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# Modification of The Gasik Game version 2.0 to Improve 21st Century Skills for Junior High School

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**Abstract**

The 21st-century skill standards in Indonesia include 4Cs (critical thinking, creativity, communication, and collaboration); ICTs (Information, Media and Technology Skills); Character Building; and Spiritual Value. All 21st-century skills need to be possessed by students as a provision to face all the challenges of life. Therefore, we need a guide who can instill all skills. The purpose of this study was to improve the students' 21st-century skills. The 21st-century skills in this study focused on increasing 4Cs skills. The development model used is Analyze, Design, Develop, Implement, and Evaluate (ADDIE Model). Research subjects were 75 eighth-grade students of junior high school. Data collection method used was an experimental method. Data collection used a product assessment questionnaire, an observation rubric of 21st-century skills, and tests. Meanwhile, the product content validity test uses the v Aiken index. The modified Gasik game (Gasik version 2.0) received ratings from the experts on the material aspect of 83.68% and in the media aspect of 87.61%. The value of the content validity v Aiken is 0.82 with a high category so that the Gasik 2.0 game can be stated as very good to be applied to 21st-century learning. The n-gain value between the pretest and posttest values in the experimental class is 0.12, while in the control class is -0.01. The results of the analysis indicate that the use of the Gasik 2.0 game can grow 4Cs skills with low categories.

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## INTRODUCTION

The aim of education is currently more focused on certain competencies or specialists to support economic growth and the nation's competitiveness in the era of the industrial revolution 4.0. These important competencies are called 21st Century skills. The 21st-century skills are very important to be applied and mapped in schools, to be able to produce productive and ready graduates from various aspects in facing the challenges of life in the 21st century (Trilling & Fadel, 2009; Stamatis, 2011; Thomas et al., 2011; Binkley et al., 2012; Zubaidah, 2016; Ariyana et al., 2018; Robiah, 2018). Stamatis (2011) suggests that the possession of all 21st-century skills can shape students into high-quality performance individuals. According to Robiah (2018), to become capable workers, students should be given a variety of 21st-century skills. For this reason, it is necessary to plan learning that can grow all 21 skills in students.

Partnership 21th Century Learning (P21) identifies four competencies as skills that are very important and needed in the life of the 21st century. In Indonesia, 21st-century competencies are known as 4Cs (critical thinking, communication, collaboration, and creativity). Ariyana et al., (2018) stated that implementation in formulating a framework that is suitable for learning towards the 21st century is multidisciplinary, meaning that all material can be based on the P21 framework.

Many researchers are committed to develop educational games to support the development of student competence in the 21st century at school. However, little is known about how play can influence 21st-century skills acquisition. A game can be designed to focus students' attention on the information or material to be studied. Through games, students become more curious about what is being learned (Smith & Munro, 2009). Games make learning activities useful and meaningful (Foster, 2008). Unlike regular games, well-designed educational games that focus on learning goals can increase motivation, interest, or value. (Bestari et al., 2014; Silva et al., 2017; Sourmelis, 2017). Games can involve students in learning so that it is easier to achieve learning goals (Smith & Munro, 2009; Logofatu et al., 2010; Thomas et al., 2011).

Qian and Clark (2016) discuss the latest literature on game-based learning (GBL) and identify 29 studies targeting 21st-century skills as outcomes. Qian and Clark's (2016) study aims to determine empirical evidence regarding the effects of GBL on 21st-century skills and to identify elements of game design that are consistent with learning theory. The method used is to find articles about learning games and 21st-century skills. The date range was restricted from January 1, 2010, to December 31, 2014. This search resulted in 3118 articles, then all articles are selected. As many as 137 articles met the criteria. 137 articles were analyzed to explore the influence of digital games on learning, especially regarding 21st-century skills. The findings show that game-based learning approach is effective in facilitating development of student competencies in the 21st century. The effectiveness of GBL depends on game design. In particular, game designs featuring blending learning theory with game design elements are proving successful in the game industry. In summary, this study suggests there are reasons for the potential use of the GBL approach for future 21st-century skills development, although only one-third of the empirical findings are attributed to medium to large effect sizes and few studies have targeted creativity, communication, and collaboration as learning outcomes.

