

DEVELOPMENT OF DOMINO CHEMISTRY GAME CARD MEDIA TO PRACTICE ANALYTICAL THINKING SKILLS OF STUDENTS IN CHEMICAL BONDING TOPIC OF CLASS X SEMESTER 1

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ABSTRAK

Penelitian ini bertujuan untuk mengembangkan permainan kartu Domino Kimia pada materi Ikatan Kimia untuk melatih keterampilan berpikir analitis siswa. Jenis penelitian ini adalah penelitian dan pengembangan. Sasaran penelitian ini adalah siswa kelas X IPA 2, SMAN 1 Krian dengan jumlah siswa sebanyak 29 siswa. Rancangan penelitian menggunakan "Research and Development (R & D)". Instrumen yang digunakan untuk mendeskripsikan Validasi media permainan kartu Domino Kimia adalah lembar Validasi, untuk mendeskripsikan keefektifan media permainan kartu Domino Kimia menggunakan lembar test keterampilan berpikir analitis dan lembar aktivitas siswa. Instrumen untuk mendeskripsikan Kepraktisan media permainan kartu Domino Kimia adalah lembar respon pengguna. Hasil penelitian ini menunjukkan bahwa rata-rata hasil validasi isi media permainan kartu Domino Kimia adalah 83,33%, sedangkan rata-rata hasil validasi konstruk media permainan kartu Domino Kimia adalah 86,11%. Hasil efektivitas media permainan kartu Domino Kimia diperoleh 86% siswa yang mengikuti pembelajaran dinyatakan tuntas. Hasil tersebut juga menunjukkan bahwa 100% siswa mengalami peningkatan dalam berpikir analitis. Keefektifan dari segi aktivitas siswa yaitu rata-rata sebesar 68,97% siswa melakukan aktivitas dengan sangat efektif, Hasil ini menunjukkan bahwa media permainan Domino Kimia efektif. Hasil kepraktisan dari hasil respon pengguna terhadap media. Rata-rata respon "Ya" pada media permainan Domino Kimia sebesar 87,19% dengan kategori sangat layak.

Kata Kunci: Domino Kimia, keterampilan berpikir analitis, ikatan kimia

ABSTRACT

The aims of this research is to develop a card game Domino Chemistry in Chemical Bonding topic to practice analytical thinking skills of students. In class X of SMAN 1 Krian Sidoarjo, during the learning process with media card games or dominoes Chemical analytical thinking skills can be practiced. The kind of this research is research and development. The target of this research is class X IPA 2, SMAN 1 Krian the number of students counted 29 students. The study design using the "Research and Development (R & D)". The instrument used to describe media Validation Chemistry Domino card game is Validity sheet, to describe the effectiveness of media Chemistry Domino card game using a test sheet analytical thinking skills and student activity sheets. Instrument to describe the media Practicality Domino card game Chemistry is user response sheet. The results of this study showed that the average results of the validation card games or media content Domino Chemistry is 83.33%, while the average results of construct validation Chemical Domino card games or media is 86.11%. The results of the effectiveness of the media card game Domino Chemical acquired 86% of students who take the learning otherwise completed. The effectiveness terms of student activity which is an average of 68.97% of students do activities with effective enough, for 29.31% of students do activities effectively, and amounted to 68.97% of students do activities with very effective. These results indicate that the media playing on Domino Chemical effectively. Results practicality of the results of the user's response to the media. The average response of "Yes" answer in the media game Domino Chemistry of 87.19% with a very decent category.

Keywords : Domino Chemistry, analytical thinking skills, chemical bonding

INTRODUCTION

Various attempts can be done to achieve quality improvement of education such as, by improving the quality of learning processes and outcomes at every level and the level of education units. This needs to be realized to get the quality of Indonesian human resources that can support national development. That Efforts are responsibility of all educators. One of the compulsory subject in 2013 for high school curriculum subjects are chemistry. However, most students still consider chemistry as a difficulties subject . [1] Standard Content stated purpose of chemical subjects is to equip students with the knowledge, understanding a number of capabilities required to enter higher education and develop science and technology. The chemistry curriculum still includes some material that requires rote memorization, often including distinctions between superficially similar items. Mastering such material is seldom exciting and many students are reluctant to perform these tasks. Therefore, a method that would make these tasks more interesting is desirable. The use of games in the classroom provides a means of reviewing material in a stimulating and interactive format.

