DEVELOPMENT OF *EXCELEARN* ANDROID-BASED LEARNING MEDIA ON NUMBER PROCESSING APPLICATIONS (SPREADSHEET) SUBJECT

PENGEMBANGAN MEDIA PEMBELAJARAN EXCELEARN BERBASIS ANDROID PADA MATA PELAJARAN APLIKASI PENGOLAH ANGKA (SPREADSHEET)

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Abstract: Development of *ExceLearn* Android-based Learning Media on Number Processing Applications (Spreadsheet) Subject. The aims of this research are: (1) develop *ExceLearn* android-based learning media on number processing applications (spreadsheet) subject for 10th grade Accounting and Financial Institutions of SMK Negeri 1 Tempel, and (2) know the feasibility of *ExceLearn* android-based learning media based on the assessment of expert and responses of students. This research is a research and development (R&D) that uses the 4D development model. Development stages carried out are Define, Design, Develop, and Disseminate. The subjects in this study were 1 material expert lecturer, 1 media expert lecturer, 1 practitioners that is accounting teacher SMK Negeri 1 Tempel, and students of 10th grade Accounting and Financial Institution 1 SMK Negeri 1 Tempel. The object in this study is an *ExceLearn* android-based learning media. In this development research, data collection techniques used a questionnaire. Data obtained from the questionnaires were analyzed descriptively qualitative and quantitative. The results of the research showed that the feasibility level of *ExceLearn* android-based learning media on number processing applications (spreadsheet) subject based on judgments: (1) Material Expert was get 4,8 score which was included in the Strongly Feasible category, (2) Media Expert was get 4,3 score which was included in the Strongly Feasible category, (3) Practitioners was get 4,0 which was included in the Feasible category, and (4) Student responses get 4,4 score which was included in the Strongly Feasible category.

Keywords: Learning Media, *ExceLearn*, Android, 4D

Abstrak: Pengembangan Media Pembelajaran ExceLearn berbasis Android pada Mata Pelajaran Aplikasi Pengolah Angka (Spreadsheet). *Tujuan dari penelitian ini adalah: (1) mengembangkan media pembelajaran ExceLearn berbasis android pada mata pelajaran aplikasi pengolah angka (spreadsheet) untuk kelas X Akuntansi dan Keuangan Lembaga di SMK Negeri 1 Tempel, dan (2) mengetahui kelayakan media pembelajaran ExceLearn berbasis android berdasarkan penilaian ahli dan respon siswa. Penelitian ini merupakan penelitian pengembangan atau Research and Development (R&D) yang menggunakan model pengembangan 4D. Tahapan pengembangan yang dilakukan adalah tahap Define, Design, Develop, dan Disseminate. Subjek dalam penelitian ini adalah 1 dosen ahli meteri, 1 dosen ahli media, 1 praktisi pembelajaran yaitu guru akuntansi SMK Negeri 1 Tempel, serta siswa kelas X Akuntansi dan Keuangan Lembaga 1 SMK Negeri 1 Tempel. Objek dalam penelitian ini adalah media pembelajaran ExceLearn berbasis android. Teknik pengumpulan data dalam penelitian ini melalui angket. Data yang diperoleh dari angket kemudian dianalisis secara deskriptif kualitatif dan kuantitatif. Hasil penelitian menunjukkan bahwa tingkat kelayakan media pembelajaran ExceLearn berbasis android sebagai media pembelajaran pada mata pelajaran aplikasi pengolah angka (spreadsheet) berdasarkan penilaian: (1) Ahli Materi diperoleh skor sebesar 4,8 yang termasuk dalam kategori Sangat Layak, (2) Ahli Media diperoleh skor sebesar 4,3 yang termasuk dalam kategori Sangat Layak, (3) Praktisi Pembelajaran diperoleh skor sebesar 4,0 yang termasuk dalam*

kategori Layak, (4) Respon siswa diperoleh skor sebesar 4,4 yang termasuk dalam kategori Sangat Layak.

