



Development Of Interactive Multimedia-Assisted Gamification Learning In The Innovation Management Course Class A13

Defita Aning Puspitasari*, Punaji Setyosari, Deka Dyah Utami

State University of Malang, Jl. Semarang No. 5 Malang, East Java, Indonesia

*Author of correspondence, Email: defita.aning.2001216@students.um.ac.id

Abstract

Gamification is still not familiar to students in class A13. This research aims to develop gamification learning development media assisted by interactive multimedia that can meet needs, feasibility and attractiveness. The types of data used in this research are quantitative and qualitative data. This research produces gamification assisted by interactive multimedia with PowerPoint class results. Based on validation tests carried out on media experts, material experts and students, it can be concluded that gamification learning media assisted by interactive multimedia is included in the valid category. So the gamification developed can be used in learning activities.

Keywords: Learning Development, Gamification, Interactive Multimedia

1. Introduction

In classroom learning, there are several conditions that are expected so that the teaching and learning process runs well, is fun and interactive. One effort to encourage children to learn is by creating a pleasant learning atmosphere and environment (Yusuf, 2007). A comfortable classroom atmosphere or atmosphere can influence students' enthusiasm and interest in learning and support the success of learning objectives. As stated by Van Brummelen, every class has an atmosphere or mood that influences the learning process and the classroom atmosphere is determined by how the teacher interacts with students and vice versa (2006). Interactive learning has an important role in strengthening understanding and facilitating an effective learning process. Student understanding emphasizes that learning is not just about providing information, but also about understanding and constructing knowledge in a way that is meaningful for students. With interactive learning that can provide adequate feedback, student understanding can be improved significantly. (Marzano : 2017).

However, in the results of observations in the A13 innovation management class, learning did not use interactive media. This makes learning in class less enjoyable and there is no interaction between teachers and students. This can affect students' enthusiasm, interest, motivation, understanding and learning outcomes to decrease. The learning carried out by educators is very monotonous and makes students feel bored with the learning being carried out (Ariyani, B., Wasitohadi, Rahayu, 2019). Another problem is that students feel bored studying in class and are lazy to pay attention to the teacher, in the end they find it difficult to accept and understand class material.

To overcome this problem, you can use interactive learning media which combines these learning resources into one media. The concept of "interactive learning media" refers to

learning materials that involve students in two-way interactions while utilizing multimedia in conveying information (Setyowati et al., 2020). In other words, interactive learning media is media that provides responses to its users, whether responses in the form of answers, decision choices and so on (Andrizal & Arif, 2017). Interactive learning media can make it easier for teachers to monitor students' progress towards understanding subject matter through learning test results (Sari & Suswanto, 2017).

Interactive multimedia can be used as a learning medium that plays a role in increasing student understanding and has a positive influence on improving student learning outcomes. The research results of Susanto, et al. (2013) shows that interactive multimedia with educational games is one of the learning media that is successful in increasing student motivation, interest and learning activities so that student learning outcomes are good. This is because educational games or educational games are games that contain educational content. Furthermore, Saputri, et al. (2018) stated that according to the character of students who like to play, learning that presents interactive multimedia combined with games will better help students understand the material.

An approach that can be applied to learning media is gamification. A learning approach with gamification can make the learning process interesting and fun, as is the conclusion from research (Jusuf, 2016) that using gamification in the learning process can provide an alternative to make the learning process more interesting, fun and effective. According to Laelasari et al, (2018), gamification itself is the application of game elements into the learning process with the intention of motivating learning and changing student behavior. According to Suarmini (2019) gamification can stimulate interest and motivation to participate, encourage the learning process, and solve problems.

Learning with the concept of gamification is very supportive in the learning process where learning content is not included in game content, in situations where students find it difficult to understand, with a design in the form of an educational game it will make it easier to understand the content presented by the teacher. To increase efficiency, effectiveness, motivation and student involvement in learning can be achieved by utilizing gamification. Gamification is a learning approach using elements in games or video games with the aim of motivating students in the learning process and maximizing feelings of enjoyment and engagement with the learning process, besides that it can be used to capture things that interest students and inspire them to continue do learning. Applying the concept of gamification in the classroom makes learning more fun, students are encouraged to complete their assignments, students are more focused and concentrated in understanding the subject matter they are studying. According to Laelasari et al, (2018), gamification itself is the application of game elements into the learning process with the intention of motivating learning and changing student behavior. According to Suarmini (2019) gamification can stimulate interest and motivation to participate, encourage the learning process, and solve problems.