The chemical bond is one of the subjects chemistry class X High School and also a vast subject with concepts and descriptions. So on this subject required a serious understanding. But in fact, one of the teachers of SMAN 1 Krian Sidoarjo tenth grade students said that the average confusion in the study of chemical bonding materials because many abstract concepts in such material.

Based on the questionnaire that has been deployed in SMAN 1 Krian Sidoarjo, 80% student of 20 students at SMAN 1 Sidoarjo Krian states less teachers that use game as learning media. Teachers simply use the blackboard and traditional learning models. It thus causing boredom students which resulted in a decrease in students' motivation to learn the material.

A very important element in the process of teaching and learning is a

teaching method and medium of instruction in accordance with the material taught, these two aspects are interrelated. Reality on the ground with the demands of teacher professionalism, still got problem that many teachers who have little knowledge of instructional media as a means of supporting learning success. On the other hand, there are some teachers who are already utilizing instructional media, but the shape and style are outdated or not satisfactory success [2].

The media is a channel that connects information between the source and receiver of information. In this sense the media interpreted as a communication facility, which can clarify the meaning of the communicator and the communicant [3]. Thus, learning media in general is a tool the learning process. Everything that can be used to stimulate the mind, feelings, concerns and abilities or skills of students so as to encourage the learning process. One of the fun media is the media game.

Educational game media can be used as a medium in student learning. The objective of the game is as a tool for students to learn independently and create a recreational atmosphere for students, thus learning more interesting. It should be noted that the media used games is not just a recreational game but also a game that is able to broaden students about chemical bonding material.

Similarly, the authors designed their chemical domino game media development as one of the alternative media in the learning process. Media games of chemical domino has been adapted from the domino game in general. The difference is that this chemical domino game lies in the cards where the cards contain the keyword in chemical bonding material. Students are trained to analyze the cards in order to play it.

The analysis covers the categories recognize, guess, count, categorize and more [4]. In chemical domino game, students are also invited to identify keywords that exist on the card, then also guess the card will fit when connecting it

with another card that is still associated with giving proper reasons

METHOD

The type of this research is research and development (R & D), which is researching and developing instructional media such as media card game Domino Chemistry to practice analytical thinking skills of students on the material chemical bonds from high school in the tenth grade MIA 2 SMA Negeri 1 Krian Sidoarjo .

Learning device used in this study is the syllabus and lesson plans, while instruments in the form of Validity sheet research, observation sheet student activities, student response observation sheet, sheet analytical thinking skills test, and the test sheet and analytical thinking.

Data collection method used is the method of observation, validation and testing. Observation method to collect data of student activity and students' response to the media playing on dominoes chemical, validation method is used to determine how the feasibility of chemical media domino game that has been developed, the test methods to collect data analytical skills. Assays were conducted as much as 2 times the initial tests before learning (pre-test) and test-final after learning (post-test).

The data analysis technique used is the validation analysis covering the content and construct validation, analysis of the effectiveness of chemical media dominoes game based on the improvement of students 'analytical thinking skills and student activities, as well as practicality analysis based on the observation of students' response to chemical media domino game.

RESULTS AND DISCUSSION

The result of this research include validity, effectiveness, and practicality.

Validity

The results of the validation analysis of the contents of which include the suitability of the subject in the media game of dominoes chemistry with learning

objectives with an average percentage of 70% to the category of good / decent. About the suitability of the premises game goal pembeajaran obtain a percentage of 90% and can be said to be very decent, and the percentage for the pretest and posttest about the suitability of the learning objectives is 90% and is said to be feasible.

Based on media procured classified into two types, namely the media so it has become a commodity trading and there are extensive dipasaran ready for immediate use (media by utilization), and media design because it requires specially designed and prepared for the purpose or specific learning objectives (media by design) [6]. Thus, the media must be developed in accordance with the learning objectives to be achieved. Suitability of media and learning objectives have been able to be seen from the results of the validation.

