. The Government Regulation (PP) is reaffirmed through Permendiknas Number 41 of 2007 concerning Process Standards which reads the planning of the learning process which requires lecturers to develop lesson plans. Thus, lecturers can no longer evade or avoid their obligation to develop their potential and develop their professional tools, one of which is teaching materials.

The development of teaching materials must always be based on expectations and realities regarding teaching materials that are in accordance with the needs of learners, meet process standards, and support the improvement of student outcomes or achievements (Sultan, et al (2017: 77-78). Because, if a teaching material is developed according to needs, meets process standards, and is oriented towards improving the cognitive, affective, and psychomotor of users, it will certainly make it easier to achieve

goals (Peranginangin, et al (2019: 20); Ragupathi & Lee (2020: 93); (2020: 248); and Hendripides and Hikmah (2018: 16).

Referring to the competency standards of graduates of the Indonesian Language Education Study Program curriculum at Universitas Muhammadiyah Bone, there is no reason for this university not to immediately improve the paradigm and achievements. Universitas Muhammadiyah Bone certainly does not want graduates with weak language skills (especially writing) and lagging behind with the pace of development of the times. Every graduate must be equipped with the latest knowledge and skills to face the increasingly fierce competition in the world of work, especially digital writing skills. For this reason, one of the foundations for realizing a curriculum that is oriented towards improving students' digital writing competencies is by designing and developing digital writing teaching materials. This is as the MBKM paradigm which states that education is based on market and industry needs. Therefore, the curriculum must be designed based on market research of industry needs, then elements of market needs are made competencies, accommodated in courses, curriculum so that it is linear with market needs (Yudhawasthi & Christiani, 2021; Rizki & Fahkrunisa, 2022; Bangkara, et al., 2022; Nurdyansyah, et al., 2022).

Regarding teaching materials, students and lecturers want products that suit their learning and teaching needs. For students, the goal is simple, namely to make it easier for them to learn, understand the material, provide easy access, be interesting, easy to own, so that it has a positive impact on their learning outcomes or achievements (the results of researchers' surveys of students of the Indonesian Language Education Study Program at the University of Muhammadiyah Bone. As for lecturers, good teaching materials are teaching materials that are able to facilitate the process of providing material so that the hope of achieving the learning process and objectives is easily implemented (the results of interviews with lecturers of the Indonesian Language Education Study Program at Universitas Muhammadiyah Bone which is supported by the opinion of Putra, 2011: 23). However, along with the development of the world of education and human civilization, this view should develop further. Students and lecturers must be able to have more advanced insights and perspectives. This is as expected in Merdeka Belajar Kurikulum Merdeka (MBKM), whose orientation emphasizes the independence of learning for students over themselves to try to achieve the expected competencies and goals. But in fact, the teaching materials that have been used by lecturers and students at Universitas Muhammadiyah Bone have not met these ideal requirements. specifically for teaching materials for scientific writing courses, there are weaknesses or deficiencies in terms of material, systematic presentation, graphic layout, language, and media used.

Furthermore, related to the culture of teaching and learning, at Universitas Muhammadiyah Bone, especially in the Indonesian Language Education Study Program, learning and teaching activities for writing courses have not made significant progress. Until now, teaching and learning activities still rely on printed teaching materials, if there are digital-based ones, all of them only rely on loose articles presented on the internet. The

model is also dominantly conventional such as lectures, discussions, or assignments. Although some have used technology bases such as power point, but of course this can be said to be left behind seeing the development of science and technology today (Rukayah, Tolla, and Ramly, 2017: 358-366).

