Musical-intelligence based Development of Mathematics Learning Media on the Material of Plane Shapes

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Abstract

Research with the title Musical-Intelligence Based Development of Mathematics Learning Media on the Material of Plane Shape. This research is aimed to develop musical-based learning media in the material of plane shapes. This is a research and development study. The procedures of the research consisted of product analysis to be developed, initial product development, and product trial. The trial was implemented for around 2 weeks with 5 times of direct meetings and during at home, these students were provided by learning video to watch. At last step of trial, students were tested to see their knowledge on plane shapes. The result of the research revealed that the developed musical-based learning media was valid, hence it is worth to use. This field trial practice resulted 5 students out of 6 who became the objects of the research, they were 100% answered the questions correctly while the other one got 1 incorrect answer. The validity results of that developed media were as follows: At media expert test, validation score gained was 90.58. Based on that achieved score, then it was concluded that the learning video being developed was worth to use. The revision process happened during the creation of song.

Keywords: Learning Media, Musical Intelligence, Research and Development.

Introduction

In general, the society has the perception of intelligence which is strongly dealt with IQ (Intelligence Quotient). Thus, there is an assumption stated that a kid with high score of IQ called as intelligent child. That assumption is contradicted with the theory of Gardner (2007) who argued that there are eight types of children’s intelligences, namely linguistic, logical mathematics, intrapersonal, interpersonal, spatial, kinetic, and naturalistic. Therefore, it can be said that kids’ intelligence cannot be measured only by cognitive ability. Because the intelligence possessed by children are different from one to another, then the learning operated at schools should be supported by learning media that is suitable with students’ types of intelligences so that the learning will be fun (ismah, et.al., 2020). Learning media becomes an integrated part especially in the education world. It can also be used to convey message from the sender to the receiver, so that it will stimulate thoughts, feeling, attention, and interests of the learners to study.

This opinion is in line with the statement of Ruth Lautfer (1999) in Tafonao (2018) who said that learning media is one of teaching aids for teachers to deliver teaching materials, improve students’ creativities and increase students’ focus in the process of learning. Learning media
is very influential in education field and one of them is to make the students become motivated and ease the teachers in giving the materials. However, in its implementation, it is still found that most teachers have not been able yet to utilize learning media innovatively. Moreover, in the current situation of Covid-19 pandemic which requires online learning. According to Sourial, et.al. (2018), online learning refers to a learning system carried out with indirect face-to-face learning, but through platforms which assist teaching and learning process even from long distance.

The use of learning media, especially the one with technology-based is urgently needed. There is a plethora of reasons why teachers do not utilize learning media. Most teachers consider that applying learning media in learning needs preparation, those media are sophisticated and pricy, while these teachers have been familiar with lecturing method. (Tafonao, 2018). This means that the utilization of media in learning process should be improved so that it can be more effective and efficient. Besides, learning media also ease both teachers in explaining the lessons and learners in understanding the materials learned. And for the students who have musical intelligence will be easier to grasp the message or information through songs’ lyrics accompanied by music. Music, in fact, has a strong impact in the process of learning, as it was proven by Kumar, et al., (2016) in his research who explained that learning while listening to music will not give any bad effect on concentration, on the contrary, it even improves academic performance, and this statement is also supported by research findings of Atashrouz, et al., (2018) who found that using music in learning will give positive impacts on motivation, achievement, and academic performance.

Music, which has been being taken as entertaining tool only in tiring time by some people, gives positive influence in creating conducive learning atmosphere (Al Prakoso et al., 2017). The use of musical media in learning is rarely applied by teachers in delivering the materials especially in mathematics subject. Music and mathematics are two facets needed in stimulating the growth of human brain, and their needs are different in terms of growing the functions of brain but those two are completed each (Cranmore & Tunks. 2015). Al Prakoso et al., (2017) described that music is composed of beat, rhythm and tone, while mathematics is a number, hence, they can be collaborated. Many students thought that mathematics is a scary subject and difficult so that it tends to make them become reluctant and even a bit lazy to study this subject.

Utilizing learning media by involving musical intelligence would be very interesting to develop. Therefore, this research developed mathematics learning media with musical intelligence-based on the material of understanding plane shapes. This utilization in learning should has been attention part of teachers as facilitators in each step of learning activities, so that the objective of learning can be achieved.

Method

This study applied Research and Development approach. The research of developing musical intelligence-based learning media of plane shapes referred to development steps proposed by Borg & Gall (1983). Those steps are product analysis, product development and product trial.

Product trial was executed on the students whose intelligence types had previously being notified through intelligence instruments adopted from McClellan & Conti (2008) table 1. There were 6 students found as possessing musical intelligence who became the objects to try this product. The validation of both media and materials were assisted by lecturers and teachers who are competent and experienced in their fields.

Table 1.