Haya (2013) has developed a game called *Gasik*. The word *Gasik* comes from the Javanese language. *Gasik* is an acronym for *Game Fisika Asyik* (a fun physics game). *Gasik* is a card game in the form of printed media that can be used as a learning medium at school and outside of school. One *Gasik* game package consists of a *Gasik* Board, *Gasik* Card, and *Gasik* Point. *Gasik* can be played by 2-4 people in turns. *Gasik* has several advantages, namely that it can attract students' attention, can improve students' cognitive abilities and learning independence, and create a pleasant atmosphere so that it can reduce boredom while studying (Rahayu, 2013; Haya, 2014). Despite its advantages, *Gasik* also has many disadvantages. In terms of the medium, the striking shortcomings are (1) the image on the card cannot be seen clearly by other group members, because it is a printed card; (2) the rules of the game are less exciting for players who are waiting their turn. Meanwhile, in terms of materials, (1) *Gasik* is not suitable for optical materials which are considered difficult; (2) the questions and material contained on the card are not by the 2013 curriculum which leads to 21st-century competence. In terms of learning, the shortcomings are (1) less good at understanding the material, but more suitable for feedback; (2) it takes a lot of *Gasik* game packages when applied to classroom learning; (3) communication between group members becomes difficult because they are disturbed by the excitement of playing different groups. By considering the advantages and improving the shortcomings of the *Gasik* game and utilizing technology in its use, it is possible to develop it into a media innovation that guides students to foster 21st-century skills. For example, improving the *Gasik* Card by adding problem-solving questions.

## METHOD

ADDIE is a model that has been commonly used to develop multimedia applications, especially Game-Based Learning. The research and

development procedure consists of five stages, Analysis, Design, Development or Production, Implementation, and Evaluations. The content validity of the expert judgment uses the average Aiken index which is an index of expert agreement on the suitability of the instrument items with the indicators to be measured.

In this study, the True Experimental Design method used in the type of Two-Group pre-test and post-test design. The experimental class was given learning using the *Gasik* 2.0 game, while the control class was given conventional learning, namely group discussions. To determine the increase in 4Cs competence, it is seen from the n-gain value between the pretest and posttest in each class.

## DISCUSSION

The product of this development research is a game of *Gasik* 2.0 which is a modification of the previous *Gasik* game (Haya, 2014). One of the weaknesses of the old version of *Gasik* is that students have difficulty seeing the printed images presented because the size is too small. Therefore, *Gasik* 2.0 is updated by adding a PowerPoint slide as a digital card that is capable of displaying images or video. The display of the PowerPoint version of the *Gasik* Card can be seen in Figure 1. *Gasik* 2.0 was not developed into fully digital media, so that all students appear to be actively communicating orally and feel involved in the learning process. To be in line with the 21st-century learning framework, the questions contained in the *Gasik* were transformed into questions that were oriented towards problem-solving problems and the rules of the game which were originally changed to individual teams into diverse teams. In detail, the differences between the first version of *Gasik* and *Gasik* version 2.0 can be seen in Table 1.

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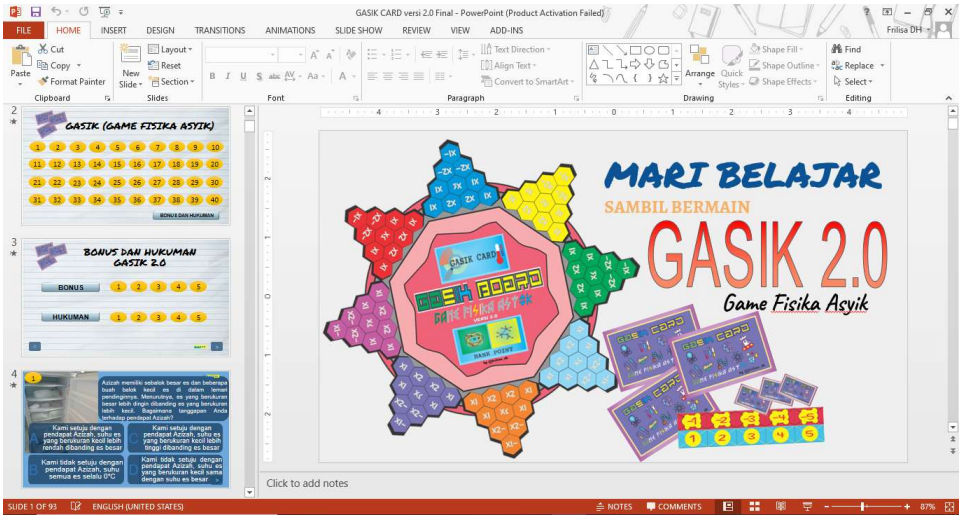


