

Development of Computer Learning Materials To Improve Spreadsheet Skills for Training Participants

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Abstract—Non-formal institutions are one of the educational containers to be able to train learners to prepare themselves for the fierce competition of world. While the compulsory subjects for all courses are Office Applications which aims to provide skills to operate software such as word processing, spreadsheet, and presentations that become one of the requirements to enter the working world. One of the skills mastery measurement used is Computer Literate Certified Professional (CLCP) from ICT Competency Certification Institution. Development of printed teaching materials is assumed to be the right target for improving spreadsheet skills. The questionnaire is an instrument used to assess the quality of printed materials produced by learning experts, media experts, and material experts using research design Pre test post test control group design. The results of the study showed significant results in terms of improving learning outcomes as well as skills using the logic function in the spreadsheet.

Keywords—Development; Instructional Materials; Spreadsheet Skills

I. INTRODUCTION

A. The Ability Of Spreadsheets For Courses And Training

In the Regulation of the Minister of Education and Culture No. 81 of 2013 on the Establishment of Non-formal Education Units article 1, paragraph 8, the Non-formal Education Program is an education service that is organized to empower the community through life skills education, early childhood education, youth education, women's empowerment education, literacy, vocational education and job training, equivalency education, and other education aimed at developing learners' abilities.

One of the Institute of Courses and Training that plays an active role to produce skilled manpower to meet the needs of workers and independent business is Mandiri Entrepreneur Center (MEC) under the auspices of Yatim Mandiri Foundation Surabaya. One measure of mastering spreadsheet skills through competence test results of Computer Literate Certified Professional (CLCP) through the Certification Institute of Information and Communication Technology

Competencies (LSK-TIK). The data shows only 9% of learners are said to have the spreadsheet competence.

B. Development of Computer Learning Materials

Suparman [1] states that there are 6 basic components in the learning system. Basic components or can be said core components consist of learners, processes, competencies of graduates, teachers, curriculum, and learning materials. Learning materials is a component that can be intervened by doing the development of learning materials in accordance with the objectives of the programmed institutions.

Abdullah, et al. (2016: 4) Mentioning that the teaching materials are a set of subject matter systematically arranged and intact so as to create easy, fun and engaging learning that enables students to learn and achieve the goals of the curriculum.

Teaching materials that need to be developed are in printed form to supplement nonprinted teaching materials that have been used previously. The use of printed materials is assumed to be more targeted because the need to do the exercises required learning activities directly without using the help of computers as well as having the ability to be duplicated using a computer.

In the study of the use of teaching materials in the form of printing economic subjects at the high school level, the results obtained that the student's response to the use of teaching materials is very good (Rosidah, 2013:16). Other similar studies have shown results that printed materials help in understanding the material and motivating learning [2]. From these two studies, it can be assumed that the development of printed materials will have a positive impact on improving spreadsheet skills

C. Improving Spreadsheet Skills for Training Participants

Spreadsheets refer to software for inputting data, processing data using multiple functions (formulas, databases, graphs) to produce certain outputs [3] using a spreadsheet software package, in this case, using logic functions.

In general, the training courses are divided into 3 main subjects: 1) core skills courses (according to study program), 2) support skill courses (all courses), and 3) skills training courses for entrepreneurship. On-course support expertise such as Office Computer Applications, Computer Basics, and Internet are provided for each course with the assumption that

the basic capabilities of software and hardware are currently needed in every job. Especially Computer Application Office that aims to provide skills to operate word processing, spreadsheets and presentations are currently one of the requirements to apply for work at the end of the training program.

II. METHOD

A. Participants

Briefly that the development of teaching materials requires several personnel as follows: learning reviewer, material reviewer, media reviewer, and learners. Learning reviewer for review the objectives of learning to be achieved with teaching materials used in the learning process. Material reviewer for review the content of teaching materials whether it is in accordance with the material/chapter on the function of logic. Media reviewer to review the visual components and linguistics used in learning materials. Last, the target user of product development is learners from accounting computer program, amounting to 32 people who are divided into 2 classes.