Kata kunci: *Media Pembelajaran, ExceLearn, Android, 4D*

INTRODUCTION

The rapid development of information technology has a posivite impact on the field of education. This development is supported by various parties, both from the government and the private sector. As reported on the website kemendikbud.go.id, Information and Communication Technology Center of Education and Culture (Pustekkom) of Ministry of Education and Culture (Kemendikbud) has developed a learning portal in the form of a Rumah Belajar application in the android version of the device. The Rumah Belajar application can be used by teachers and students in learning activities. In the Rumah Belajar application there are a number of interesting features, such as Electronic School Books (BSE), Learning Resources, and Virtual Laboratories. In addition, there is a startup company that develops various technology-based learning services, namely PT. Ruang Raya Indonesia (Ruangguru). The technology-based learning services contained in Ruangguru are virtual classroom services, online exam platforms, subscription learning videos, private tutoring marketplaces, and other educational content that can be accessed through the Ruangguru website and application. However, there are still teachers in Indonesia who have not utilized ICT in the learning process.

Reported from republika.co.id, Head of Information and Communication Technology Center of Education and Culture (Pustekom) Kemendikbud Gogol Suharwoto revealed some of Indonesia's challenge, namely the gap in the need for learning content and teaching media for teachers, and the gap in the ICT competence of teachers. Based on these challenges, it is necessary to increase teacher competence in utilizing ICT in the learning process. Thus, it is expected to facilitate the implementation of learning activities.

The school's effort to be able to keep up with technological developments in the field of education is to provide information technology facilities in school. The facilities provided can be in the form of a computer laboratoty, LCD projector, and wifi network. With these facilities, teachers can use them to develop interesting learning media for students. According to Wina Sanjaya (2016: 61) are everything such as tools, environments and all forms of activities that are conditioned to increase knowledge, change attitudes or instill skills in everyone who uses them. In addition to the facilities

provided by the school, students also have facilities that can be used in the implementation of learning activities, namely smartphones.

Smartphone is a mobile phone device developed by implementing a computer-based operating system. The operating systems on smartphones that are widely used today are the android and iOS operating systems. The use of smartphones in education is known as mobile learning technology (m-learning). According to Gonzalez (2015: 32), m-learning can make a positive contribution to students to access learning materials or as learning media. There are several facilities available in smartphones, namely social media applications, messaging, and games. This is a challenge for teachers to use smartphones as interesting learning media. So that students can use their smartphones to learn not to play.

Currently, the world is experiencing the COVID-19 pandemic which has spread to various parts of the world, including Indonesia. The Indonesian government's effort to break the chain of the spread of the COVID-19 virus is to implement an appeal to implement physical dictancing. The appeals include calls for social distancing, avoiding crowds, gatherings, and gatherings with large numbers of people. With the call for physical distancing, the Ministry of Education in Indonesia also issued a policy in the field of education. The policy is to close schools and replace the teaching and learning process (KBM) by using an online system.

The problem faced in implementing learning policies with online systems is that signals and limited gadget storage space constrain access to information. The application of the learning system in the network (online) also causes educators to change the learning models and learning methods that will be used. Educators are required to be able to use online media as a substitute for direct classroom learning without reducing the quality of the material and achievement targets in learning. Facilities that can be used include e-learning, zoom application, google classroom, youtube, and whatsapp social media.

SMK Negeri 1 Tempel is a vocational high school which is located at Jalan Magelang Km. 17, Jlegongan, Margorejo, Tempel, Sleman, Yogyakarta 55552. SMK Negeri 1 Tempel has 30 study groups consisting of 5 majors, namely Accounting and Financial Institutions (AKL), Automation and Office Governance (OTKP), Online Business and Marketing (BDP), Logistics Governance Engineering (TL), and Computer and Network Engineering (TKJ). The curriculum applied at SMK Negeri 1 Tempel is the 2013 Revised Curriculum (K-13 Rev). In the 2013 Revised Curriculum (K-13 Rev), accounting and financial institution majors are subjects, namely number processing applications (spreadsheet). The

subject of number processing applications (spreadsheet) is one of the computer-based subjects. The subject of number processing applications (spreadsheet) was developed as a computerized simulation of paper sheet accounting. In the subject of number processing applications (spreadsheet) the application used is Microsoft Excel.