**Figure 1.** *Gasik* 2.0 Game Interface

**Table 1.** The difference between the first version of *Gasik* and *Gasik* version 2.0

| **The first version of *Gasik*** | ***Gasik* 2.0** |
|---|---|
| A 30×30 cm$^2$ *Gasik* Board made of thick Yellow Board paper | *Gasik* Board with 1×1 m$^2$ shape made of flexible material (like an MMT banner) |
| the mathematics board on the *Gasik* Board is 4. | There are 8 math boards on the *Gasik* Board. |
| The 6×9 cm$^2$ *Gasik* Card contains material info and matchmaking questions that are printed on the card directly in the form of pictures and writing | The 8×15 cm$^2$ *Gasik* Card only contains the written question number, bonus, or penalty. Questions and discussions are presented in Powerpoint form and there is an experimental video. |
| *Gasik* Point measuring 3×4 cm$^2$ | *Gasik* Point measuring 4×6 cm$^2$ |
| Bonus Cards or Penalty Cards only contain information about bonuses/penalties | Bonus Cards or Penalty Cards provide additional information about 21st-century competence |

| | |
|---|---|
| design drawings on the media are only optical instruments | Design drawings on media are more varied because they are more flexible. |
| played by individuals (2-4 people) | played by a team (2 - 8 teams) |
| naming player: player 1,2,3 etc. | The naming of players: Presentation team and answering team red/yellow / etc (according to the color of the math board) |
| the next player in the order hompimpa / seats | The next player is randomly assigned to the team that gets *Gasik* points. |
| adapted to the KTSP curriculum | adjusted to the 2013 revised curriculum |
| development goals to embed material concepts. | development goals for supporting learning materials by providing problem-solving exercises and fostering 21st-century skills |
| The game's mission is to get points by explaining the concept to the opponent playing. | Game missions to get points by solving questions (for the answerer). |
| *Gasik* Points belong directly to the questioner/presenter, but their placement on the math board is governed by whether or not the answerer's answer is correct. | *Gasik* Points are contested by all teams, and they are placed freely on any team's mathematics board. |

The media draft for *Gasik* 2.0 was validated by 4 validators. Assessment indicators that received low scores on material aspects were (1) the accuracy of data and facts; (2) the accuracy of drawings, diagrams, and illustrations; (3) the effectiveness of the sentence. Meanwhile, indicators with low scores on the media aspect are card design variations. The average percentage of the *Gasik* 2.0 assessment score from the four validators was 86.34 % of the maximum score. While the average *Gasik* 2.0 assessment given by the validator for each category is presented in Table 2. The average result of the Aiken v index is 0.82 in the high category.

**Table 2.** Results of Ratings *Gasik* 2.0 by Experts

| Aspect | Category | Score Percentage (%) | | | | | Criteria |
|---|---|---|---|---|---|---|---|
| | | Validator 1 | Validator 2 | Validator 3 | Validator 4 | Average | |
| Theory | Material on Question Points | 83.33 | 92.86 | 82.14 | 83.33 | 83.68 | good |
| | Language | 88.89 | 80.56 | 72.22 | 86.11 | | |
| Media | *Gasik* Board | 86.36 | 84.09 | 81.82 | 88.64 | 87.61 | very good |
| | *Gasik* Card and Point (print) | 85.42 | 89.58 | 72.92 | 91.67 | | |
| | *Gasik* Card (ppt file) | 100.00 | 90.63 | 75.00 | 93.75 | | |
| | Rule of the game | 75.00 | 83.33 | 75.00 | 100.00 | | |
| | Learning design | 90.91 | 93.18 | 97.73 | 93.18 | | |

The results of the pretest and posttest scores in the experimental class and control class are shown in Table 3. The average score in the experimental class increased from 53 to 59. While the average score of the control class has decreased from 46 to 45. To see the increase in 21st-century skills results can be seen from the results of the n-gain test. The n-gain value for the experimental class is 0.12, meaning that in the experimental class there is an increase in 21st-century skills, but it is in a low category. While the value of n-gain for the control class is worth -0.01, meaning no increase in 21st-century skills.

**Table 3.** The Average of Students' 21st-century skills

| Score | Experiment Class | | Control Class | |
|---|---|---|---|---|
| | Pretest | Postes | Pretest | Postes |
| The highest | 77 | 84 | 76 | 72 |
| Lowest | 28 | 38 | 16 | 23 |
| Average | 53 | 59 | 46 | 45 |
| n-gain | 0.12 | | -0.01 | |

The use of the *Gasik* 2.0 game in learning has been proven to be able to foster 21st-century skills. Increasing the 21st-century skills students is low. This is possible because most students are not familiar with questions that require reasoning. However, students feel more enthusiastic and serious about following the learning process. Implementation *Gasik* 2.0 is only done once, so the focus and the energy are exhausted to recognize the game. Students try to force themselves to solve the questions that are being given by cooperating with teammates even though they don't know each other. Also, students became more active and dared to argue even though at first they felt afraid and embarrassed when speaking and expressing opinions, but gradually they became used to it.

## CONCLUSION

The assessment results in *Gasik* 2.0 by experts on the media aspect of 87.61 %, whereas the material aspects of 83.68% with a validity index v Aiken 0.82 in the high category. *Gasik* 2.0 excellent to be applied to 21st-century learning. Therefore, it can be concluded that the use of the *Gasik* 2.0 game can improve students' 4Cs skills even though with an increase of 0.12 in the low category.

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