The results validate the contents of the acquisition value of chemistry faculty Mathematics and Natural Sciences and chemistry teacher SMAN 1 Sidoarjo Krian obtain a percentage of 83.33% and is said to be feasible.

Conformity with the media about the age of the students get a percentage of 100%, with a very decent category. While the suitability of the language at the level of understanding of the students get a percentage of 90% with a very decent category. The use of terms that are easily understood earn a percentage of 100% to the category of very decent. Clarity of letters and numbers to obtain a percentage of 90% with a very decent category. Harmony of color and design drawings card to obtain a percentage of 90% to 90% category. Quality card paper a matter of getting a percentage of 80%, with a decent category.

As for the validation question pretest and posttest were used to determine the test results of students based on compliance with the age of the student gets a percentage of 100% to the category of very decent. While the suitability of the language used by the students' understanding tingkan get a percentage of 100% to the category of very decent. The use of easily understood terms to obtain a percentage of 90% with a very decent category. Clarity of letters and numbers to obtain a percentage of 100% with a very decent category. Based on the cognitive level of the media can improve cognitive skills students gain a percentage of 90% with a very decent category.

Validation viewed from the aspect kependidikannya covering their learning activities by answering the question cards to obtain a percentage of 100% to the category of very decent. The game can melatihkan sportsmanship students gain a percentage of 80% with a decent category. Permainan can make students happy to get a percentage of 80% with a decent category. Permainan can melatihkan disciplined and responsible with a percentage of 90% with a decent sngat category. The game can melatihkan caring attitude and work hard to obtain the percentage of 90% with a very decent category.

Thus validating the contents of one lecturer of Chemistry and Chemistry teacher 1 SMAN 1 Sidoarjo Krian obtain a percentage of 86.11% to the category of very decent. This shows that the game is said to be a decent developed educational games. One aspect that shows the chemical is a domino game educational game that can improve the ability to think.

Effectiveness

The effectiveness of this research interns are the increasing of analytical

thinking skill and the student activity. This research is tested to 29 students of X MIA 2 State Senior High School 1 Krian Sidoarjo. This test includes pretest and posttest. The pretest is conducted before the student play the dominoes card game, while the post test is conducted after the student play the dominoes card game.

Students are said to have increased analytical thinking, if the test results of students analytical thinking there was an increase from the pretest to posttest results held after students perform Domino game Chemistry. Based on Bloom's taxonomy [7] analyzes (analysis) as well as divergent thinking is the ability describes a concept or principle in parts or components.

Group of subjects in science and technology aimed at developing logic, thinking and analytical abilities of participants [8]. So kesimpuannya that, in 2013 curriculum analytical thinking ability is one of the objectives to be developed. In the process of chemical domino game melatihkan analytical thinking skills reflected when students analyze domino obtained. Students must perform activities that reflect analytical thinking in the form recognize, categorize, compare and much more.

Pretest results carried out by the students of class X-MIA 2 SMAN 1 Sidoarjo achieve mastery kasikal Krian by 20.68%. The results of the pretest conducted after students perform chemical domino game increases. Classical completeness obtained is 86.21%. When the pretest there are only 6 students are finished, the posttest there is increasing that there are 25 students who completed, which means that there are four students who did not complete. If connected with student response sheet, the four students who did not complete was not highly interested in learning with media. This is reflected in their jawaban on student

response sheet. On the question "I would like to learn chemistry by using the game" they tick in the column are not. Here are the results of the pretest and posttest students.

Table 1 Gain Value

Category	The Number of Student	The Percentage of Student
High	8	27.60 %
Moderate	21	72.40 %
Low	0	0.00 %

Activity of students in learning activities is one of the principles of learning [9]. The value acquired 31.03% of students do activity A (Students show curiosity by reading the game rules carefully) with effective and 68.97% with very effective students. In the aspect of B (students do not ask questions about how to run a chemical domino game as a learning medium) 10.34% of students do quite effectively, 41.38% of students do so effectively and 48.28% of students do very effectively. The reason for the questions arise about how to play dominoes games or chemistry is because there are some students who have not ever know how to play dominoes real. Thus, they feel confused when researchers explain how to play dominoes chemistry.

