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Expert Judgement Android Package Kit to Improve Mathematical Problem Posing of Prospective Teachers

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ABSTRACT

This study aims to obtain a valid learning media that is used to improve the ability to submit mathematical problem candidates for mathematics teachers based on the Android Package Kit (APK). This research method is included in the research development. Retrieval of data using a questionnaire and legibility test instrument. The results of expert judgment in this study indicate that the developed media is valid and is used with little revision. Hopes for the future, after being implemented in learning are expected to be able to improve the mathematical problem posing ability of prospective mathematics teachers.

***Keywords :** expert judgment, APK, prospective teachers*

1. INTRODUCTION

2018 is a special year for the advancement of education in Indonesia, because for the first time teachers play a role in making the National Standard School Exams, which is 75% of teachers and 25% of the Ministry of Education and Culture. The Minister of Education and Culture in 2017 said that in the 2018 USBN mechanism, teachers would be involved to improve the ability of teachers to refer to national standards [1]. Minister of Education and Culture advised that the teachers do not play around in making USBN questions. "The Ministry of Education and Culture exam questions are as anchors, they should be used as a reference for making other questions" [2]. Unfortunately, many teachers are not ready to make questions that are in accordance with Graduates Competency Standards (SKL). This is consistent with the statement of the Minister of Education and Culture that the majority of teachers are not biased to make quality questions [3]. Various efforts to bridge these problems, one of which is to train teachers to make questions with HOTS standards [4]. At USBN, we ask teachers to write essays or essay questions. The portion is around 10 percent of the whole problem [5].

Thus the independence of college students needs to be demanded so that college students are more active and creative in following the learning process, in order to foster the nature or character of college students. For example honest, hard working, and responsible. One form of activity that can be done by using android-based media. It is undeniable that rapidly advancing technology must be anticipated as early as possible both by the instructor (lecturer) and students. Because by adapting the development of technology, the learning process will be formed. Adaptation of the use of technology referred to in this study with the use of Android-based learning media in the form of APK development. With android-based learning college students are expected to be able to make questions or submit problems.

In addition to the needs of teachers today, the ability to make questions / raise important issues is owned by teachers and prospective teachers everywhere, this is in accordance with the statement [6]; [7]; and [8] that the development of mathematical abilities requires creative imaginative abilities which include developing when raising new questions, creating new opportunities, and looking at old questions from new perspectives. [9]; [10]; [11]; [12] MPP can improve the quality of student learning outcomes. [13]; [14] MPP helps teachers in building, constructing, and broadening their understanding. By maximizing MPP since studying, it is hoped that when becoming a teacher, it can create good mathematical problems and HOTS standard.

To support the achievement and improvement of the MPP of prospective teachers, it is necessary to develop media that are close to the life of the prospective teacher and can be installed on Android-based smartphones. [15]; [16]; [17] said that APK can provide the right insights to the right people to anyone and anywhere. In this study not only developed an APK containing mathematical content

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that has been developed by several developers so far, but emphasizes the development of APK that can train prospective mathematics teachers to be able to submit mathematical problems with HOTS standard.

Prospective Professional Teachers can be formed with the Reflective Microteaching Model that has been developed [18]. Calculus Based Learning E-Learning To Grow Creativity and Character Students prospective teachers [19]. Implementation of Development of Learning Media Using Macro Media Flash Professional effectively [20]. The use of geogebra is effective against problem posing [21]. The Effectiveness of Blended Learning Based on Local Wisdom in Mathematics Learning [22]. Effect of Problem Based Learning and Discovery Learning Against Mathematical Problem Posing of Junior High School Students [23]. Development of mathematical resilience for math teacher brokers [24]. Moodle learning works effectively for prospective mathematics teachers [25]. Mobile Phone Application can improve students' mathematical critical thinking abilities and dispositions [26]. Misconceptions occur in prospective mathematics teachers before practice in the field [27]. The need for resilience of mathematics teacher candidates for the development of mathematics learning media [28]. After comparing with the research that has been done, it is clear that this research has significant differences (differentciation) and has a novelty because this research uses technology that is close to student teacher candidates, does not require other devices to run it and can help improve the ability to submit problems mathematically, which is very necessary to become a professional teacher and in accordance with the demands of the times.

2. METHODOLOGY

Lots of research on android based learning including: [29]; [30]; [31]; [32]; [33]; [34]; [35]; [36]; [37]; [38]; [39]; [40]; [41]; [42]; [43]; [44]; [45]; [46]; [47]. Researchers have tried to create learning media that are used to improve learning outcomes, but have not made an Android-based learning media that can help improve the mathematical problem posing ability of prospective teachers. So it is necessary to do this research as an initial step of development before entering into limited trials and extensive trials, where the stages of research conducted by researchers adopt the procedure of developing the 4-D model (Four D model) popularized by Thiagarajan consisting of four stages, namely defining , planning, development and dissemination. This research is only up to development in the revision section after the validation of experts.