Gamification learning needs to be supported by multimedia because multimedia has the ability to improve the quality of learning and accelerate students' understanding of learning material (Gagne, 1992). Multimedia, such as images, audio, video, and other interactive elements, can help students understand abstract concepts and explain phenomena that are difficult to understand verbally. Apart from that, multimedia can also be used as a source of

information, teaching aids, and evaluation tools, allowing students to learn more effectively and have fun. With multimedia technology, the learning process becomes more interactive, interesting, and helps students acquire the desired knowledge, skills, and attitudes (Prawiradirga, 2008). The advantage of using multimedia compared to other media is that it allows students to learn independently, with high interactivity, increasing memory levels, more efficiently and effectively. Several studies that have been conducted have shown that the approach using gamification can improve the student learning environment (Sitorus, 2016).

2. Method

The development model used in this research is the model developed by Lee & Owens (2004). This development model consists of five stages, namely: (1) analysis; (2) design (design); (3) development; (4) implementation (implementation); and (5) evaluation. This model has a more complete and comprehensive flow. According to Lee & Owens themselves, it is explained that this model is specifically for multimedia product development. This model was chosen because this research and development model has a complete research and development model flow. In accordance with the needs of the research and development carried out, this model was chosen by the researcher. From this statement, this model is deemed relevant to the development of Gamification-based Interactive Multimedia which is used to improve student learning outcomes Molenda & Reiser (2003). The stages in developing the Lee & Owens (2004) model are as follows

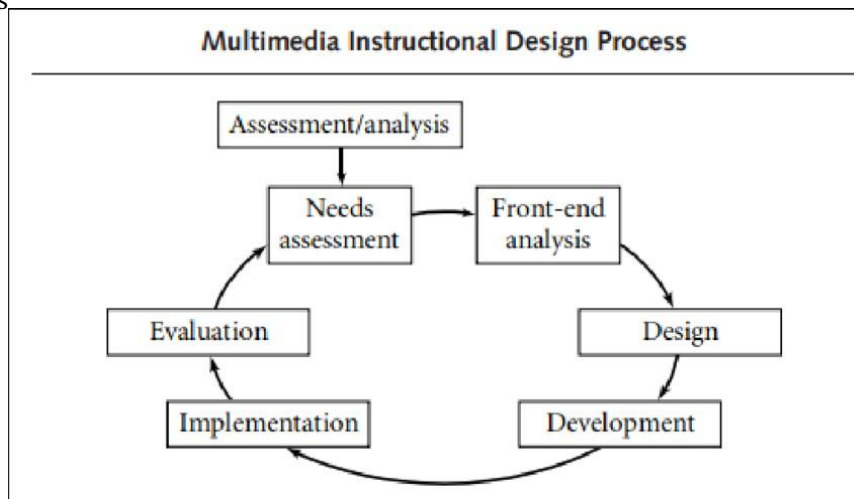


Figure 1. Media Development Model Learning (Lee & Owens (2004))

The first stage is analysis which is divided into two, namely needs analysis and initial and final analysis. In the needs analysis here, researchers conducted research in the Innovation Management class, class A13, State University of Malang regarding the conditions and needs of students regarding media to overcome existing problems in the learning process. Currently, Design Thinking learning in class A13 does not use interactive media,

In the initial and final analysis, the researcher collects detailed information about what needs to be improved by (1) Analyzing students, namely identifying student backgrounds and learning characteristics. The background of students in their study habits so far is that they often study independently and lack the use of learning media that helps them understand the material provided. (2) Analyze the required technology requirements. As technological developments increase, the need for technology in learning is also very necessary. (3) Analyzing the media, during class learning the use of media, the material or content used is still difficult to understand.

The second stage, namely design, according to Lee Owens (2004), consists of several steps including: (a) designing an activity schedule. Making a schedule in development aims to provide a time limit for the development process (b) assembling a project team, in this development, researchers become the development team and the validator team consists of media experts and material experts. (c) media specifications, learning media specifications, then a framework is prepared (d) material structure, material *design thinking* is an approach to solving problems that focuses on users, creativity and iterative thinking, and (e) configuration control, which is a step to control the development of components and materials in PowerPoint media.