Based on interviews with accounting teachers at SMK Negeri 1 Tempel, one of the productive subjects considered difficult for students to understand is the number processing applications (spreadsheet). This can be seen from the list of Final Semester Assessments (PAS) in the odd semester of the 2020/ 2021 school year. Based on the list of Final Semester Assessments (PAS), information was obtained that there were 18 students from 36 students in class X AKL 1, 13 students from 36 students in class X AKL 2, and 9 students from class X AKL 3 who did not complete the KKM score. The KKM score set for productive subjects in class X is 75. The teacher of the number processing applications (spreadsheet) subject said that the difficulty of students in understading the material was due to the application of a learning system in the network (online), so that students only got the theory, they could not practice directly using a computer. In addition, not all students receive Information and Communication Technology (TIK) subjects at the junior high school level. Thus, teachers still have to teach students about the basics of operating a computer, such as how to turn on a computer, how to use a mouse, and so on.

Learning media that are often used by teachers in number processing applications (spreadsheet) learning are still monotonous. As happened at SMK Negeri 1 Ngawi, the learning resources used are still limited to handouts, in the form of photocopies of materials and teacher modules (Prasetya, Y.D, 2016: 2). This also happened in SMK Negeri 1 Tempel. The media used are modules, both in the form of hardfiles and softfiles send via whatsapp. Learning media in the form of modules are considered less effective and less innovative. Number processing applications (spreadsheet) subjects are practical subjects, so learning media is needed to make it easier for students to understand the material, both in the theory and practice. Students are expected to often practice operating Microsoft Excel independently outside of class. Another problem found is that not all students have computers at home, so students cannot practice independently. Therefore, there is a need for more practical learning media innovations. Media that students can use anytime and anywhere, without having to use a computer.

Learning media that is being developed today is android-based learning media. The android-based learning media has various interactive learning features such as the

availability of interactive learning materials, animations and illustrations, simulations, as well as a collection of practice questions for understanding the concept (Edi Ismanto, 2017: 43). With these features, it can be used for the development of learning media in the subject of number processing applications (spreadsheet), which are practical subjects. So, these learning media can help students understand the steps in Microsoft Excel through the simulation feature in the form of video tutorials. In addition, in the subject of number processing applications (spreadsheet) there are several materials regarding the use of formulas or functions in Microsoft Excel. A collection of practice questions, it can make it easier for students to understand the concept of using formulas or function in Microsoft Excel. There are several advantages in using Android-based learning media. These advantages are that it can be accessed anytime and anywhere, can be designed as attractively as possible, and helps the implementation of the online learning process.

Based on the phenomenon that occured, researchers have an idea to develop innovative and creative media as an alternative source of student learning. The learning media is in the form of an android-based educational application. The application developed is ExceLearn. This learning media is more practical and can be used by students anytime and anywhere. The ExceLearn application contains materials, tutorial videos and quizzes. With the ExceLearn application, students are expected to learn the steps in Microsoft Excel without using a computer.

Based on these problems, the researchers are interested in conducting research with the title "Development of ExceLearn Android-based Learning Media on Number Processing Applications (Spreadsheet) Subject for 10th Grade Accounting and Financial Institutions of SMK Negeri 1 Tempel". The development of ExceLearn learning media is expected to help students understand the material on the subject of number processing applications (spreadsheet).

LITERATURE REVIEW

Number Processing Applications (Spreadsheet) Learning

Learning is a process of changing behavior for the better based on experience in interacting with the environment and other learning resources (Suyono, 2014: 13-14). According to Nyayu Khodijah (2014: 50), learning is a person's process of acquiring new competencies, skills, and attitudes through a process of training, experience and social interaction. Based on the definitions above, it can be concluded that learning is a person's process of acquiring new things

through experience and interaction with the environment.

Definition of learning according to Sugihartono, et al (2013: 81) is a process of gaining knowledge and experience due to individual interactions with other individuals, and with their environment. Meanwhile, according to Trianto (20^{10}: 17) learning is a conscious effort of the teacher to achieve the expected goals by teaching and directing student interactions with other sources. Based on this definitions, it can be concluded that learning is a process of interaction between individuals and interactions with their environment to gain knowledge and experience in order to achieve predetermined goals.

