Development of mobile learning: Basis of ethnopedagogy of Baduy Community, Banten Province

N Rochmah*, U Cahyana and A Purwanto
Magister Pendidikan Kimia, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Negeri Jakarta, Jl. Margonda Raya No.11, Kec. Pulo Gadung, Kota Jakarta Timur, Indonesia

*nur.rochmah@untirta.ac.id

Abstract. Educational development in the Industrial Revolution 4.0 and the law of the Republic of Indonesia No. 11 of 2019 (National System of Science and Technology) can affect digital learning. In regard to this, it is necessary to develop an instructional media mobile that is interactive towards the development of technology based on the traditional and cultural knowledge. This media development was systematically designed phases such as preliminary phase analysis of material needs and characters of the students; and phase of developmental design using flash devices based on the traditional and cultural knowledge of Baduy Community. The next phase was validation and material review by the experts: 3 Chemical Engineering lecturers, 2 Chemical Teachers and 3 Communication Science lecturers. Should the media claimed to be valid, trial was conducted by researchers. Media trial and revision on a small group comprised of 10 students and 2 teachers. Then, it was followed by a larger group comprised of 70 students and 3 teachers. The result analysis of the media validation test is based on 26 Likert scale questions using SPSS tools and two open-ended questions. The result is valid with a significance <0.05 with a Cronbach's Alpha value of 0.877> 0.05 (Reliable).

1. Introduction

Communicative and interactive content delivery can improve the quality of education [1]. Education itself is considered as a multidisciplinary, an intradisciplinary knowledge and a cross-discipline [2]. Based on the Law of the Republic of Indonesia number 11 of 2019 on the National System of Science and Technology article 4 states that the National System of Science and Technology recognizes, respects, develops and preserves the diversity of traditional knowledge, local wisdom, natural and non-natural resources and culture as part of national identity. One of the Indonesian cultural identities can be found in Banten Province, it is the indigenous tribe of Baduy [3,4].

A learning activity does not always guarantee students to learn [5]. Nowadays, the use of mobile leaning is a fun way to learn for students. The development of ethnopedagogy-based mobile learning in the Baduy community can help students understand the learning content. It relates contextually to Banten culture in general with the knowledge of local traditions of Baduy people who live in nature.

Mobile learning is an educational innovation in learning methods. It includes the formulation of the organization of teaching materials, the delivery strategy and management of activities by taking into account the goals, obstacles, and characteristics of students to obtain an effective, efficient result and most importantly can generate learning attraction [6]. For such reason, using a mobile learning based
on the ethnopedagogical context to the Baduy Community in Banten Province is sought to be an effective approach for students.

Mobile learning is one way of learning to utilize technology and mobile devices. Thus, students can access learning content anywhere and anytime [7]. The concept of this gadget-based learning is the availability of teaching materials with interesting visuals or features. Meanwhile, ethnopedagogy is a practice of education in accordance to a local wisdom driven from the cultural values of an ethnic group and this becomes the standard of student behavior [8]. The complexity of this pedagogical study includes the relationship between culture, classroom, policy, practice, teacher, learner and public and personal knowledge; those differentiate between pedagogy and instruction [9].

Local traditions of Baduy people who live in nature [10]. Using buntiris leaves (kalanehe pinnata, crossulaceae) for a cold by rubbing it simply on the surface of affected area [2,11]. For how many years, Baduy community has applied multidisciplinary field for agricultural practices such as knowledge in ethnochemistry, ethnobotany, ethnomathematics and ethnoastronomy [12]. This multidisciplinary can be seen from the unused of synthetic pesticides, instead natural pesticides are applied such as noni fruit through a simple extraction. In addition, for fertilizing the soil, Baduy community use Paraserianthes (Albizia) Falcatarian which trees can grow quickly by nitrogen fixing. To store the crops, it is stored in a place called "leuit" which is carefully designed for an anti-rat design with wooden circles on the feet that are made slippery [13].

2. Research methods
The study was conducted to design, develop and examine the feasibility of mobile learning based on the approach of ethnopedagogy of Baduy community.

Figure 1. Flowchart of the research and development (R n D).
The development of media of mobile learning on the basis of ethnopedagogy of Baduy community was conducted in several stages. The first one is a preparatory analysis stage that is data collection of characteristic analysis of material and students of SMA Negeri 3 Kota Serang, Banten. The next one, developmental stage learning using flash media based on the results of preliminary analysis. Next was done some steps namely validation test and expert review on material from 3 chemistry lecturers, 3 chemistry teachers and for the media was done by 3 communication science lecturers. Afterwards, continuous revision was conducted with experimental stage by experts, experiment and revision by a small group of 10 students and 2 chemistry teachers. Lastly, experiment and revision by a big group of 70 students and 3 chemistry teachers.

3. Developmental design of mobile learning
Figure 2. Developmental design of mobile learning on the basis of ethnopedagogy of Baduy community was carried out by flash application. Inside the application, (a) basic introduction analysis on the development of learning objective, (b) and (c) review of previous lessons, (d), (e), (f), strategy and learning materials as well as students’ test result (g) and (h).