Questionnaire for Musical Intelligence

<table>
<thead>
<tr>
<th>NO</th>
<th>STATEMENT</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I am sensitive to tone (able to sing a song with good tone)</td>
<td>SA</td>
</tr>
<tr>
<td>2</td>
<td>I am able to remember a song melody easier</td>
<td>A</td>
</tr>
<tr>
<td>3</td>
<td>I am like singing</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>I am able to play one of musical instruments well</td>
<td>D</td>
</tr>
<tr>
<td>5</td>
<td>I am able to move followed the rhythm of the song</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>I am like hum while doing activities</td>
<td>SD</td>
</tr>
<tr>
<td>7</td>
<td>I am like rhythmically knocking tables when studying</td>
<td>SD</td>
</tr>
<tr>
<td>8</td>
<td>I am sensitive to acknowledge sounds from surrounding</td>
<td>SD</td>
</tr>
<tr>
<td>9</td>
<td>I often move parts of my body while listening to song or music (for instance: nodding heads, moving legs, etc.)</td>
<td>A</td>
</tr>
<tr>
<td>10</td>
<td>I am able to sing one song after having listened to it one or two times</td>
<td>N</td>
</tr>
</tbody>
</table>

Remarks: SA= strongly agree; A=agree; N=neutral; D=Disagree; SD=Strongly Disagree
Result and Discussion

Product analysis developed consisted of analyzing concept, designing and collecting materials. On the step of analyzing concept, the analysis was done on anything needed in the planning of learning devices. At this stage, it was decided that the material used was plane figure focusing on its examples. The developed media was not only in the form of song, but also learning video that could be accessed by anyone so that it would ease the students in learning and also had media durability value to be used any time without being worried that the media would be broken.

At design analysis stage, the researchers designed the display of rhythms which were being developed in creating song. At this time, the researchers started to plan the lyrics of the song, figure planes being used, and the examples of these shapes in the daily lives. Creating interesting media for students obviously requires things which make other people become attracted. Learning video was created by using animations which were able to support the message sent in the song. This video was developed by inserting pictures of figure planes so that these figures were not only being explained through song but also via pictures.

At collecting materials step, materials needed were collected to make the product. Here, the researchers used guitar as the instrument to make song as musical-based media. That song’s creation used the materials of plane shapes’ examples covering rectangles, circles, triangles, trapezoids, kites, and rhombuses. The creation in the form of video used several supportive applications such as wonder-share filmora installed in Personal Computer (PC) and VN in the smart-phone.

Developing Product

Developing product was started by making the intro for the song or usually called as the introduction of a song which was had been created and developed from various chords of guitar. After having the intro, the next step was creating stand-out tones such as for the refrain. After that, deciding the materials that would be made into the lyrics, i.e. introducing plane shapes covering rectangles, circles, triangles, trapezoids, kites and rhombuses. The song developed was given title “I am the Plane Figure”. The selection of this title was based on the expectation to anyone who listens to sings the song will always remember the shapes of plane shapes especially in the daily lives.

The intro of the song had very simple chords since it was only played by the ones familiar for music players especially those who play guitar. Chords taken in the intro of the song were G and C which were being repeated for twice and ended by chord D. These chords were being chosen due to their simplicity and besides, this song was intended for kids; simple tones were applied so that they could be played by all people. After the tones for intro, the next one was creating the chorus part. Chorus is the main idea of the message to be delivered which commonly used comfortable tones different from refrain. In this part, the chords used were similar with the intro, namely at note G, C, and D. The beginning part of the song’s lyrics was created to describe that this song was full of knowledge. Additionally, game-guessing was also provided asking several shapes of plane shapes in daily lives and requiring to mention ‘in what shape the plane shape was’. Plane shapes used in chorus 1 were rectangles, circles, squares and triangles.

The tones for refrain were slightly different but still having the same chords starting from C, G, D, C and G. As it has been being described before that refrain is the core of a song, then the lyrics were about telling all examples of the previous ones namely shapes of plane shapes. Chorus 2, it was seen that before coming to the song, melody tone was given so that the created song had its own color and characteristics. In this part, the shapes of plane shapes were circles, trapezoids, kites and rhombuses. The ending of the song was created in such a way. The message needed to be conveyed was inviting to keep learning, especially to learn mathematics such as the material of plane shapes found in daily lives. The following were the lyrics and the chords of the song entitled “I am the Plane Figure”.

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The creation of learning video was done after the song had accomplished. The process of creating learning video in the form of song was started from video recording when singing with guitar and being recorded by camera. This recording was integrated into the applications of wonder-share filmora and vn to be edited in such a way until it became an attractive learning video.

The finished learning video creation was being uploaded to YouTube with the link: https://www.youtube.com/watch?v=rQtMn28J4IQ This link was made to make the students access the video easily. The learning video Picture 2 was opened by addressing gratitude to related parties.