B. Instruments

In the expert test process with the main objective to make improvements of the teaching materials to be applied in later stages, the Guttman scale is used to express the "yes" or "no" stance of the expert on the developed product. Guttman scale is made in the form of the checklist with the highest score 1 (if no need revision) and the lowest score 0 (if necessary revision) [4]

The instruments provided for the teaching expert emphasize the assessment of the effectiveness of the achievement of the learning objectives with the developed teaching materials. Indicators assessment is based on the syllabus and Lesson Plans documents of Computer Training Office Application, namely:

TABLE I. LEARNING EXPERT QUESTIONNAIRE INSTRUMENT

No.	Indicators	Amount
1	Clarity of the formulation of learning objectives (does not lead to multiple interpretations and the behavior of learning outcomes)	1
2	Selection of materials (in accordance with the objectives and characteristics of learners)	1
3	Organizing teaching materials (demands, material systematics and conformity with time allocation)	1
4	Selection of resources / learning media (in accordance with the objectives, materials, and characteristics of learners)	1
5	Clarity of learning scenarios (steps of learning activities: initial activities, core activities, and closing activities)	1
6	Kerincianskenariopembelajaran (setiap langkah terdefinisi strategi/metode dan lokasi waktu pada setiap tahap)	1
7	Compatibility of techniques with learning objectives	1
8	Completeness of the instrument (question, answer key, scoring guide)	1

Instruments provided to media experts emphasize the judging of language and graphic feasibility. In Chapter II

Literature Review in the language and graphic feasibility assessment tool by National Education Standards Agency (BNSP) on text-based teaching materials there are several indicators that become points, namely:

TABLE II. MEDIA EXPERT QUESTIONNAIRE INSTRUMENT

No.	Indicators	Amount
1	Clarity	3
2	Communicative	1
3	Dialogic & Interactive	2
4	Conformity with Students	2
5	Conformity with the Language Rule	2
6	Use of Terms, Symbols or Icons	2
7	Size of Learning Materials	2
8	Cover Design	8
9	Materials Design Contents	19

Instruments gave to the material specialist emphasize the feasibility assessment of content and feasibility of presentation. In Chapter II Literature Review by National Education Standards Agency (BNSP) content feasibility assessment instrument on text-based teaching materials there are several indicators that become points, namely:

TABLE III. MATERIAL EXPERT QUESTIONNAIRE INSTRUMENT

No.	Indicators	Amount
1	Material compliance with Basic Competency & Competency Standards	3
2	Material accuracy	7
3	Material updates	5
4	Encourage curiosity	2
5	Presentation technique	2
6	Supporting presentation	8
7	Presentation of learning	1
8	The coherence of thinking flow	2

Here are the observation guidelines that are used to measure the learning outcomes of spreadsheet skills after using the instructional materials given to learners:

TABLE IV. OBSERVATION GUIDELINES FOR LEARNERS

No.	Indicators	Amount
1	Using a single IF logic function	2
2	Using compound IF logic functions	2
3	Using the logic function IF with the arithmetic function	2
4	Using the IF logic function with the text function	2
5	Using the IF logic function with statistical functions	2

C. Data Analysis

After that determine the meaning of each eligibility indicator in the following way:

$$\text{Percentage Score} = \frac{\text{Score Earned}}{\text{Highest Score}} \times 100\%$$

Criteria score (Riduwan, 2010:41):

0% -20% = very bad (very unfeasible)

21% -40% = bad (not feasible)

41% -60% = enough (decent enough)

61% -80% = good (feasible)

81% -100% = very good (very feasible)

To see the effect of the effectiveness of the use of teaching materials, the data obtained will be analyzed using t-test two samples for repeatable measurements. The two sample t-test is a comparative test used to see the differences in a variable. The function of this test is to test the ability of generalization, namely the significance of research results in the form of comparison of the variable state of the two average samples [4]The significance level used is $\alpha = 0.05$ with two-party testing criteria: $t \text{ count} > t \text{ table}$, can be said significant /influential [4]

III. RESULTS AND DISCUSSION

A. Feasibility of Learning Material

TABLE V. TEACHING EXPERT REVIEW

No.	Indicators	Eligibility Criteria
1	Clarity of the formulation of learning objectives (does not lead to multiple interpretations and the behavior of learning outcomes)	100%
2	Selection of materials (in accordance with the objectives and characteristics of learners)	100%
3	Organizing teaching materials (demands, material systematics and conformity with time allocation)	100%
4	Selection of resources / learning media (in accordance with the objectives, materials, and characteristics of learners)	100%
5	Clarity of learning scenarios (steps of learning activities: initial activities, core activities, and closing activities)	100%
6	Detailed learning scenarios (each step is reflected in the strategy/method and time allocation at each stage)	100%
7	Compatibility of techniques with learning objectives	100%
8	Completeness of the instrument (question, answer key, scoring guide)	100%

TABLE VI. MEDIA EXPERT REVIEW

No.	Indicators	Eligibility Criteria
1	Clarity	100%
2	Communicative	100%
3	Dialogic & Interactive	100%
4	Conformity with Students	100%
5	Conformity with the Language Rule	100%
6	Use of Terms, Symbols or Icons	100%
7	Size of Learning Materials	100%
8	Cover Design	50%
9	Materials Design Contents	95%

