Validity of Simple NOMIC Game Based Android as Learning Media on Nomenclature of Inorganic Compounds

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Abstrak. Penelitian ini bertujuan untuk memperoleh permainan berbasis android Simple NOMIC yang valid sebagai media pembelajaran pada materi Tata Nama senyawa anorganik sederhana. Metode penelitian yang digunakan adalah metode penelitian dan pengembangan Research and Development (R&D) oleh Sukmadinata. Untuk mengetahui validitas, penelitian ini hanya dilakukan sampai pada langkah reviu di tahap studi pendahuluan. Validitas diperoleh dari penilaian permainan Simple NOMIC oleh tiga validator. Berdasarkan hasil penelitian, permainan Simple NOMIC memperoleh persentase validitas isi sebesar 83% dan validitas konstruk sebesar 86%. Validitas isi dan Validitas konsruk, keduanya termasuk dalam kategori sangat valid karena persentase yang diperoleh ≥ 61%.

Kata-kata kunci: Validitas Permainan *Simple* NOMIC, Media Pembelajaran, Tata Nama Senyawa Anorganik Sederhana

Abstract. The aim of this research is to obtain Simple NOMIC game based android that is valid as a learning media on nomenclature of inorganic compounds. This research use a Research and Development (R&D) method by Sukmadinata. To find out the validity, this research was only carried out until the review step at the preliminary study stage. Validity obtained from the assessment of the Simple NOMIC game by the three validators. Simple NOMIC game obtained percentage of content validity 83% while construct validity obtained percentage 86%. Content and construct validity, both aspects of validity, including in a very valid category, because the percentage are ≥ 61%.

Keywords: Validity of Simple NOMIC game, Learning Media, Nomenclature of inorganic compound.

1. Introduction

Education is fundamental for everyone. Every human being has the right to get a better education. In accordance with Education system has regulated in law number 20 of 2003 concerning the national education system, it states that education is a conscious and planned effort to create a learning condition and learning process so that students actively develop their potential to have religious spiritual power, control self, personality, intelligence, noble character, and skills needed by him, society, nation and state [1]. The survey results from UNESCO in 2014 explained that Indonesia was at level 57 of 115 based on the assessment of the Education Development Index (EDI). The low level of education in Indonesia can cause low quality of Human Resources. To get high-quality human resources through education, the government designed an appropriate and accurate education curriculum. This is because the curriculum is an educational component that is a reference by every education unit both the manager and the organizer [2]. One of the efforts made by the government is the improvement of the education curriculum. In the globalization era in addition to the development of education, the progress of a nation can also be viewed from the use and development of Science and Technology. The rapid development of this technology can be used to improve the quality of education in accordance with one of the contents of the Graduate Competency Standards, for example the use of Android or a smartphone in the learning process as a learning media.

The rapid development of technology certainly has positive and negative impacts. For example, using Android or a smartphone that has a game application. Today there are many school-age children who are addicted to playing Android games. This will cause their learning activities to be disrupted and cause difficulties in learning. In order for these negative impacts to be overcome and minimized, it is necessary to develop an educational game which is usually called edugame (education-game). With the existence of edugame, the game that originally had a negative impact will be something more fun and useful for the learning media than the common game.

One of the chemical materials taught in 10th grade high school is nomenclature of simple inorganic chemistry. This matter are the subject of chemistry that requires students to be able to observe, understand, require accuracy and require a lot of memorization. In applying the IUPAC rules, students must understand and memorize the procedures for naming a particular compound.

Based on the results of the pre-study conducted at SMAN 1 Manyar Gresik on Thursday, October 4th, 2018 to 30 students of 11th grade stated that the average material on the whiteboard was the most frequently used media when teaching in class and 4% stated the teacher used power point media as a companion when teaching. This proves that the use of learning media that utilize information technology developments such as computers and Android is minimize. In addition, it also causes the learning process to be less attractive and tends to be boring because students are less involved in active learning. Then as many as 100% of students agree that an Android game is used as a media for learning Chemistry. In addition, in the study of Slamet &Hidayah, it was stated that one of the chemical materials that is difficult to understand is nomenclatue of simple compound names [3].

According to Alexandre& Almeida states that development of educational application games can merge the educational qualities of games and attractive technologies, making the traditional chemistry teaching process become much more interesting and effective to students when permeated with interactive technological tools [4]. Based on the description, it is necessary to hold an innovation to package the learning that is done so that students are more interested in learning Chemistry, especially in chemistry compound material using educational media. Therefore, there is a need for a learning media in the form of an Android-based media game on the Nomenclature of Simple Inorganic Compounds, Simple NOMIC.