In the 2013 Revised Curriculum (K-13 Rev) there are number processing applications (spreadsheet) subjects for accounting and financial institution majors. A number processing program or spreadsheet according to Sodikin and Djarot Nugroho (2019: 3) is a computer application program commonly used by companies, organizations, and individuals to store and process data in the form of calculations in tabular form. Deky Noviar and Bimo Suciono (2013: 5) stated that "microsoft excel is one of the popular number processing/ spreadsheet programs and is widely used to help calculate, analyze, graph, and manage data".

Based on the definitions of learning and number processing applications (spreadsheet) above, it can be concluded that learning number processing applications (spreadsheet) is a process of interacton between individuals or individuals with their environment to gain knowledge and skills on how to use spreadsheet aplications.

Learning Media

Media according to Wina Sanjaya (2012: 57) is a tool used as an intermediary to convey messages or information from sources of information to recipients of information. Media is something that must exist in the learning process in order to achieve goals (Yudhi Munadi, 2013: 2). According to Wina Sanjaya (2012: 61) learning media are everything such as tools, environments, or activities that can be used to convey messages that contain education. The delivery of the message aims to change attitudes, increase knowledge, and skills.

Based on some of the definitions above, it can be concluded that learning media is an intermediary used to convey information to students in order to achieve learning objectives.

ExceLearn Android-based Learning Media

Interactive learning media according to Seels & Glasgow in Azhar Arsyad (2002: 36), is a learning system where students are asked to provide an active response and that response will determine the speed and

sequence of presenting the material. Meanwhile, Munir (2013: 88) states that in the interactive learning process, there are several forms of communication that occur during the delivery of material, namely one-way communication and two-way communication. The communication takes place between the material giver and students, where students are asked to provide responses to the material presented. Based on definition above, it can be concluded that interactive learning media is an intermediary tool used to deliver the material to the students. Students are asked to provide an active response to the material presented in order to achieve learning objectives.

Android is a Linux-based operating system that is open (open resource) and designed for touch screen mobile devices such as smartphones and tablet computers (Salbino, 2014: 7).

ExceLearn learning media is an interactive learning media based on android. The media can be used anytime and anywhere, because it uses a smartphone. The development of the ExceLearn learning media aims to make learning on the subject of number processing applications (spreadsheet) more interesting, so that students can understand the material easily.

The material contained in the ExceLearn learning media is material on Basic Competence 3.9 analyzing data based on semi-absolute, absolute, and logical formulas for number processing applications (spreadsheet) subjects. ExceLearn learning media contains material, video tutorials, and practice questions. The practice questions presented in the ExceLearn learning media are divided into 3 forms, namely true-false, fill in the blank, and sequence.

Research and Development

The research and development method according to Sugiyono (2015: 30) is a scientific way that someone does to produce a product through the process of research, planning, manufacturing, and product evaluation. In addition, Wina Sanjaya (2013: 129) also states that "Research and Development (R&D) is the process of developing and validating educational products". Based on that definition, the definition of the research and development is the process of making new products or improving existing products, from planning to testing the validity of the products developed.

There are 2 research and development models that will be explained, namely: 4D Models and ADDIE Models. The Four-D model stands for Define, Design, Development, and Dissemination. This research model was developed by Thiagarajan (1974). While the ADDIE model stands for Analysis, Design, Development or Production, Implementation or Delivery, and Evaluation. This research model was developed by Dick and Carry (1996).

RESEARCH METHODS

Development Model

The research method used in this research is research and development (R&D). Wina Sanjaya (2013: 129) states that "Research and development (R&D) is the process of developing and validating educational products". The product that will be developed in this research is in the form of an android-based learning media for number processing applications (spreadsheet) subject. The development model used in this research is the Four-D model. The Four-D model stands for Define, Design, Develop, and Disseminate which was developed by Thiagarajan (1974) in Endang Mulyatiningsih (2013: 195).