The third stage, namely the development of Lee Owens (2004), stated the basic principles of developing gamification learning media assisted by interactive multimedia which consists of (1) determining the type of product, gamification learning media assisted by interactive multimedia that was developed was designed in accordance with the "design thinking" material. (2) developing designing media components, developing assisted gamification learning media components multimedia interactive among them : slides, picture, video, audio, text, games. (3) carry out a review process, PowerPoint classpoint is also tested on students. The product will be revised until it is declared valid or suitable for use in the learning process. (4) product presentation, the product was tested on students in class A13 Innovation Management.

The fourth stage is implementation, the product being developed is implemented in the learning process. Gamification learning media based on interactive multimedia has been validated by media experts and material experts. The fifth stage is evaluation, Internal development This, evaluation formative form pre-test And post-test given to students on the subject matter of design thinking in innovation management subjects. The type of data used in this research is quantitative and qualitative data. The source of quantitative data comes from calculating the results of validation questionnaires carried out by media experts, material experts, audiences, as well as student learning outcomes tests. Meanwhile, qualitative data was

obtained from observations, as well as critical suggestions from material experts and media experts. Media that has received validation from experts will be tested on the audience. The audience is students of class A13 Innovation Management, State University of Malang. Individual trials will be carried out on 3 students, small group trials will be carried out on 9 students and a total trial of 31 students will be carried out on class A13 Innovation Management students at the State University of Malang.

Analysis of questionnaire data was carried out using the following formula, which was adopted from Arikunto and Jabar (2014):

$$P = \frac{\sum x}{x_t} \times 100 \%$$

Information :

P = Percentage

$\sum X$ = Respondent's Score

$\sum X_i$ = Total ideal score

100% = Constant

The level of feasibility and validity of data resulting from data processing will be measured based on the following criteria:

Table 1. Media Eligibility Criteria

Kategori	Rentang Presentase	Keterangan
A	81% - 100%	Valid
B	61% - 80%	Cukup Valid
C	41% - 60%	Kurang Valid
D	<40%	Tidak Valid

Arikunto dan Jabar (2014)

Processing test data on student learning outcomes is obtained by calculating the acquisition of test scores in the form of *pre-test* and *post-test questions* with 10 questions. Meanwhile, processing test data on learning outcomes uses the N-Gain score calculation, with the following formula:

$$N\ Gain = \frac{Skor\ Posttest - Skor\ Pretest}{Skor\ Ideal - Skor\ Pretest}$$

The categorization of N-Gain score interpretations is as follows:

Table 2. Categorization of N-Gain Score Interpretation

Nilai <i>N- Gain</i>	Kategori
$G > 0,7$	Tinggi
$0,3 \leq g \leq 0,7$	Sedang
$G < 0,3$	Rendah

Sumber : Melzer (dalam Syahfitri, 2008)

N-Gain score effectiveness interpretation category

Table 3. Categories of Interpretation of N-Gain Effectiveness

Presentase (%)	Tafsiran
< 40	Tidak efektif
40 – 55	Kurang Efektif
56 – 75	Cukup Efektif
>76	Efektif

Sumber : Hake, R.R (1999)

3. Results and Discussion

3.1 Result

The final result of this research and development is a product in the form of gamification assisted by interactive multimedia in the form of a PowerPoint class on design thinking material.