Simple NOMIC game is a game based application was developed for android device using Construct 2D Platform. It is a bilingual (Bahasa Indonesia and English), and easy to play game that allowed students to review inorganics compound nomenclature. The main menu displayed at Figure 1.

Figure 1. Main menu of Simple NOMIC Game

Simple NOMIC is game that is modified from the Diamond Rush game that is tailored to the goals of chemistry learning. The Diamond Rush game itself is a game on a smartphone that can stimulate critical thinking in solving a problem. In the Simple NOMIC game there are volumetric flasks, diamonds, and gold crates containing questions of different types regarding

the Nomenclature of Simple Compounds. The player must be able to find the 3 components and must be able to pass the obstacles in his journey. As example the player gets gold crates in Figure 2 and then appear a question in Figure 3.

Figure 2. The player gets gold crates

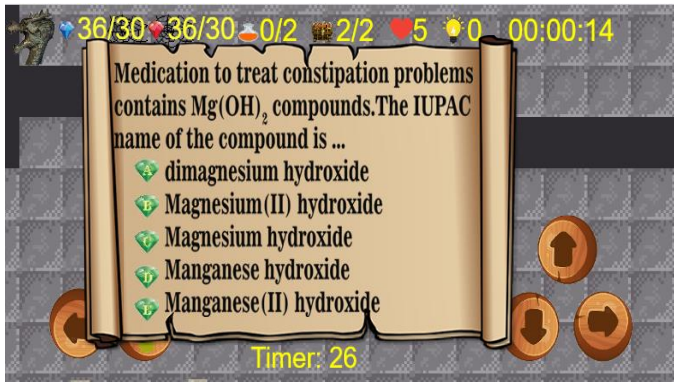

Figure 3. Appear a question about inorganics compound naming

This learning media is expected to facilitate students in understanding the Material of Simple Inorganic Compounds naming. This media can be applied at the end of learning as an enrichment to further strengthen students' memories so that the information they get on Simple Material Inorganic Compounds is not easily forgotten and can enter long-term memory.

2. Methods

This type of research is a development research with Research and Development (R & D) research method which refers to Sukmadinata. To find out the validity, this research was only carried out until the review step at the preliminary study stage.. The research instruments used included media review sheets, media validation sheets, student response sheets, and observation sheets for student activities. Methods of collecting data through questionnaire methods, observation methods, and test methods.

The results of the study of the game media obtained criticism and suggestions from reviewer that is one lecturer in chemistry, then the criticism and suggestions were followed up to improve the game media. The next stage is game media validation in terms of content validity and construct validity given to three validators which are two chemistry lecturers and one chemistry teacher giving assessment scores in the range 0-4 to the game media in accordance with the validation sheet. The validity of game media is calculated using a formula:

$$\text{Validity (\%)} = \frac{\sum total\ score}{\sum criteria\ score}\ x\ 100\%$$

Σ Criteria score = highest score of each item x the number of item x the number of validators

The percentage of validation data results determined using Likert Scale. The results of the assessment of the validity score that have been obtained are interpreted by using the developmental validity criteria as in Table 1 with the criteria of the developed game media scores being said to be valid if they meet the minimum valid criteria.

Table 1. Criteria for Interpretation Score

Percentage	Criteria
0% – 20%	Invalid
21% - 40%	Less Valid
41% - 60%	Valid Enough
61% - 80%	Valid
81% - 100%	Highlyvalid

[6]

Based on the score interpretation criteria, the developed game media can be valid if the validity aspect of the content and the validity of the constructs obtain a percentage of ≥61% [6].

3. Results and Discussion

Validation aims to determine the assessment of chemical lecturers and chemistry teachers on the validity of the game's developed media. There are two validity aspects including content and construct validity.

From the results of the assessment that has been carried out by three validators such as two chemistry lectures and one chemistry teacher obtained the percentage shown in Figure 1.

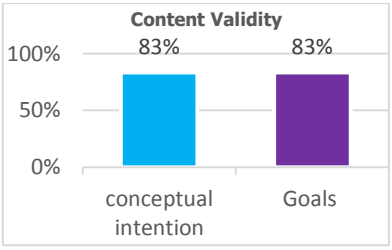

Figure 4. Content validity diagram

Content validity includes conceptual intentions and goals. Based on Figure 4 above, each indicator obtains a percentage of ≥ 61% so that when viewed from the validity of the content, the NOMIC Simple media game is declared valid. This is achieved because at the preliminary stage, that in the formulation of the product has been formulated the purpose of learning and refers to the Sudjana statement which explains that one of the benefits of using the learning media is the learning media is more clearly meaningful, students and enable them to master the material and achieve learning goals [7]. According to Sanjaya in addition to being in line with the purpose of learning, the media should also be in line with the characteristics of the material to be taught. Therefore the selection of the material on the game should be taken into account so that no false concept [8].