Still related to teaching materials in the teaching and learning process, every lecturer certainly wants maximum results or achievements in both the process and the learning objectives. It is an indicator of researchers that if teaching materials and learning processes are well designed and developed, of course student learning outcomes or achievements will also be good. This is in accordance with what Tessmer revealed (in Shaikh, et al, 2020: 475-476) in his book "Planning and Conducting Formative Evaluations" explains that learning materials are directly related to the process and learning outcomes of students. But in fact, student learning outcomes or achievements in the Writing Course are still very low with a learning completeness rate of only 39.17% so that the scientific papers that have been produced by students are still far from scientific standards. Based on the expectations, reality, and constitutional basis above, researchers are challenged to develop digital-based teaching materials as a solution offered from these problems. In essence, digital teaching materials have been developed by many researchers and educational practitioners, for example, digital teaching materials in the form of electronic modules developed by Asrial, et al (2019) and Novia, et al (2022). Teaching materials based on android media have also been developed by many researchers and practitioners such as; Mudiartana et al, (2021); Hakim, et al (2019); Haq, et al (2022), and many more that can be found in the google scholar corpora. As for website-based digital teaching materials, it is still very rare to find, researchers found one relevant one, namely research conducted by Lince, et al (2023) who developed web-based teaching materials for junior high school mathematics subjects. The web referred to in the study is still basic because it is in the form of a weblog. The lack of research on the development of web-based teaching materials, especially the Writing Scientific Works course is due to the very high level of complexity of its development. Websites are much different from webblogs, but in essence, webblogs are the simplest form of the website itself. In addition, the budget required is quite large, especially if utilizing the services of a programmer. However, this does not make researchers retreat, but rather it becomes a significant challenge in order to realize a better world of education by relying on available resources.

In the future, this web-based digital teaching material will become a reference source for digital learning for students of Universitas Muhammadiyah Bone in particular, and students who study Scientific Writing courses in general. With this teaching material, students will gain a systematic understanding because the material presented is based on student learning needs and refers to the weaknesses and shortcomings of previous teaching materials that have been refined. For example, citation management material with mendeley, online reference corpora management for scientific writing, accredited national and reputable international scientific publication procedures, and other materials that are not found in teaching materials that have been used by lecturers and students.

The choice of a website base in the development of this teaching material is an adaptive form to the increasingly rapid pace of development of knowledge and technology. Website media is also seen as the most appropriate media for teaching digital writing courses for students. The web itself is a digital page that comes from an online-based domain and contains various kinds of information. Until now, the web is increasingly in demand by the public both from educators (lecturers), students, entrepreneurs, and other general public for various informative purposes such as the presentation of learning materials, promotion of merchandise, advertising, storage of personal experiences or documents, and so on.

In addition, the website base was chosen on the consideration that digital or electronic teaching tools can increase the effectiveness of learning because it allows students to be actively and creatively involved in the learning process, because these teaching tools are equipped with various facilities or interesting features and virtual experiment designs that can lead students to engage or experience the process of science (sciensing) as reported by Chris (2007: 1147-1160). Irlidiyah, Tolla, Noni, and Anshari (2015: 553-559) also revealed that digital learning media that has a variety of senses (multimedia) is very effective in improving learning outcomes. This is due to the carrying capacity of each media style or style that is integrated into one media. For this reason, learning needs based on the learners' sensory emphasis can be met. Furthermore, digital-based teaching materials have a high level of efficiency in all respects. This is in accordance with the opinion of Opara & Oguzor (2011: 188-198) in their research report published in the International Journal Research of Social Science that the efficiency level of e-learning is better than conventional learning that must bring sheets or collections of books into the classroom. Meanwhile, with digital learning, it is enough to utilize one technology (computer, laptop, mobile phone, or other digital devices) that can accommodate thousands of teaching materials.

Research and development of teaching materials for Writing Scientific Papers based on e-learning by utilizing web technology is important. This is based on several facts that; 1) the shift in student learning culture, especially students of the Indonesian Language Education Study Program, Universitas Muhammadiyah Bone, needs to be welcomed as a form of progress in thinking, creating, and innovating which is expected to bring great changes in students and in the world of education itself. This is as stated in the achievement profile of graduates of the Indonesian Language and Literature Education study program at Muhammadiyah Bone University; 2) Muhammadiyah Bone University wants a dynamic, creative, innovative, and progressive movement that must always be supported by lecturers, even becoming the driving force of change itself to realize the vision and mission of the university; and 3) the value of novelty offered in this research is the excellence of educational features, as well as the quality of the materials and media to be developed.