3. RESULT AND DISCUSSION

The stages of research that have been carried out can be explained in detail as follows:

3.1. Defining Phase

Activities carried out at this stage are preceded by a preliminary analysis carried out and contain preliminary studies conducted to plan work programs that have been carried out in the form of developing APKs for prospective mathematics teachers to improve the ability to submit mathematical problems, followed by student analysis, concept analysis, task analysis and specification of learning objectives through interview methods with supporting teacher and student resource persons.

3.2. Planning Phase

At this stage, media development research is carried out in the form of APK (Android Package Kit) learning with mathematical problem posing. APK-based learning tools in this research are: APK story board (Android Package Kit), APK (Android Package Kit), and instructions for using APK (Android Package Kit). The instruments developed are: APK story board validation sheets, APK validation sheets, and APK usage validation sheets. The indicators of the learning device validation sheet include: APK storyboards, APKs, and instructions for using the APK described as follows:

a. Story Board APK
   1) Complete the APK story board component.
   2) Fill in the APK story board.
   3) Compliance with the objectives of the learning device.
   4) Proportion of views.
   5) Layout Story Board.
   6) Writing the story board APK.
   7) The language component in the APK story board.

b. APK *(Android Package Kit)*
   1) Completeness of APK components.
   2) Fill out the APK.
   3) APK compliance with learning objectives.
   4) The truth of the APK concept.
   5) Material component of the APK.
   6) Writing model in APK.
   7) The language component in the APK.

c. Instructions for Using APK
   1) Complete the components of instructions for using APK.
   2) Fill in the APK usage instructions.
   3) The suitability of the APK usage instructions with the learning device.
   4) The truth of the concept of usage instructions APK.
   5) Components of the APK usage assessment component.
   6) Writing the APK instructions for use.
   7) The language component in the APK usage instructions.

3.3. Development Stage

The activities carried out in succession are expert validation, collect data on the assessment and input / suggestions for improvement from the validators, describing the results of general evaluations of the validators, and selecting and considering various corrections and suggestions for improvement from the validators.

The results of expert validation can be seen in Table 1.

Table 1 Results of Average Value of Expert Validation

		1	2	3	4	5	Average	Criteria
Average Value	*Story board*	3,25	3,13	3,63	3,13	3,13	3,25	Well
	APK	3,13	3,00	3,13	3,00	3,00	3,02	Well
	Instructions for use	2,91	3,09	3,09	2,91	3,09	3,05	Well
	Average Total						3,10	Well

From Table 1 it can be seen that for the validation of the storyboard of the five validators the average is 3.25; APK validation the average is 3.02; validation of usage instructions the average is 3.05 out of a maximum value of 4.

Based on the results of the expert validation of the learning device the results obtained in the form of suggestions for improvement are as follows:

3.3.1 Validation of APK story boards

The validation results for the storyboard, the validator says the storyboard is good (Table 1) and can be used with revisions. Based on expert validation, some revisions made to the storyboard can be seen in Table 2.

Table 2 Revision of Storyboard Based on Input from Validator

Before Revision	After Revision
1) The APK storyboard design is unclear	1) APK storyboard design is made more attractiv
2) Graphics and colors are not very attractive	2) The graphics and colors have been changed to be more attractive
3) The authorship design is less attractive	3) The authorship and font have been changed to be more interesting
4) The explanation is unclear	4) An explanation of the APK storyboard is clear

3.3.2 Validation of APK

The validation results for the APK, the validator says the APK is good (Table 1) and can be used with revisions.

Based on expert validation, some revisions made to the APK can be seen in Table 3.

Table 3 APK Revision Based on Input from Validator

Before Revision	After Revision
1) APK is less interesting	1) The APK is made more interesting
2) APK why is there no music	2) Already given music on the application
3) There is no media title yet	3) There is already a media title namely MPP (Mathematical Problem Posing)
4) The color selection design is not suitable and the display is lacking	4) The color selection design has been changed to be more attractive
5) Which part can improve	5) This application is a tool for learning tools such as a pocket book that can be taken anywhere to study because it is based on Android
6) There is no icon image for the application	6) Already given an image for the application icon

3.3.3 Validation of instructions for using APK

The validation results for the instructions for using the APK, the validator says the instructions for using the APK are good (Table 1) and can be used with revisions. Based on expert validation, some revisions made to the instructions for using APK can be seen in Table 4.

Table 4 Revised instructions for using APKs based on input from the validator

Before Revision	After Revision
1) Most style fonts	1) Font style has been adjusted and reduced in type
2) Directions for use are still unclear	2) It has been clarified in the use of APK
3) Lack of detail in the explanation for each button function	3) Explanations for each key function have been clarified

4. CONCLUSION

The conclusion of this research is APK-based learning media (Android Package Kit) to improve the ability to submit mathematical problems for prospective mathematics teachers to solve and provide a new problem to their students.

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