Students' Imaginative Skills to Create a Simple Gamification on Chemistry Material

Nelius Harefa[1]* and Sumiyati Sumiyati[2]

[1,2]Chemistry Education Study Program, Universitas Kristen Indonesia, Jakarta

*Email: nelius.harefa@uki.ac.id

Abstract: *The creativity dimension related to cognitive, affective, psychomotor and other skills aspects. The creativity dimension is closely related to learning outcomes and students' ability to be creative in producing relevant products. One important indicator of the creativity dimension is students' imagination skills. Through good imagination skills, students will be able to predict and create patterns in the content and context of learning material. In this research, an analysis of students' imagination skills will be carried out which consists of three indicators, namely playing with possibilities, making connections, and using intuition. The research was carried out using a classroom action research approach consisting of 3 cycles, where research data was collected by giving a questionnaire consisting of 4 statements for each indicator with 5 options for each research instrument. Apart from the questionnaire method, research data was collected through random interviews and structured observation. Based on data analysis, students' imagination skills were highest in the playing with possibilities indicator at 81.05 in cycle 3. Meanwhile, students' imagination skills were lowest in the using intuitions indicator at 35.75 in cycle 1. In general, simple gamification activities were able to increase students' imagination skills between 10% - 40%.*

Keywords: *Gamification; Imaginative Skills; Simple Gamification*

INTRODUCTION

The use of learning media is a form of adaptation of the education sector to current era. Elaboration and exploration of learning media is one of the activities to accommodate students' needs, especially those related to the need for digital development ((Panggabean et al., 2021); (Holly et al., 2023);(Qur'ani et al., 2023)). Elaboration and exploration of learning media is an effort to maintain the relevance of the learning process with current developments. The flexibility of elaboration and exploration of learning media is able to facilitate various development ideas in an effort to accommodate students' needs so that the learning process can be adapted to the needs of current developments. The flexibility of developing learning media can facilitate its development according to the desired learning materials so that elaboration and exploration of learning materials can be optimized (Harefa, 2020); (Purba et al., 2021); (Panggabean et al., 2022)). Apart from that, the development of learning media can be

carried out using various approaches which have different positive contributions.

One learning media that is relevant to digital developments that is able to accommodate students' needs is gamification. Gamification is a learning media that can be developed as a medium for exploration and elaboration of learning material, which can increase the learning output so that the learning process output can be optimal. Gamification provides a variety of development options so that development can be tailored to needs, both student needs and the characteristics of learning materials and content ((Alzahrani & Alhalafawy, 2023); (Oliveira et al., 2023)). Gamification is able to accommodate content development according to needs and can be developed continuously so that development can be adapted to current developments, whether development is carried out as a whole or partial development ((Wang, 2023); (Xiao & Hew, 2024); (Parkerson, 2023)).

Gamification-based learning media can be developed with various learning approaches, and can be developed with various levels of complexity that can be selected according to needs. Gamification-based learning media can be developed from a complex level to simple gamifications that have different characteristics ((Harsaya et al., 2023); (Yu et al., 2024); (David & Weinstein, 2023)). The option of developing simple gamification is one option that can be explored and elaborated to support the learning process for educational units that have inadequate facilities and infrastructure. Simple gamification can be a digital accommodation option for educational units that do not yet have the latest facilities and infrastructure, so that digital developments can still be integrated into the learning process.

Simple gamification can be used as a stimulator for the development of students' cognitive, affective and psychomotor domains, as well as other process skills. One of the relevant skills that can be stimulated through the implementation of simple gamification is the dimension of creativity. Through the implementation of simple gamification, student creativity can be stimulated and explored which has an impact on the efficiency and effectiveness of elaboration and exploration of learning material. Through the implementation of simple gamification, students can be stimulated to be creative and determine the best way to optimize the elaboration and exploration of learning material ((Luarn et al., 2023); (Chen et al., 2023); (Lyons et al., 2023)).

The dimension of creativity is one of the important aspects that students must have in this era of massive digital development. Students must have good creativity so they can compete and adapt optimally to current developments. Creativity is an important aspect to stimulate so that elaboration and exploration of learning material can be optimized ((Erol et al., 2022); (Harvey & Berry, 2023); (Harefa et al., 2024)). The creativity aspect is an aspect that is related and able to influence other aspects such as cognitive, affective and psychomotor aspects of students. The creativity dimension is one aspect that can optimize the exploration of learning outcomes. Apart from the context of elaborating learning materials, creativity greatly influences students' skills in producing products that are relevant to learning materials, both in the context of commercialization and in the context of exploration of learning materials. One important indicator of the creativity dimension is students' imagination skills (Lucas, 2016). Imagination skills are an important indicator in producing a product that is able to describe the content of learning material. Imagination skills will greatly influence the product produced, which becomes an illustration of a learning material concept (Caiman & Lundegård, 2018). Imagination skills will influence the variety of products produced as well as other relevant ideas. Good imagination skills will produce a product design that can be developed into a product and be able to predict the product that will be produced. Therefore, imagination

skills must be stimulated in the learning process so that students can translate a concept and learning content into a product that is able to depict the content in a real way (Harefa & Purba, 2020).