Figure 2. Display of material title



Figure 3. Material Questions



Figure 4. Material Explanation Display



Figure 5. Material Explanation Display

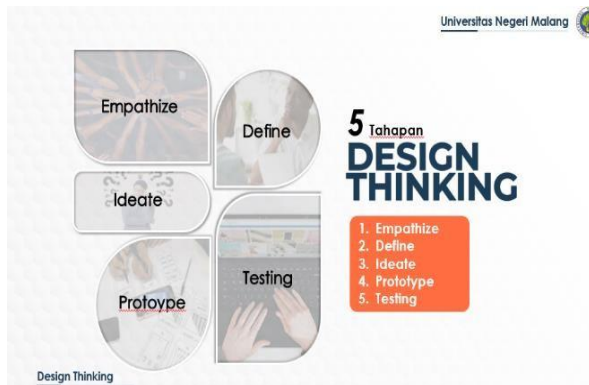


Figure 6. Stages of Design Thinking



Figure 7. Explanation of Design Thinking Stages

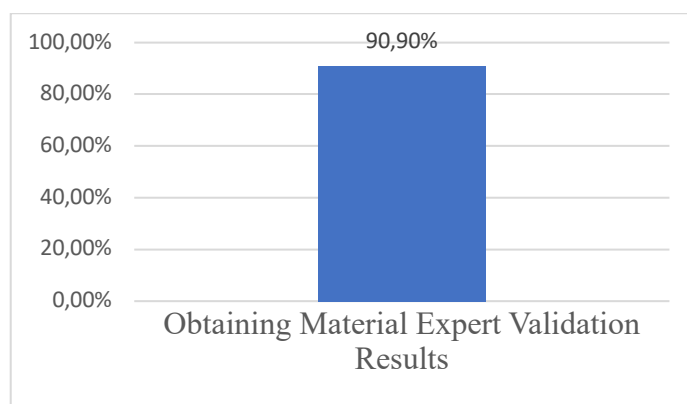


Figure 8. Game Using Questions

Before being tested on students, learning media is first validated by material experts and media experts. The material experts involved in validation are lecturers in Educational Technology, State University of Malang, while media experts come from lecturers in Educational Technology, State University of Malang. The following are the results of validation from media experts, material experts, and trials with the audience:

1. Obtaining Material Expert Validation Results

Material expert validation calculations are carried out using the following formula:

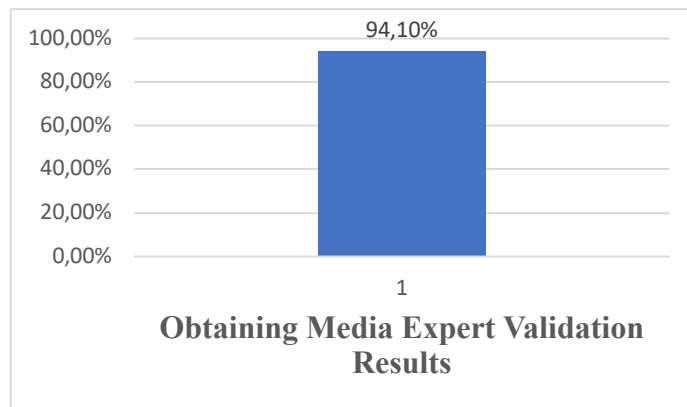


$$\begin{aligned}
 P &= \frac{\sum x}{x_i} \times 100 \% \\
 &= \frac{50}{55} \times 100 \% \\
 &= 90,9 \%
 \end{aligned}$$

From the results of calculating the percentage of validity of the material, the result was 90.9%, so based on the eligibility criteria it can be concluded that the material contained in the PowerPoint classpoint on design thinking material is declared valid and suitable for learning activities so that validation will continue with media experts.

2. Obtaining Media Expert Validation Results

The media expert validation calculation is carried out using the following formula:



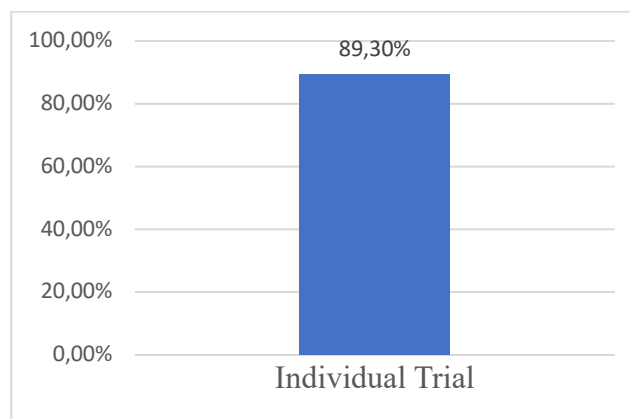
$$\begin{aligned}
 P &= \frac{\sum x}{x_i} \times 100 \% \\
 &= \frac{80}{85} \times 100 \% \\
 &= 94,1 \%
 \end{aligned}$$

From the results of calculating the percentage of media validity, the result was 94.1%, so based on the feasibility criteria it can be concluded that the *powerpoint classpoint media for design thinking* material is declared valid and suitable for learning activities so that it will be continued to carry out trials of the final product.