Development Procedure

The development model used in this research is the Four-D model. Based on that development model, there are four stages that must be carried out in the development of ExceLearn learning media, namely: (1) *Define*, the define stage is carried out to be able to analyze development needs, product development requirements, and appropriate research and development models. There are five steps in this stage, namely needs analysis, students analysis, task analysis, concept analysis, and purpose analysis. (2) *Design*, the design stage aims to design learning media in accordance with the results of the analysis that has been carried out at the define stage. At this stage, the researcher designs the media, starting from the material to be presented, selecting the media to be developed, selecting the instructional media format, and making the initial design of the media to be developed using storyboards. (3) *Develop*, after designing the learning media, at this stage the researcher developed the learning media and adapted it to the design that had been made. If the development of learning media has been completed, then the learning media will be validated or tested by media experts, material experts, and learning practitioners. The suggestions obtained from media experts, material experts, and learning practitioners are used to improve the developed learning media, than the learning media are tested on research subjects. The subjects in this research were 36 students of class X Accounting and financial Institution 1 SMK Negeri 1 Tempel. The development test was conducted to determine student responses to the ExceLearn learning media. (4) *Disseminate*, this stage is the last stage in the Four-D research model. The purpose of this stage is to disseminate the research products that have been produced on a wider scale. The way to disseminate the research products that have been produced is by hosting on Google Drive and spreading the Google Drive link through Instagram, Facebook, Twitter, and Whatsapp.

Place and Time of Research

This research was conducted in class X Accounting and financial Institution 1 SMK Negeri 1 Tempel which is located at Jalan Magelang Km. 17, Jlegongan, Margorejo, Tempel, Sleman, Yogyakarta. This research was conducted in stages from December 2020 to May 2021.

Product Trial Design

1. **Trial Design**

   Trials were carried out in this study twice, namely expert tests and field tests. Expert tests or validatiors carried out by experts, aim to strengthen and review the initial product and provide input for improvement. Field tests were conducted to test the quality of the product to be applied to students during the learning process.

2. **Trial Subject**

   The subjects in this research included class X Accounting and financial Institution 1 SMK Negeri 1 Tempel which consisted of 36 students, one Media Expert and one Material Expert namely a lecturer in the Accounting Education Department, and one Learning Practitioner namely an accounting teacher at SMK Negeri 1 Tempel. The object in this research is an ExceLearn Android-based Learning Media.

3. **Data Collection Techniques and Instruments**

   The types of data to be collected in this research are qualitative and quantitative data. The data collection technique used in this research was a questionnaire. According to Sugiyono (2015: 216) "questionnaire are instruments for data collection, where participants or respondents fill out questions or statements given by researchers". The questionnaire in this research was used to determine the feasibility of the learning media that had been developed. Questionnaires were administered and filled out by Media Experts, Material Experts, Learning Practitioners, and Students.

   The questionnaire on the feasibility of this learning media uses a Likert scale with a five-choice model (five scale). The alternative answers provided are Strongly Agree (SS), Agree (S), Less Agree (KS), and Disagree (TS), and Strongly Disagree (STS). Furthermore, to obtain quantitative data, scoring is done for each alternative answer. The scoring for the answers provided is SS (Strongly Agree) = 5; S (Agree) = 4; KS (Less Agree) = 3; TS (Disagree) = 2; STS (Strongly Disagree) = 1.

4. **Data Analysis Technique**

   Qualitative data in this research are in the form of suggestions and input from media experts, material experts, learning practitioners, and students regarding the developed learning media. The data was analyzed descriptively as an

improvement material in the development of ExceLearn learning media.

Quantitative data in this research were obtained through filling out questionnaires by media experts, material experts, learning practitioners, and students. The data analysis technique used is quantitative descriptive data analysis. Quantitative data analysis was used to determine the feasibility of ExceLearn learning media. The steps of data analysis carried out are as follows: (1) Scoring to change the qualitative assessment to quantitative with the following conditions:

Table. Scoring Rules with Likert Scale

Category	Score
SS (Strongly Agree)	5
S (Agree)	4
KS (Less Agree)	3
TS (Disagree)	2
STS (Strongly Disagree)	1

Source: Eko Putro Widoyoko (2015: 109)

(2) Tabulate/ recapitulate research data, (3) Calculate the average score of each aspect with the formula:

$$\bar{X} = \frac{\sum X}{N}$$

Information:

$\bar{X}$ = Average score

$\sum X$ = Total score

N = Number of test subjects

(4) Summing up the average score of each aspect, (5) Change the quantitative to qualitative assessment