RESEARCH METHODS

This type of research is research and development. Research and development is used as a basic reference in finding problems, formulating solutions, designing, and creating or developing a prototype of teaching materials that are valid, effective, and practical.

The data and data sources in this research and development are described as follows;

Problem analysis and solution determination data. This data includes (a) curriculum data (RPS, and teaching materials), (b) student and lecturer understanding data (problems, needs, and student characteristics), and (c) literature study data (relevant research results and other references). The data comes from (a) the curriculum for learning Writing Courses at FKIP UNIM Bone, (b) students and lecturers, (c) relevant research results in the form of dissertations, scientific journals, or other references.

Needs analysis data, this data includes (a) determination of objectives, indicators, material / content, and evaluation of teaching materials, (b) determination of media, (c) data on student and lecturer understanding. The data sources are (a) curriculum, teaching material books related to the material developed by the developer, (b) media / educational technology literature studies and researcher considerations based on problems, (c) students and lecturers.

Teaching material development data includes (a) data on the results of teaching material validation, (b) teaching material trials in the form of teaching and learning activities and student activities. The data comes from experts and test subjects.

Data on the results of the implementation of teaching materials in the form of (a) data on the effectiveness of teaching materials in the form of learning outcomes, (b) data on the practicality of teaching materials in the form of student and lecturer responses to teaching materials. The data comes from students and model lecturers.

Data Analysis Technique

After the data is collected, the next step is data analysis. The data must be well selected, the data obtained is valid, practical, and effective based on the grouping of data according to the type of data. The purpose of researchers analyzing data is to be able to interpret all research results in the form of descriptions / explanations and then inform the wider community (Sugiyono, 2014: 333).

Problem solving is carried out with data analysis techniques that are in accordance with the problems studied. The analysis techniques used in this research are qualitative data analysis techniques and quantitative data analysis techniques.

Research Results and Discussion

In this section, the discussion of research results on the development of teaching materials for writing scientific papers based on *digital learning* is described, which includes the achievement of research objectives. The achievement of the objectives, the research described is how far the research objectives to be planned are achieved. The achievement is related to the feasibility, practicality, and effectiveness of the teaching materials for writing scientific papers based on *digital learning* that have been developed. The discussion of the achievement of research objectives is described as follows.

1. **Development of Prototype Teaching Materials for Writing Scientific Writing based on *Digital Learning***

In the previous research results section, it has been presented that the prototype of teaching materials for writing scientific papers was developed by adapting the teaching material development procedure of the *Dick and Carey* model (2003) into five stages, namely preliminary study, design, prototype draft development, evaluation, and revision (expert feasibility test, revision of expert feasibility test results, small-scale field trials, revision of small-scale field trial results, large-scale field trials, revision of large-scale field trial results) and dissemination. The five stages are discussed sequentially based on the stages of developing prototype materials for writing scientific papers based on *digital learning.*

At the prototype draft development stage, as suggested by teaching material experts, as well as media experts that teaching materials for writing scientific papers using *digital learning* are designed systematically, starting with the preparation stage, namely designing the structure of the material, then developing it into sub-point material, teaching material content in the form of books, *files*, and *urls.*

The learning outcomes and teaching materials for writing in *digital learning* are formulated based on the analysis of students' needs in learning to write. Course learning outcomes consist of Sub-CLOs and indicators of learning success. Sub-CLOs contain learning outcomes that are marked by measurable changes in behavior, including students' attitudes, knowledge, and skills in learning to write. Meanwhile, learning success indicators contain descriptions of the behavior that students are expected to achieve after learning to write.

2. **Feasibility of Teaching Materials for Writing Scientific Writing Based on *Digital Learning***

In development research, after the prototype of teaching materials is developed, the first step taken is feasibility testing. Feasibility testing of this teaching material involves experts who are asked to read and examine carefully related to the content and structure of teaching materials. Feasibility testing is very important. Solano-Flores, and Nelson-Barber (2001) revealed that currently many learning materials are used without going through scientific testing or assessment so that the outcomes produced from these materials are not truly scientific. Therefore, before being used, the materials should be standardized.