In the aspect of C (students do not ask questions because they do not have difficulty in understanding the questions presented in the chemical domino game as learning media) are 34.48% of students do so effectively and 65.52% of students do very effectively. Based on these results, the media proved effective chemical domino game. The average student activity obtained 68.97% of students do activities with very effective. The use of appropriate media and varied education can overcome the passive nature of the students [10].

Practicality

The results of the analysis of media practicality chemical dominoes game seen

from the results of students' response to the media developed. Percentage of students' response to the media card chemical domino Good show results. Students are very interested and when the teacher announced initiatives will learn to use chemical dominoes.

Obtained 89.66% of students answered yes to the statement "the game is easy to understand instructions", 100% of students answered yes to the statement "The language used in the game is easy to understand", 79.31% answered yes to the statement "The material in games or easy to understand". One characteristic of instructional media, among others, is to facilitate communication between teachers and students in learning [11] therefore the clarity of language in the game is very important to help smooth communication.

Obtained 82.76% of students answered yes to the statement "How to play the game relatively easy". It shows that most students do not have trouble when playing a game of dominoes chemistry. Instructional media is actually just a tool which facilitate students and teachers in recognizing information or to master the learning material [11]. Thus, the media must have the ease of use it, in order to achieve the learning objectives that have been prepared.

Designed media needs to have the ability to practice analytical thinking skills of students. Data 93.10% of students answered yes to the statement "games or make me more interested in learning chemistry". In general, media education can overcome passivity varied protégé, giving rise to a passion for learning [10]. Spirit and passion to learn is able to overcome the difficulties of learning that learners face.

Amounting to 82.76% of students answered yes to the statement "I think playing on can practice analytical chemistry learning". Thus it can be seen that students are able practice analytical thinking skills through the medium of dominoes chemistry. The statement is also supported by the data of 100% of students improvement in analytical thinking. How to play dominoes chemically linking a

card that has a concept relating stimulate students to be able to analyze each card is obtained to be able to answer the question cards. The process is carried out repeatedly proven capable practice analytical thinking skills of students. Amounting to 82.76% of students answered yes to the statement "I prefer to learn chemistry by using the game". Learning will be effective if it is done in an atmosphere of fun (fun and enjoy) [12]

CLOSURE

Conclusion

Based on the data obtained in this study, the following are the conclusions that can be drawn:

1. The validity of the content of the game as a learning medium Domino Chemistry at the Institute of Chemical materials for high school students of class X is said to be good, to obtain a percentage of 83.33% and is said to be feasible. Acquisition value of construct validation earn a percentage of 86.11%. These percentages are included in the category of very decent.
2. Effectiveness Domino game as a learning medium Chemistry Institute of Chemistry for high school students of class X is good, it is reflected on the results of the posttest and student activities. Obtained results 86% of students or 25 of the 29 students who take lessons otherwise completed. The results also showed that 100% of students has increased in analytical thinking. Effectiveness in terms of student activity which is an average of 1.72% of students do activities with effective enough, for 29.31% of students do activities effectively, and amounted to 68.97% of students do activities with very effective. These results indicate that the media playing on Domino Chemical effective because it can practice analytical thinking skills and have a percentage of the activity is very effective.

3. Practicality Domino game as a learning medium Chemistry Institute of Chemistry for high school students of class X is seen from the user's response to the media. The average response of "Yes" in the media game Domino Chemistry of 87.19%. Thus, the media game Domino Chemistry otherwise very practical as a medium of education game.

Suggestion

With the development of the game Domino Chemistry media in the subject matter of the chemical bonds can practice analytical thinking skills class X of SMAN 1 Krian Sidoarjo then here is a suggestion from the author. Based on research conducted only focuses on training students' analytical thinking skills and how the activity and response to the media to development. So, for further research that would like to develop a similar game media can examine their social skills as well. So that the data obtained to be more perfect.

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