Table. Converting Quantitative Data to Qualitative Data

Score Interval	Category
$4{,}2 < \bar{X} \leq 5{,}0$	Strongly Feasible
$3{,}4 < \bar{X} \leq 4{,}2$	Feasible
$2{,}6 < \bar{X} \leq 3{,}4$	Moderately Feasible
$1{,}8 < \bar{X} \leq 2{,}6$	Unfeasible
$1{,}0 < \bar{X} \leq 1{,}8$	Strongly Unfeasible

Information:

$\bar{X}$ = Average score

Source: Eko Putro Widoyoko (2015: 112)

RESEARCH RESULTS AND DISCUSSION

Description of Research Location

The research on the development of ExceLearn learning media was carried out at SMK Negeri 1 Tempel which is located at Jalan Magelang Km. 17, Jlegongan, Margorejo, Tempel, Sleman, Yogyakarta 55552.

Description of Research Subjects

The subject involved in this research were Mr. Eka Ary Wibawa, S.Pd., M.Pd., (Lecturer of Accounting Education FE UNY) as a material expert, Mr. Endra Murti Sagoro, S.Pd., S.E., M.Sc., (Lecturer of Accounting Education FE UNY) as a media expert, and Mrs. Suwartini, S.Pd., (Accounting Teacher at SMK Negeri 1 Tempel) as learning practitioner, as well as students of class X Accounting dan Finance Institutions 1 SMK Negeri 1 Tempel, totaling 36 students as users.

Description of Research Time

The development of the ExceLearn learning media was carried out for 6 months, from December 2020 to May 2021. The research procedure for the development of this learning media consisted of several stages, namely: Define (December 2020), Design (December 2020-January 2021), Develop (January 2021-April 2021), and Disseminate (April 2021-May 2021).

The Development of ExceLearn Android-based Learning Media

The development of ExceLearn Android-based Learning Media uses the 4D development model developed by Thiagarajan in 1974. Based on Endang Mulyatiningsih (2013: 195-199), there are 4 stages of development in the 4D development model, namely defining stage, design stage, develop stage, and dissemination stage.

1. **Define**

   The definition stage is carried out to be able to analyze the needs and problems that occur in the learning process on the subject of Number Processing Applications (Spreadsheet) in class X Accounting and financial Institutions at SMK Negeri 1 Tempel. There are 5 steps carried out in this stage, namely: Needs Analysis, Student Analysis, Task Analysis, Concept Analysis, and Purpose Analysis.

   Based on the results of an interview with an accounting teacher at SMK Negeri 1 Tempel, the accounting teacher explained that the learning process at SMK Negeri 1 Tempel is currently carried out online (on a network), so there is no face-to-face interaction between teachers and students. Teaching and Learning Activities (KBM) for number processing application (spreadsheet) subjects are only carried out through WhatsApp chat, there is no learning by e-conference. The media used are handbooks (LKS) and material soft files sent through the WhatsApp Group. At each meeting, the teacher conveys the material to be studied, and students are given practice questions related to the material being taught. The teacher admitted that he had difficulty explaining the subject matter of number processing application (spreadsheet) with an online system, because before the COVID-19 pandemic, the teacher could explain directly to students and could use the computer laboratory facilities provided by the school for practice. Currently, not all students can practice number processing application (spreadsheet) materials directly because not all students have computers at home.

   Based on these problems, it is necessary to develop creative and innovative learning media as an alternative source of student learning. The development of learning media is

expected to assist teachers in delivering the material. In addition, it is also expected to make it easier for students to understand the material, both theory and practice.

2. **Design**

The design stage aims to create a learning media design that is in accordance with the results of the analysis at the definition stage. There are 4 steps carried out in this stage, namely: Test Preparation, Selection of Learning Media, Selection of Learning Presentation Forms, and Initial Design.

At the test preparation stage, the preparation of materials, questions, and answers in this learning media refers to various references. The preparation of the questions is accompanied by the preparation of the answer key. In the ExceLearn learning media there are several types of questions, namely the type of sequence question, short answer question, and true false question. The preparation of materials, questions, and answer keys were then validated by a material expert, namely Mr. Eka Ary Wibawa, S.Pd., M.Pd., (Lecturer of Accounting Education Department, FE UNY). The inputs and suggestions given by the material experts are used as material for improving both material, questions, and answer keys.