![Figure 2. Design of mobile learning on the basis of ethnopedagogy of Baduy Community.](image)

4. Analysis of validation and design experiment
Analysis of validation test and reliability utilize SPSS application. Validation is an index that the measuring instrument actually measures what is being measured [14]. This shows the extent to which
the measurement result to remain consistent then it was done twice or more towards similar state and similar measuring instrument [15].

**Table 1. Validation test of materials, experiment and questions.**

| No | Statement                                                                 | Coefficient Correlation | Sig      | Remarks |
|----|---------------------------------------------------------------------------|--------------------------|----------|---------|
| 1  | Materials and questions on media are easy to understand                   | 0,907                    | 0,000    | Valid   |
| 2  | Materials, experiment and questions on the media are clear                | 0,852                    | 0,000    | Valid   |
| 3  | Materials provided are complete and systematic                           | 0,874                    | 0,000    | Valid   |
| 4  | Discussion on questions corresponds to the questions on the media         | 0,912                    | 0,000    | Valid   |

Table 1 appoint the Materials, Experiment and Questions of mobile learning to be valid with a significance of 0,000.

**Table 2. Validation test on the language use.**

| No | Statement                                                      | Coefficient Correlation | Sig            | Remarks |
|----|----------------------------------------------------------------|--------------------------|----------------|---------|
| 1  | Language used is not ambiguous                                  | 0,865                    | 0,000          | Valid   |
| 2  | Language used is simple and communicative                       | 0,718                    | 0,000          | Valid   |
| 3  | Language used is grammatically correct and appropriately diction| 0,763                    | 0,000          | Valid   |

Table 2 appoint the Test on the Language Use of mobile learning to be valid with a significance of 0,000.

**Table 3. Validation test on audio-visual.**

| No | Statement                                                      | Coefficient Correlation | Sig  | Remarks |
|----|----------------------------------------------------------------|--------------------------|------|---------|
| 1  | Layout is appropriate                                          | 0,800                    | 0,000| Valid   |
| 2  | Layout placement is well organized                             | 0,704                    | 0,000| Valid   |
| 3  | Background used is appropriate                                 | 0,702                    | 0,000| Valid   |
| 4  | Colours used are appropriate and eye-catching                  | 0,673                    | 0,000| Valid   |
| 5  | Images are able to see clearly                                 | 0,794                    | 0,000| Valid   |
| 6  | Writings are able to read well                                 | 0,683                    | 0,000| Valid   |
| 7  | Fonts are able to read well                                    | 0,717                    | 0,000| Valid   |
| 8  | Font size is correct with the layout                           | 0,715                    | 0,000| Valid   |

Table 3 appoint the Test on Audio-visual of mobile learning to be valid with a significance of 0,000.

**Table 4. Validation test on the device implementation.**

| No | Statement                                                      | Coefficient Correlation | Sig  | Remarks |
|----|----------------------------------------------------------------|--------------------------|------|---------|
| 1  | Sound/music is appropriate                                     | 0,668                    | 0,000| Valid   |
| 2  | Navigation and symbol on the media are consistent and easy to learn| 0,864                    | 0,000| Valid   |
| 3  | Media is easy to operate                                      | 0,675                    | 0,000| Valid   |
| 4  | Quality of media is good                                      | 0,852                    | 0,000| Valid   |
| 5  | Media is able to use repeatedly                                | 0,729                    | 0,000| Valid   |
Table 4 appoint the Test on the Device Implementation of mobile learning to be valid with a significance of 0.000.

Table 5. Validation benefits.

| No | Statements                                      | Coefficient Correlation | Sig    | Remarks |
|----|-------------------------------------------------|--------------------------|--------|---------|
| 1  | Media result assists students to remember the materials | 0.775                    | 0.000  | Valid   |
| 2  | Media result assists students to understand the materials | 0.841                    | 0.000  | Valid   |
| 3  | Media *mobile learning* is able to use outside the school hour | 0.672                    | 0.000  | Valid   |

Table 5 appoint the benefits of mobile learning to be valid with a significance of 0.000.

Table 6. Reliability test on mobile learning reliability.

| No | Aspect                              | Cronbach Alpha | Remarks |
|----|-------------------------------------|----------------|---------|
| 1  | Materials, Experiment and Questions | 0.781          | Reliable|
| 2  | Language                            | 0.677          | Reliable|
| 3  | Audio Visual                        | 0.877          | Reliable|
| 4  | Media Implementation                | 0.804          | Reliable|
| 5  | Expediency                          | 0.649          | Reliable|

Table 6 appoint of mobile learning to be reliable with a range Cronbach alpha 0.6 – 0.8.

5. Conclusion

Research on developing mobile learning with the basis of ethnopedagogy is fundamentally conceptualized on the improvement of learning quality from the students. It will definitely bring a fun learning using mobile device that is based on the local wisdom of Baduy Community - one way to apply a conceptual approach for the students. The development of mobile learning using flash application was validated and experimented. Using SPSS application, the result shows valid number of sig. 0.00<0.05 and the reliability was proved showing Cronbach Alpha that is bigger than r table. Furthermore, its significance resulted in 5%.

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