One component in the game is the existence of certain goals to be achieved [9]. In addition, one of the important principles in choosing learning media is in accordance with the learning objectives and the needs of students both in the form of media and the level of difficulty [10]. Therefore the material and questions about the game given to students must be in accordance with the learning objectives. The material on the Simple NOMIC game media is a summary of material accompanied by tables, animations and videos. The summary of the material used at each level is determined according to the learning objectives.

Construct validity in relation to the characteristics of IPA, conformity with student characteristics, rules, guiding, competition, requirements and strategies in play, there is a standard of success of students, challenging and actively involving participants's success,

providing feedback, display (color, font size and animation) and audio communication, the construct validity of the NOMIC Simple game is given in Figure 2.

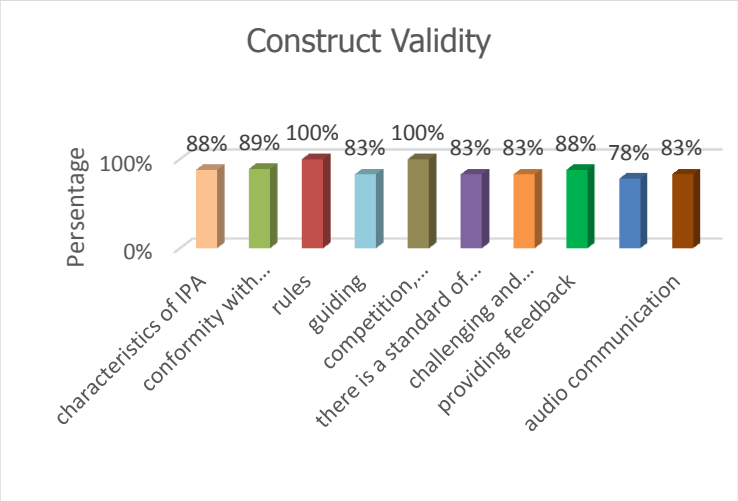

Figure 5. Diagram of Construct validity

Based on Figure 5 above, it is found that the NOMIC Simple media game viewed from the aspect of construct validity can be stated valid. On the aspect of characteristics of IPA got a validity percentage of 88%. This is because at the stage of compilation the game has been adapted to Ministerial Regulation Number 59 of 2014 state the purpose of the Chemistry learning is to raise awareness of the application of Chemistry that can be useful to both Indigenous people and the environment and to realize the importance of managing the community. In the aspect of conformity with the characteristics of the students, it has a percentage of 89%. Because it deals with chemical compounds, it must describe the symbols of elements, ions, compounds and molecular forms, it refers to Piaget Theory which states that the development of 11 years old and above include into cognitive development where students are easy to understand abstract things but still need help in the form of media that can concretize abstract things [11]. Furthermore, based on Junior, Nobre & Nascimento educational games have been established as increasingly popular way of learning in the classroom [12]. The existence of Simple NOMIC games that are audiovisual and in accordance with the learning styles of students are able to attract students to prefer to study Chemistry.

In the competition aspect get a percentage of 100%. This is because the game fosters a competitive attitude between students to be the best. according to Revell, students more easily accept chemical concepts when learning activities are combined with the use of games classrooms, and leads to a combination of students to make student performance better [13].

According to Sari & Rahma, android-based educational game that has special material and questions visualized with images and animations can improve student literacy [14]. So it's a something important to give an interesting pictures, animations and symbols in the education game. Based on Jones, Spichkova & Spencer mobile gaming can help students remember concepts because fun and interesting, mobile media is available there are attractive designs, music, challenges of different difficulty levels [15]. Thus, it can be concluded that the developed NOMIC Simple media game is valid because it is based on the validity of the content and construct validity, each obtaining the validity percentage ≥ 61%.

4. Conclusion

Based on the suitability between the research result and the problem formulation and the data analysis, it can be concluded that the Simple NOMIC Games developed as a media of learning on the Nomenclature of simple inorganic compounds are declared valid. The validity of

the assessment results obtained percentage of content validity 83% while construct validity obtained percentage 86%. Content and construct validity with valid criteria.

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