In the selection of learning media stage, the media chosen is media that can contain material, video tutorials, and practice questions in it. In addition, the selection of media is based on the need for accounting learning media, especially in the subject of number processing applications (spreadsheet) that can help students to understand the material. The media is expected to make it easier for students to learn in the midst of the COVID-19 pandemic by implementing online teaching and learning activities (KBM). Therefore, the selected media is mobile learning in the form of interactive learning media.

After choosing the media, namely interactive learning media, the researchers chose the format and software used in making the learning media. The format chosen is android-based interactive learning media. The consideration in choosing this format is that android-based learning media can contain material, video tutorials, and practice question in it, and can be used by students anytime and anywhere. It also supports teaching and learning activities (KBM) which are carried out with an online system, so that students can use their smartphones more optimally for learning. The software used to create interactive media based on android is Adobe Flash CS6.

The initial design of the ExceLearn Android-based Learning Media began with the preparation of materials, the preparation of questions and answers, the creation of an application logo, and the creation of a media design (storyboard).

3. Develop

At the development stage, a media assessment was carried out by 1 lecturer as a media expert, 1 lecturer as a material expert, and 1 accounting teacher as a learning practitioner. The inputs and suggestions obtained from media expert, material expert, and learning practitioner will be used to improve the learning media that are being developed. After repairs were made, the learning media was then tested on students as research subjects.

The material expert in this research is Mr. Eka Ary Wibawa, S.Pd., M.Pd. He is one of the lecturers of the Department of Accounting Education FE UNY. The assessment carried out by material expert covers several aspects, namely material aspects, questions aspects, language aspects, and presentation aspects. Material expert also provide comments and suggestions for improvement regarding the material that will be included in the ExceLearn learning media.

The following table presents the results of the recapitulation of assessments by material expert in brief.

Table. Recapitulation of Material Expert Validation

No.	Aspect	Total Value	Average Value	Category
1	Material	47	4,7	Very Feasible
2	Question	34	4,9	Very Feasible
3	Language	24	4,8	Very Feasible
4	Presentation	14	4,7	Very Feasible
Total/ Average		**119**	**4,8**	**Very Feasible**

The media expert in this research is Mr. Endra Murti Sagoro, S.Pd., S.E., M.Sc. He is one of the lecturers of the Department of Accounting Education FE UNY. The assessment carried out by media expert covers several aspects, namely aspects of software engineering, aspects of visual communication, and aspects of learning. Media expert also provide comments and suggestions for improvement in the development of ExceLearn learning media. The following table presents the results of the recapitulation of assessments by media expert in brief.

Table. Recapitulation of Media Expert Validation

No.	Aspect	Total Value	Average Value	Category
1	Software Engineering	32	4,6	Very Feasible
2	Visual Communication	51	4,3	Very Feasible
3	Learning	25	4,2	Feasible
Total/ Average		**108**	**4,3**	**Very Feasible**

The learning practitioner in this research is Mrs. Suwartini, S.Pd. She is one of the accounting teachers at SMK Negeri 1 Tempel. The assessment carried out by learning practitioner covers several aspects, namely aspects of software engineering, aspects of visual communication, and aspects of learning. Learning practitioner also provide comments and suggestions for improvement in the development of ExceLearn learning media. The following table presents the results of the recapitulation of assessments by learning practitioner in brief.

Table. Recapitulation of Practitioner Validation

No.	Aspect	Total Value	Average Value	Category
1	Software Engineering	28	4,0	Feasible
2	Visual Communication	48	4,0	Feasible
3	Learning	44	4,0	Feasible
Total/ Average		**120**	**4,0**	**Feasible**

Before the ExceLearn learning media is disseminated, it is necessary to conduct a development test to determine student responses to the ExceLearn learning media. The development test was carried out in class X Accounting and financial Institutions 1 of SMK Negeri 1 Tempel, totaling 36 students. Due to the COVID-19 pandemic and teaching and learning activities (KBM) are carried out online, the development test is carried out online through the whatsapp group. Technically in the implementation of the development test, the researcher distributes a google drive link to students to download the ExceLearn application and provides guidance on how to install and use the ExceLearn application. After students install and use the ExceLearn application, students are asked to fill out a questionnaire via google form link that has been shared through the whatsapp group. The results of the recapitulation of the development test are shown in the following table.