The data on the feasibility of teaching materials for writing scientific papers based on *digital learning* is obtained from the results of the feasibility of material and media experts which are described as follows.

a. **Feasibility of *Digital Learning* Media Design**

The feasibility of media design in learning has been explained that the criteria for media feasibility include presentation techniques, supporting presentation, presentation of learning, and coherence and conciseness of piker flow. Furthermore, the graphic part includes the size of the material, cover design, design of the content of teaching materials. The linguistic aspects include straightforward, communicative, dialogical and interactive, compatibility with learner development, conformity with language rules, and the use of symbol terms and icons. On media criteria (website) is divided into visual communication display and software utilization.

The results of the assessment of the media expert team both qualitatively and quantitatively show that in the criteria for presentation techniques, the consistency of the systematic presentation in learning activities is in the very feasible category. This shows that the consistency and sequence of concepts in the media are easy to use and coherent. There are questions in learning activities and practice questions at the end of each learning activity.

In general, the first validator of media experts concluded that the design of teaching materials through the media can be used with minor revisions. In particular, the improvement suggested by the first validator of media design is to add a summary of each material because it is not contained in the features that have been made, this makes it easier for students to learn the essence of each material presented.

The results of the Expert Team's assessment both quantitatively and qualitatively show that the presentation of learning involves students, this is supported by the results which show that it is very feasible. This is in the learning process using the media, it is necessary to involve students as learning resources so that there is linkage between learning activities / learning sub-activities, besides that the meaning in learning learning activities remains intact, this is indicated by the results of the assessment which is very feasible even though from a quantitative point of view it has not reached the maximum value, but after being revised it shows very feasible results from a quantitative and qualitative point of view. However, the task indicators on the features are recommended to be revised. This is intended, so that the training is more varied which can stimulate students to learn independently and can measure students' mastery of writing scientific writing.

Based on the assessment test, it is necessary to differentiate or separate each material per meeting in the media. The goal is to better illustrate the accuracy of the material available in the learning media. Then the second validator, the media design expert, concluded that the design of teaching materials for writing media could be used with minor revisions. In particular, the improvements suggested by the media design validator are: add the task feature because it is still needed by students and lecturers when providing learning materials at each meeting. In addition, the concepts and theories presented to achieve the Sub-CLOs are in accordance with the applicable provisions in linguistics. The concepts and theories presented in the media are aspects of knowledge that support the achievement of cognitive objectives.

The results of the expert team's assessment both quantitatively and qualitatively show that the graphical aspects which include capacity and display size are compatible. The indicators presented in the learning are accurately not revised because the criteria for graphics are in the very feasible category. In the design does not use a combination of fonts, this right is intended so that there is consistency in writing.

The results of the Expert Team's assessment both quantitatively and qualitatively show that the linguistic aspects are not revised, because they are in the minor revision category. Sometimes, unrevised sentences can lead to double or unclear meanings. Revision helps to remove ambiguity and make arguments stronger and well-structured. Making linguistic revisions helps to improve the quality of writing. research requires the use of formal and precise language according to academic standards. Revision helps to correct sentences that may be too informal or inappropriate to the scientific context...However, the assessment results for conformity with language rules and the use of terms, symbols, and icons have shown very decent results.

The results of the Expert Team's assessment quantitatively and qualitatively in learning on the visual communication display spec include slides on the media that are easily accessible, have a color composition, font and display in the very feasible category. It is intended that the design of the display of teaching materials is attractive and proportional. In the media design display, each slide has a different function or part. Some contain material, assignments, quizzes, and essays.

The results of the Expert Team's assessment quantitatively and qualitatively in learning on the media aspect show that based on the indicator of *software* utilization, it is not revised because it is in the very feasible category. This shows that the media in the visual communication display is designed so that all teaching and learning activities are carried out by accessing the website or browser. *Tools* or devices on the media function properly. Then users who can use are users who have registered and have their own accounts. Students can still access all of their meetings.