TABLE VII. MATERIAL EXPERT

No.	Indicators	Eligibility Criteria
1	Material compliance with Basic Competency & Competency Standards	100%
2	Material Accuracy	100%
3	Material Updates	100%
4	Encourage Curiosity	50%
5	Presentation technique	100%
6	Supporting presentation	100%
7	Presentation of learning	0%
8	The coherence of thinking flow	100%

In the process of feasibility testing conducted there are some revision activities on learning materials developed based

on the results of the questionnaire instrument provided to the expert

B. Effectiveness Of Learning Material

Field tests to see the effectiveness of teaching materials developed in the learning process. Field test uses a pre-test post-test control group design [5]

TABLE VIII. EFFECTIVENESS TEST RESULTS

No	Respondents	Experimental class	Control class
1	1 st Respondent	80	65
2	2 nd Respondent	75	70
3	3 rd Respondent	80	70
4	4 th Respondent	85	70
5	5 th Respondent	85	65
6	6 th Respondent	85	75
7	7 th Respondent	85	75
8	8 th Respondent	80	75
9	9 th Respondent	85	75
10	10 th Respondent	85	75
11	11 th Respondent	85	80
12	12 th Respondent	85	75
13	13 th Respondent	80	75
14	14 th Respondent	75	75
15	15 th Respondent	95	80
16	16 th Respondent	90	85
Amounts of Data		16	16
Sum		1335	1201
Average		83.44	75.06
Deviation Standard		5.07	5.23
$t \text{ table} = n-2 (5\%)$		1.76131	
$t \text{ count}$		29,51442	

$t \text{ count} > t \text{ table}$, $29.51442 > 1.76131$, can be said significant /influential.

IV. CONCLUSION

In the Regulation of the Minister of Education and Culture No. 81 of 2013 on the Establishment of Non-formal Education Units, article 1, (8) stipulates that the Non-formal Education Program is an educational service organized to empower communities through life skills education, early childhood education, youth education, women, literacy education, vocational education and job training, equivalency education, and other education aimed at developing learners' abilities.

One form of Non-formal education is the institution of courses and training. The institution is expected to be the spearhead in improving community competence, especially information technology. One of the competencies in the world of work is the ability to use numerical processing software or so-called spreadsheets. With the varied characteristics of learners in the course and training institutions, it is necessary to provide learning resources to support learning activities.

Not all non-formal education institutions have effective learning resources. Whereas currently, the demand for the increased competence of learners is quite high with the certification of competence in accordance with the field of

expertise. For the field of expertise to operate the number-processing software of one of the national competency test providers is the competency certification of information and communication technology.

Activity is needed to generate learning resources that are appropriate to the learning objectives, characteristics of learners as well as the characteristics of the institution itself. Especially Non-formal institutions that have variations in the characteristics of learners and the characteristics of different agencies although they have the same learning program. One of the things that are likely to be the development of printed learning resources.

The consideration of the selection of printed materials cannot be separated from the characteristics of a more flexible without the need for electrical resources. The limitations of institutions in providing hardware such as computers that are ready to use at any time provide space for printed materials can be used by anyone and anytime. Even for Non-formal institutions that have a system of *keasramaan* (dormitory), does not allow learners to operate mobile phones every day or other communication equipment.

Rusijono & Mustaji [6] states that development is an activity that produces solutions or products that can be used to solve problems used in theories, concepts, principles, or findings to solve problems. According to Kemp and Smellie (1994) in Molenda & Boling [7] mentions 3 levels in producing learning media that is: mechanical, creative, and design. Development of learning materials is an effort to produce products in the form of learning media at the design level. Developers, in this case, can start their activities by identifying topics, audiences, and learning goals [7] The initial identification process is an important step in the development process of learning materials. Spreadsheet skills, in this case,

are the ability to use the function of logic "IF" with a single form or compound. When viewed with the need for competency achievement in the competency certification test, this logic function has a high degree of difficulty. Moreover, if there are problems combining logical functions with other functions such as arithmetic functions, text functions, and statistical functions.

From the process of making the teaching materials, the design and development process feels both together and mixed. This happens because the feasibility testing process by the learning experts, media experts, and material experts slightly alter the product prototype. As for the implementation phase, need extra activities in accordance with the learning schedule of learners to be able to learn the learning materials that have been developed.

There is one thing of concern during the implementation process in the field that the ability to use the logic and arithmetic that exist in the learning experience of each learner is different. There are 3 people who have difficulties in submitting these logic functions so that in their learning activities often get help from other friends. In fact, it is also quite felt in the control class, at least 8 people experienced the same thing.

In the future, research and development on non-formal education are important to do especially in the availability of learning resources. We know that skills related to information and communication technologies can change rapidly. Then the process of improvement of this learning materials should be continuously done.

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