Table. Recapitulation of Development Test

No.	Aspect	Total Value	Average Value	Category
1	Software Engineering	948	4,4	Very Feasible
2	Visual Communication	1.900	4,4	Very Feasible
3	Learning	1.151	4,6	Very Feasible
Total/ Average		**3.999**	**4,4**	**Very Feasible**

4. Disseminate

After the learning media is tested for development, the next stage is the dissemination stage. ExceLearn learning media is hosted through Google Drive, then the link from Google Drive is shared throught the researcher's social media posts. The social media include Febriyanti Ratnasari's facebook, twitter @febriyrs, WhatsApp Story, and Instagram @febriyrs.

Discussion of Research Results

The development of ExceLearn Android-based Learning Media uses the 4D development model developed by Thiagarajan in 1974. Based on Endang Mulyatiningsih (2013: 195-199), there are 4 stages of development in the 4D development model, namely defining stage, design stage, develop stage, and dissemination stage.

The feasibility of the ExceLearn Android-based Learning Media can be determined through two stages, namely the assessment carried out by experts and development tests. Expert assessment is carried out by one material expert, one media expert, and one learning practitioner. The expert's assessment of the ExceLearn Android-based Learning Media as a whole obtained an average value of 4.5 which was included in the very feasible category for use as a learning media.

The development test was carried out in class X Accounting and financial Institution 1 of SMK Negeri 1 Tempel, totaling 36 students. Based on the results of the overall development test, the ExceLearn Android-based Learning Media obtained an average value of 4.4 which was included in the very feasible category to be used as a learning media.

The final product of this research is an ExceLearn android-based learning media with material for analyzing data based on semi-absolute, absolute, and logical formulas. The ExceLearn learning media contains materials, tutorial videos, and quizzes. Quizzes in the ExceLearn learning media are quite varied, namely true/false quizzes, short answers, and sequences. The display on the ExceLearn learning media is presented with a simple and attractive appearance, dominated by green.

The advantages of ExceLearn learning media include: (1) ExceLearn learning media is a learning media that can be installed on a smartphone so that it can be used anytime and anywhere, (2) The display of the ExceLearn learning media is simple but attractive, (3) ExceLearn learning media presents three types of quizzes, namely true/false, short answer, and sequences.

The weaknesses of ExceLearn learning media include: (1) The material contained in the ExceLearn learning media only includes one basic competency (KD), namely analyzing data based on semi-absolute, absolute, and logical formulas. (2) The speed in the tutorial video playback depends on the internet network. (3) The display of the learning media cannot be rotated to landscape. (4) Playing the full version of the video tutorial must open a browser, it doesn't play directly on the application.

CONCLUSIONS AND SUGGESTIONS

Based on the results of research and development, it can be concluded several

things as follows: (1) The development of *ExceLearn* Android-based Learning Media on Number Processing Applications (Spreadsheet) Subject for 10th Grade Accounting and Financial Institutions of SMK Negeri 1 Tempel has been developed with Four-D model. In the Four-D development model there are 4 stages carried out, namely the Define, Design, Develop, and Disseminate stages, and (2) The assessment of the feasibility of the development of *ExceLearn* Android-based Learning Media on Number Processing Applications (Spreadsheet) Subject for 10th Grade Accounting and Financial Institutions of SMK Negeri 1 Tempel by experts obtained an average score of 4.5 which is included in the strongly feasible category, and the results of the development test obtained an average score of 4.4 which is included in the strongly feasible category.

Based on the research and development that has been done, there are still many weaknesses in the ExceLearn Android-based Learning Media. Therefore, the researcher provide suggestions that can be used for further research and product development as follows: (1) The material contained in the learning media should be more complete, not just one basic competency (KD), (2) Learning media needs to be developed again by adding features that can be directly connected to Google spreadsheets, (3) It is recommended that further product development be carried out with the Iphone operating system (ios), not only limited to the Android operating system, and (4) Further research should also measure the level of effectiveness of the use of learning media.

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