3. Obtaining Test Results

Individual Trial

Individual trials are carried out to determine the attractiveness of the media that has been developed. The data processing to determine media attractiveness is calculated using the following formula:

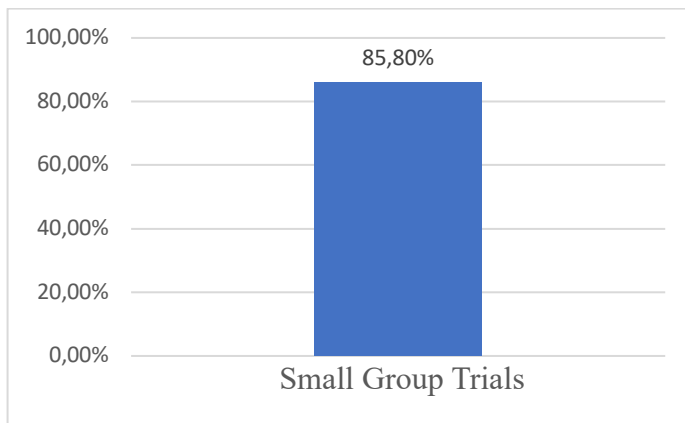


$$\begin{aligned}
 P &= \frac{\sum x}{x_i} \times 100 \% \\
 &= \frac{201}{225} \times 100 \% \\
 &= 89,3 \%
 \end{aligned}$$

Based on the results of individual trials, gamification learning media assisted by interactive multimedia in *design thinking material* obtained a score of 89.3%. The score shows that students feel interested in learning with the help of interactive multimedia, based on predetermined criteria. Thus, gamification learning media assisted by interactive multimedia is interesting and can be used to help lecturers teach *design thinking material*.

Small Group Trials

Small group trials were carried out to determine the practicality of the media that had been developed. The data processing to determine the practicality of the media is calculated using the following formula.

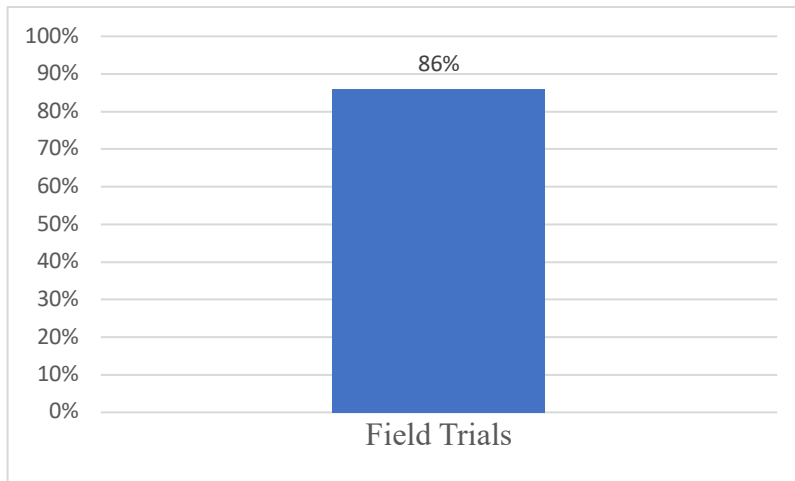


$$\begin{aligned}
 P &= \frac{\sum x}{x_i} \times 100 \% \\
 &= \frac{576}{675} \times 100 \% \\
 &= 85,8 \%
 \end{aligned}$$

Based on the results of small group trials, gamification learning media assisted by interactive multimedia on *design thinking material* was proven to be practical for use in learning activities. This is proven by the score of 85.8% obtained from calculating the percentage of small group trials, where this value shows a high level of practicality. Thus, this learning video media can be the right choice for lecturers to use in teaching *design thinking material* to students.

Field Trials

The field test aims to test the attractiveness and practicality of learning media in the field. Data obtained from field tests are processed using the following formula:



$$\begin{aligned}
 P &= \frac{\sum x}{x_i} \times 100 \% \\
 &= \frac{2.000}{2.325} \times 100 \% \\
 &= 86 \%
 \end{aligned}$$

Based on the results of field trials, gamification learning media assisted by interactive multimedia on design thinking material proved to be interesting and practical for use in learning activities. This is proven by obtaining a field trial percentage score of 86%, which shows a sufficient level of interest and practicality. Thus, gamification learning media assisted by interactive multimedia can be the right choice for lecturers to use in teaching *design thinking material* to students.