METHODS

This research is classroom action research which was carried out in September – December 2023. The research sample consisted of 35 class XI students at Abdi Siswa High School, Jakarta. The research was carried out in 3 cycles as in the following Figure.
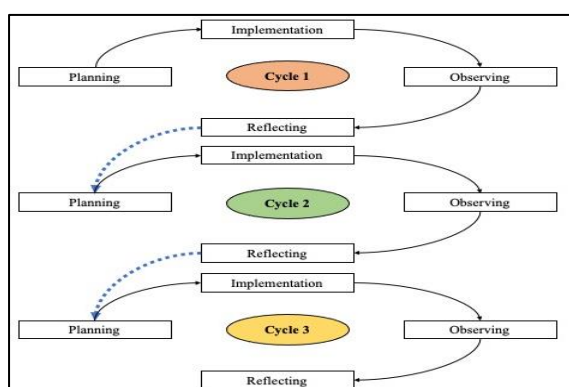

Figure 1. Research procedure

Research data was collected by giving students a questionnaire prepared using the Linkert scale, which consists of 12 statements with 5 options for each statement. Apart from the questionnaire method, data was collected by conducting random observations and interviews with the research sample. Through the exploration and elaboration of simple gamification, an analysis of the dimensions of creativity, especially imagination skills, is carried out, which consists of 3 indicators, namely playing with possibilities, making connections, and using intuition (Lucas et al., 2023). The research instrument consists of 4 statements for each indicator which are prepared using a Linkert scale approach, where each statement is given 5 choice options. Observations were carried out thoroughly during the learning process. Interviews were conducted randomly on representative samples. Research data was analyzed and interpreted using SPSS 24 for Windows and Microsoft Excel.

RESULT AND DISCUSSION

The dimension of creativity that is the object of research study is students' imagination skills (Lucas, 2016). The imagination skills analyzed include playing with possibilities, making connections, and using intuition. Data was collected by giving a questionnaire to the research sample which was prepared using a Linkert scale approach, each indicator consisting of 4 statements with each statement given 5 choice options. Apart from using questionnaires, structured observations and random interviews were carried out with representative research samples. The research was carried out using a classroom action research approach consisting of 3 cycles. Based on data analysis, the average student imagination skills are as shown in the following Figure.
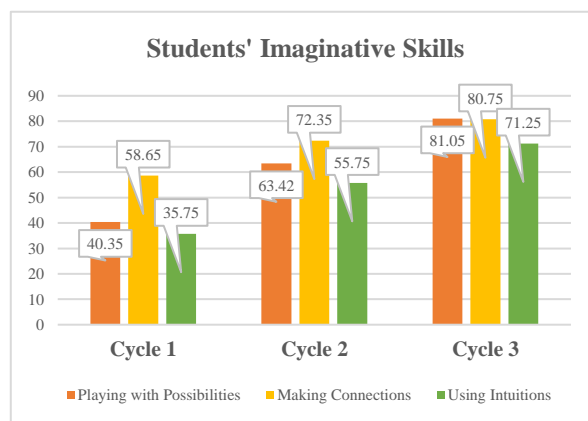
Figure 2. Students' imaginative skills

Based on Figure 2, students' imagination skills are highest on the playing with possibilities indicator of 81.05 in cycle 3. Meanwhile students' imagination skills are lowest on the using intuitions indicator of 35.75 in cycle 1. Overall, there is an increase of students' imagination skills between cycles as in Table.

Table 1. Increasing students' imagination skills

Indicators	Percentage Increase in Students' Imagination Skills	
	Cycle 1 – Cycle 2	Cycle 2 – Cycle 3
Playing with possibilities	36.38%	21.75%
Making connections	18.94%	10.40%
Using intuition	35.87%	21.75%

Based on Table 1, the increase in students' imagination skills in creating simple gamification in the playing with possibilities indicator was 36.38%. This increase occurred in cycle 2, where students were able to design games that were most likely to be developed based on the content and context of the learning material. The lowest increase in students' imagination skills in the making connection indicator was 10.40%, the increase occurred in cycle 3, where students' making connection skills in cycle 2 were already in the high category so that the percentage increase in imagination skills in cycle 3 was not significant compared to other indicators. In general, there is an increase in students' imagination skills for each research cycle, through creating simple gamification, students' imagination skills can be improved. Imagination skills will help students predict product designs that are relevant to learning content and materials ((Hoffmann & Russ, 2016); (Kimmel & Groth, 2023); (Mavrelos et al., 2023)). Good imagination skills can help students pattern concepts of learning material, especially abstract material which is often found in chemistry learning ((Simonton, 2023); (West & Sacramento, 2023)).

CONCLUSION

The creativity dimension is a dimension related to cognitive, affective, psychomotor and other skills aspects. The creativity dimension is closely related to learning outcomes and students' ability to be creative in producing relevant products as an implementation of their scientific field. One important indicator of the creativity dimension is students' imagination skills. Through good imagination skills, students will be able to predict and create patterns in the content and context of learning material. Based on data analysis, the increase in students' imagination skills in creating simple gamification in the playing with possibilities indicator was 36.38%. This increase occurred in cycle 2, where students were able to design games that were most likely to be developed based on the content and context of the learning material. The lowest increase in

students' imagination skills in the making connection indicator was 10.40%, the increase occurred in cycle 3, where students' making connection skills in cycle 2 were already in the high category so that the percentage increase in imagination skills in cycle 3 was not significant compared to other indicators. In general, simple gamification activities were able to increase students' imagination skills between 10% - 40% each cycle.

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