**Picture 1.**
*Lyrics and Chords*

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**Picture 2**
*Initial view*
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Picture 3.
Self-Profile

The next view Picture 3 was self-profile which covered name, student's number, study program, faculty and university's name. In that view, institutions’ logos were also being displayed.

Picture 4.
‘Present’ View

In picture 4, the word “Present” was outlined in the form of rectangle by integrating the colors of black and neon blue as the compliment of the video. In picture 5, the description of learning media made on musical-based was viewed. Picture 6, displayed motivational words of “Happy Learning” in which in Indonesian language it means “Selamat Belajar” aimed to motivate everyone who sees the video.

Picture 5.
Learning Media

In the main core of this learning video at picture 8 was the explanation of the material about several examples of plane shapes. This part was supported by animations as the examples of plane shapes such as door, wheel and so forth. In the end, the view of the video was the written of the words ‘Thank You’ (picture 9), as the gratitude for the watchers for watching this learning video from the beginning until the end.

Picture 6
‘Happy Learning’ View

Picture 7.
Material View

Picture 8.

In picture 4, the word “Present” was outlined in the form of rectangle by integrating the colors of black and neon blue as the compliment of the video. In picture 5, the description of learning media made on musical-based was viewed.

Picture 9.
Last View

Product Trial

After the development of initial product has accomplished, product trial was conducted consisting of field practice, interview and instrument test. Field practice was carried out to see the responses of the students when they learned by using musical-based learning media, and to measure the results before and after listening and singing that song.
The validity results of that developed media were as follows: At media expert test, validation score gained was 90.58. Based on that achieved score, then it was concluded that the learning video being developed was worth to use. The revision process happened during the creation of song. The revisions consisted of adding the examples of plane shapes, in which previously they were only rectangles, squares, circles and triangles. The additional examples were trapezoids, kites, and rhombuses.

The validity results after passing the revision phase both on the tone lyrics and the appropriateness of that plane figure, had been being assessed by three lecturers who are very competent and experienced in the research field in which they were on the category of very good. The result of that validity test assumed that the media was valid and ready to be trialed.

Field trial was executed in order to test the developed media directly. This trial was performed on 6 students who possessed musical intelligences (based on the results of intelligence types measurement). The interview went through direct oral setting for the sake of measuring students’ prior knowledge and understanding toward shapes of plane shapes and their examples. Referring to the interview before starting the learning, shapes of plane shapes known by these students were rectangles, squares, circles and triangles.

The trial was implemented for around 2 weeks with 5 times of direct meetings and during at home, these students were provided by learning video to watch. At last step of trial, students were tested to see their knowledge on plane shapes. This field trial practice resulted 5 students out of 6 who became the objects of the research, they were 100% answered the questions correctly while the other one got 1 incorrect answer.

Depending on those trials, it was found that implementing intelligence musical-based learning media was able to help the students to recognize shapes of plane shapes. The administered test instrument covering several questions related to the examples of plane shapes. The following are the examples of the test items on plane shapes:

![Test Items on Plane Shapes]

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**Instrumen Tes Mengenal Bangun Datar**

Nama: ........................................

Usia: ........................................

Kelas: ........................................

Tuliskan nama bangun datar dari gambar berikut ini!

1. = 
2. = 
3. = 
4. = 
5. = 
6. =

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Discussion

The findings of both validity and trial confirmed that musical intelligence-based learning media on the material of plane figure was valid. The results of this small-scale trial got positive responses toward that song media. Besides, the students were getting motivated so that their thoughts, feelings, attention, and interests could be stimulated to study mathematics especially on the discussion of plane shapes.

Musical intelligence-based learning media which had been being developed did not only contain various shapes of plane shapes but also facilitated students to be actively involved when learning by using that song. In that developed media, the song was presented through guesses so that the students might be enthusiastic to answer while singing.

This learning media which is packed in the form of video can be watched anytime and anywhere. The role of teachers as educators will also be supported since this media needs no complicated tools and space.

In general, learning media has merits and demerits. The merits of this learning media are as follows: 1) the learning video has the quality of HD; 2) chords used are not really difficult to be played by anyone; 3) this media can be innovated by teachers in the learnings, for instance, creating games while singing; 4) this video has animations which give the examples of plane shapes so that they help in explaining the lesson; 5) the song in this media is packed in the form of question and answer, hence this make the students become active and do not feel bored.

Vice versa, the demerit of this media is that the material conveyed is limited to several shapes of plane shapes so that other songs' lyrics need to be developed to other learning materials.

Conclusion

Media of learning with musical intelligence-based which had been being developed is valid and able to increase students' motivation to learn mathematics. This media is considered limited since it only composes the material of plane shapes, thus, the researchers expect that further researches will develop this musical-intelligence based learning media on other mathematics materials. Therefore, there will be more learning media which can be developed suitable with students’ types of intelligences.

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