4. Student Learning Outcomes Test

Before the media is shown in class, students will work on pretest questions and after the media is shown in class, students will be presented with posttest questions. Student learning result test scores are processed using the N-Gain formula. This was done to determine the increase in learning outcomes after implementing gamification learning media assisted by interactive multimedia. The N-Gain formula is used to calculate the average increase in test scores from *pre-test* to *post-test* by considering differences in initial scores between students. The following is the N-Gain formula:

$$\begin{aligned}
 \text{N- Gain} &= \frac{\text{Skor Posttest} - \text{Skor Pretest}}{\text{Skor Ideal} - \text{Skor Pretest}} \\
 &= \frac{3420 - 3020}{(100 \times 36) - 3020} \\
 &= \frac{3020 - 3420}{(100 \times 36) - 3020} \\
 &= \frac{400}{580} \\
 &= 0,689
 \end{aligned}$$

From the results of calculating the N-Gain score, the result was 0.689 or 68%, so based on the N-Gain score criteria it can be concluded that after using gamification learning media assisted by interactive multimedia in *design thinking material*, learning outcomes have increased in the medium category, and the media is included in the category quite effective for learning activities. Most students gave positive responses after using gamification learning media assisted by interactive multimedia in *design thinking material*. In general, students think that they feel helped and interested in this interactive multimedia-assisted gamification learning.

3.2 Discussion

According to Kapp (2012), gamification can be defined as a concept that combines games, aesthetics and thinking skills to attract attention, motivate, promote learning, and solve problems. Learning with the concept of gamification is very supportive in the learning process where learning content is not included in game content, in situations where students find it difficult to understand, with a design in the form of an educational game it will make it easier to understand the content presented by the teacher. To increase efficiency, effectiveness, motivation and student involvement in learning can be achieved by utilizing gamification (Pradnyana 2020). Gamification learning needs to be supported by interactive multimedia because interactive multimedia has the ability to improve the quality of learning and accelerate students' understanding of learning material (Gagne, 1992).

The effectiveness of gamification is that it can provide a teaching and learning process activity to develop learning materials, increase student involvement and motivation (Kresnayana 2004). The concept of "interactive learning media" refers to learning materials that involve students in two-way interactions while utilizing multimedia in conveying information (Setyowati et al., 2020). In other words, interactive learning media is media that provides responses to its users, whether responses in the form of answers, decision choices and so on (Andrizal & Arif, 2017). Interactive learning media can make it easier for teachers to monitor students' progress towards understanding subject matter through learning test results (Sari & Suswanto, 2017). Apart from that, the use of interactive learning media has the benefit of digitizing the teacher's role in the media (Purba et al., 2022).

Based on the results of validation of media suitability carried out by media experts, material experts and student trials. Obtained from media experts amounting to 94.1% in the valid and feasible category, material experts amounting to 90.9% which is included in the valid category, and student trials namely through individual trials amounting to 89.3% and declared

feasible, group trials small 85.8% was declared practical, field trials were 86% and declared interesting. So from the validity results it can be concluded that the gamification learning development media assisted by interactive multimedia is valid or declared suitable for use in learning activities.

A learning approach with gamification can make the learning process interesting And pleasant like conclusion from study (Jusuf, 2016) using gamification in process learning, can give alternative For make learning process more interesting, pleasant And effective. Results study Susanto, et al. (2013) shows that interactive multimedia with educational games is one of the learning media that is successful in increasing student motivation, interest and learning activities so that student learning outcomes are good. This is because educational games or educational games are games that contain educational content. Furthermore, Saputri, et al. (2018) stated that according to the character of students who like to play, learning that presents interactive multimedia combined with games will better help students understand the material.

Students also said that gamification learning media assisted by interactive multimedia could help improve learning outcomes. This makes students in the classroom more active and interactive. This is very relevant to the concept of educational technology, namely facilitating learning, in order to support learning activities so that the desired goals are achieved.

4. Conclusion

The product resulting from this development is proven to be feasible, practical and interesting for use in gamification learning assisted by interactive multimedia design thinking material. This media received a positive response from the results of reviews by media experts, materials and students. Media experts say that in general the gamification learning media assisted by interactive multimedia that has been developed is quite good. Material experts also stated that gamification supports the learning process of design thinking material in accordance with students' characteristics and needs. The learning media developed gets response Which positive from student. Student participate in a way active in the learning process using PowerPoint Classpoint. Students are interested in using the features in Classpoint.

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