Based on the results of the feasibility test by the media expert team in digital learning, it can be concluded that the average value of the feasibility results by media experts in learning to write scientific papers is 3.5 in the very feasible category ($3.5 \leq M \leq 4$). This is in line with what is stated by Nurdin (2007) that teaching materials are declared feasible if the average value of the feasibility test results for all criteria is at least in the feasible category and the value of the feasibility test results for each criterion is at least in the feasible category.

b. Feasibility of teaching materials

In developing teaching materials, the design principles and development processes used must follow national standards. The National Education Standards Agency (BNSP, 2006) explains that the criteria for teaching materials that are good and feasible to use are measured through aspects of the suitability of the material to the syllabus, the accuracy of the material, the currency of the material, and encouraging curiosity. If the four components are not achieved, the teaching materials are not suitable for use. If this is taken into account, it will have an impact on the learning process and student learning outcomes.

The material indicator with the syllabus includes the components of material completeness, material breadth, and material depth. Subcomponents of material accuracy include the accuracy of concepts and definitions, the accuracy of data and facts, the accuracy of examples and cases, the accuracy of images, diagrams, and illustrations, the accuracy of terms, the accuracy of notations, symbols, and icons, and the accuracy of library references.

In the indicator of material sophistication, it includes the components of the suitability of the material with the development of science, examples and cases in everyday life, pictures, diagrams, and illustrations in everyday life, using examples of cases found in everyday life, and up-to-date literature. Furthermore, the indicator of encouraging curiosity includes sub-components of encouraging curiosity and creating the ability to ask questions.

The results of the expert team's assessment both quantitatively and qualitatively show that the indicator of the suitability of the material with the syllabus on the completeness of the material and the breadth of the material is in the very feasible category. The material aspects in the teaching materials include instructions for using textbooks, writing concepts, scientific papers, writing papers, writing articles, writing theses and theses and obstacles in writing scientific papers. So that the teaching materials

for writing scientific papers can be systematically presented in *digital learning-based* writing teaching materials. In addition, the material presented refers to the scope in the syllabus, from the introduction of concepts to the interaction between concepts to explore each topic by paying attention to the guidance of CPMK and Sub-CPMK. So that the level of difficulty in understanding the context has been adjusted to the level of understanding of students. This means that the words used in writing teaching materials use standard language, and use the right choice of words, which are in accordance with the KBBI and are easily understood by students because they are communicative.

The results of the Expert Team's assessment both quantitatively and qualitatively show that the material accuracy indicators include the accuracy of concepts, data and facts, the accuracy of examples and cases, the accuracy of images, diagrams, and illustrations, the accuracy of terms and the accuracy of notations, symbols and icons and literature references are not revised because they are in the very feasible category. This shows that the concepts and theories presented to achieve the learning success indicators are in accordance with the applicable definitions in the field of language skills, especially writing skills.

The concepts and definitions presented are aspects of knowledge that can support cognition. Similarly, the examples chosen and presented have shown the sequence of concepts from easy to difficult, from concrete to abstract, from simple to complex. Similarly, the examples presented describe life according to student experience. In contrast to the points of assessment of the accuracy of images, notations and symbols quantitatively are not revised but qualitatively suggested for revision. This is intended to make the illustrations used more interesting. Then in the closing section, it contains a bibliography, which is a list of books and other sources used as references in writing the book beginning with the author's name, (arranged alphabetically), year of publication, book title, place, and publisher's name.

The results of the Expert Team's assessment both quantitatively and qualitatively show that the indicators of material sophistication ranging from the suitability of the material with the development of science, examples and cases in everyday life to the latest literature show very feasible results, and are not revised. This means that the suitability of the material, examples, images and illustrations that have been presented reflect existing events or events or contextual conditions. However, the case is different with the assessment item of the recency of the library. Quantitatively revised but qualitatively not revised. This means that it is necessary to strengthen the content of each material in each unit of writing teaching materials.

The results of the expert team's assessment on the indicator of encouraging curiosity which includes encouraging curiosity and the ability to ask questions are in the very feasible category. In the indicator of encouraging curiosity from a quantitative and qualitative point of view shows very feasible results, it encourages students to stimulate metacognition and student skills. Encourage students' ability to imagine, create, think critically through illustrations, analysis, at the end of learning. Thus, encouraging students to know the content of teaching materials.

The results of the expert team's assessment on the indicator of creating the ability to ask questions from a qualitative assessment show very feasible results even though the quantitative results show that it has not been maximized. It is intended that the presentation of learning can have a high curiosity effect by students. Placement of students as the subject of learning because the description in the material is also

supported by activities that are able to form student learning independence, students are motivated to learn comprehensively about various issues in writing scientific papers.

Based on the discussion that has been presented, it is concluded that writing teaching materials are declared very feasible based on the results of the feasibility of teaching material experts and learning media. The eligibility criteria are met, namely the average value is 3.5 very feasible category. This is in line with Nurdin's (2007) opinion that writing teaching materials are declared feasible if the average feasibility value for all criteria is at least in the feasible category and the feasibility value for each criterion is at least in the feasible category.

3. **Practicality of Writing Teaching Materials Based on** *Digital Learning*

After the teaching materials are declared feasible based on the results of the feasibility test by experts, the teaching materials must go through a practicality test. The practicality of teaching materials is good or not if it can make it easy for users, both in preparing, using, interpreting, or obtaining results, as well as the ease of storing them, and is also related to the efficiency and effectiveness of time and funds (Arikunto, 2010: 48). In addition, Nieveen (1993: 136) states that to measure the level of practicality of the development of teaching materials, see and consider materials that are easy and can be used by lecturers and students. Therefore, the criteria used in evaluating the practicality of *digital learning-based* writing teaching materials are adapted from Forcier's theory (2005).

The assessment criteria in the form of a student response questionnaire on learning contain questionnaire item indicators including guidance on the use of teaching materials and clear, this teaching material explains a problem related to everyday life, the sentences used are clear and easy to understand, the language used is simple and easy to understand, learning resources and learning activities are easily accessible, using examples related to everyday life, the presentation of the material starts from easy to difficult, there are several parts to find the concept yourself, contains questions that are in accordance with the material taught, contains tests that can test the extent of understanding related to writing scientific papers in the form of papers, encourages me to actively discuss, enthusiastic, and interested in learning the material and understanding the subject matter more directed and coherent. (adaptation of Forcier's theory, 2005)

The results of the data analysis of student responses in the small-scale field test in *digital learning* showed that there were three aspects that did not get the maximum score. These aspects are learning resources and accessible learning activities. In the aspect of learning resources and learning activities easily accessible has a score that has not been maximized, because 6 students (50%) disagree, the aspect of questionnaire items using examples related to everyday life there are 5 students (41%) who disagree so that this aspect has not reached the maximum score. Furthermore, the aspect of containing questions that are in accordance with the material being taught has also not reached the maximum score because out of 15 students, there are 5 students (41%) who disagree.

Then after being revised and retested on a large-scale field trial, the results of data analysis of student responses in learning were obtained. The aspect of questionnaire items has a score that was previously not maximized to be maximized, because the average of 30 students (100%) and the average percentage value of student responses who stated that they agreed with the questionnaire items asked was 100% and the average percentage value of student responses who stated that they disagreed with the questionnaire items was 0%. This shows that students and lecturers can access learning resources and learning activities for *digital learning-based* teaching materials. There are examples related to

everyday life and contain questions that are in accordance with the material taught in the teaching material.

The results of the data analysis of student responses in learning in the large-scale field test show data on the results of student responses to teaching materials for writing scientific papers in large-scale trials, it can be concluded that teaching materials for writing scientific papers based on *digital learning* in learning are in the very practical category, namely (86%-100%) because the total average value of all questionnaire items asked is 98.5% and the percentage of disagreement is 1.1%. This is in line with what Sugiyono (2010) stated that the *digital learning-based* writing teaching materials developed are declared practical for use in learning to write scientific papers if the average percentage of student responses is at least in the range (76%-85%).

4. **Effectiveness of *Digital* Learning-Based Writing Teaching Materials**

Related to the teaching material products developed, a new stage is needed to determine the effectiveness of these teaching materials. Because one of the main requirements for teaching materials is that they can be used effectively towards achieving learning objectives. One of the learning objectives is realized through student learning outcomes. The utilization of teaching materials to make changes in student learning outcomes there are three possibilities that can occur, namely (a) the benefits occur in a short time; (b) the benefits of changes in a long time; (c) no benefits occur (Ormrod in Arsyad, 2017: 261). The measure of effectiveness in this research and development from these three possibilities only refers to the first possibility. Because, it is very effective when the benefits of an object (teaching material) can be seen or felt in a short time. This is in line with the results of the implementation of the development of teaching materials for writing scientific papers based on *digital learning for* students of the Indonesian Language Education Study Program, Universitas Muhammadiya Bone.

Data on the effectiveness of teaching materials for writing scientific papers based on *digital learning*
Obtained from student learning outcomes in learning to write on a *pretest* of 30 multiple choice questions and likewise in writing scientific papers based on *digital learning* on a large-scale field trial *posttest*.

In the large-scale field trial, the trial of teaching materials for writing scientific papers based on *digital learning*, before *treatment,* the sample was first given an initial test *(pretest)* according to the material on writing learning and at the end of the lecture the sample was given a final test *(postest)* of understanding of the material on writing scientific papers. (Sugiyono, 2010).

Student *learning* outcomes in learning to write scientific papers based on *digital learning* on *pretest* and *posttest* were analyzed using descriptive statistics and polygon analysis. It is known that the results of descriptive statistical analysis of student *learning* outcomes in learning to write scientific papers based on *digital learning* in learning who obtained learning outcomes (≥75-≤100) amounted to 3 students (10%) and students who obtained learning outcomes (0-<75) amounted to 27 people (90%). However, after using teaching materials for writing scientific papers based on *digital learning* and after giving the *posttest*, students who obtained learning outcomes (≥75-≤100) amounted to 30 students (100%). This shows that the teaching materials for writing scientific papers based on *digital learning* developed are able to encourage students to be active, think critically, be able to study, and analyze scientific writing well.

Conclusion

Based on data analysis and discussion of the results of research on the development of teaching materials for writing scientific papers based on *digital learning,* it can be concluded that the results of this study are:

First, teaching materials for writing scientific papers based on *digital learning* What has been developed consists of learning resources and learning activities. Learning resources consist of books, *word, url* and *page files.* Learning activities consist of assignments, quizzes, materials and essays.

Second, the teaching materials for writing scientific papers based on *digital learning* developed are very feasible to use in learning to write scientific papers for students of the Indonesian Language Education Study Program, Universitas Muhammadiyah Bone. The feasibility test by expert validators was carried out in two stages. The first stage, the overall average value of the overall eligibility criteria for teaching material experts is 3.5 in the very feasible category ($3.5 \leq M \leq 4$) While the overall average value in learning is 4 in the category ($3.5 \leq M \leq 4$). So the feasibility value by the teaching material expert for writing scientific papers based on *digital learning* is in the very feasible category ($3.5 \leq M \leq 4$).

The design of learning media for writing scientific papers based on *digital learning* developed is very feasible to be used in learning writing for students of the Indonesian Language Education Study Program, Universitas Muhammadiyah Bone. The feasibility test by expert validators was carried out in two stages. In the first stage, the average value of media feasibility is $M = 3.5$ in the very feasible category ($3.5 \leq M \leq 4$). In the second stage, the overall average value of the feasibility assessment performance by media experts is $M = 4$ in the very feasible category ($3.5 \leq M \leq 4$).

Third, the teaching materials for writing scientific papers based on *digital learning* developed have met the criteria of practicality in learning writing for students of the Indonesian Language Education Study Program, Muhammadiyah Boen University. The average value of the percentage of student responses who agreed in the large-scale field trial in learning with the questionnaire items asked was 98.5%, in the very practical category, namely (86%-100%).

Fourth, the teaching materials for writing scientific papers based on *digital learning* that have been developed have met the criteria for effectiveness in learning to write for students of the Indonesian Language Education Study Program, Universitas Muhammadiyah Bone. Then the average *posttest* score obtained was 83.7 in the range ($\geq 75 - \leq 100$).

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