

## Development of Uno Stacko Games-Based Learning Media Integrated with QR Code on the Material of the Human Respiratory System in Increasing Interest and Understanding of Concepts for Grade VIII Middle School Students

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### Keywords

Interest, Conceptual Understanding, ADDIE, Learning Media, Uno Stacko, QR Code, Human Respiratory System

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### Abstract

Game-based learning media is a media that can improve students' interest and conceptual understanding effectively. In this study, the research and development (R&D) method was used by adopting the ADDIE model to develop a learning media based on Uno Stacko game with a focus on the topic of Respiratory System which was integrated with the QR Code. The effectiveness test that was used on the learning media was a quasi-experimental design. The media testing used three classes consisting of a trial class with a total of 25 students, as well as a control class and an experimental class, each of which consisted of 23 students. The results of the study of the students' learning interest with the Respiratory System Uno Stacko learning media along with further explanation by the teacher using the lecture method differ significantly from the learning interest of the students who only used the lecture method. The implementation of the learning media can improve learning interest. It can be seen from the result of the average percentage of the experimental class with a total of 81% which is higher than the control class with a total of 76.

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## INTRODUCTION

The process and success of students learning at school will always relate to the factors of learning interest and conceptual understanding. Learning interest plays an initial gateway that helps students build concentration and show a willingness to learn. Learning interest is one of the factors that have a big portion of distribution in determining the success or failure of a learning process, including the learning outcomes and students' conceptual understanding. According to Amaliyah et al. (2021), students with a poor learning interest will tend to experience more learning difficulties because they will not learn optimally if they do not feel any attraction to something they learn. The loss of interest in learning will affect the seriousness of students to participate in learning activities. Learning that is not in line with their interests will make students not serious about participating in the learning activities.

Something that focuses attention and gives enjoyment will awaken students' interest so that the learning process can be carried out in a fun way without coercion (Prihatini, 2017). Learning interest that is successfully stimulated will provide benefits for students to participate actively in learning activities (Simbolon, 2013). The students interest can be identified through indicators, namely attention, interest, enjoyment, and involvement (participation) (Ricardo & Meilani, 2017; Slameto, 2010). Learning interest that is successfully cultivated will increase concentration, form a learning passion, and provide enthusiasm in carrying out each task from the teachers so it increases conceptual understanding (Y. L. Putri & Rifai, 2019; Mulyaningsih, 2021).

Conceptual understanding is an important factor besides interest, which can help students

achieve learning goals (Huda et al., 2022). Conceptual understanding that is possessed by students, one of which is in science topics, will be able to provide a mature understanding of the problems they face, provide an overview and examples, and explain the knowledge that is obtained more broadly and creatively (Komariyah et al., 2018; Putra et al., 2018). Based on the revision of Bloom's taxonomy, there are seven indicators of understanding the concept, namely explaining, interpreting, giving examples, concluding, summarizing, classifying, and comparing (Anderson & Krathwohl, 2010).

The achievement of learning objectives can be supported by the role of interest and conceptual understanding. Conceptual understanding becomes vital in the learning process because it affects knowledge acquisition and the achievement of student learning outcomes. Therefore, teacher intervention plays a big role in supporting students to achieve learning goals. In fact, until now, there are still teachers who are not able to optimally create learning interest and students' understanding because the learning system that is applied is still not varied. According to Husna et al. (2019), teachers are still too dominant in using conventional learning. It will lead to student boredom because the learning system runs in a monotonous manner thereby eliminating student concentration, which results in less achieved learning outcomes. The limitation of learning media used by teachers is the cause of the lack of student participation during the learning process.

Teachers who play as a central figure in education can make some efforts to implement learning media during the learning process together with students. One form of media that can be used is game-based media. Game-based learning media is a media that is not only made to satisfy students' enjoyment but is specifically designed with rules that are focused on achieving learning objectives so that it can provide insight and knowledge because it has a characteristic of containing material and information that are educational (McEnroe-Petitte & Farris, 2020; Ramadan, 2019). Game-based media provides interactive experiences to students, provides enjoyment, and can be used in many types of curricula (Muell et al., 2020). Game-based media help students feel more comfortable and can create student-centered learning situation. Also, it can be a solution for students who are not successful in learning with conventional methods. The implementation of game-based media in student learning activities can be given at the end of the meeting, which has a function as supplementary learning media to previous the material (Priyaningsih, 2020). Games-based media potentially increase students' conceptual

understanding because, through game-based media, the subject matter can improve motivation, train student skills, stimulate and increase perceptions, and improve students' ability to solve problems (Hidayatulloh et al., 2020). The inclusion of evaluation will make it easier for educators to monitor the progress of student understanding. In line with Slameto (2010), evaluation is important and deserves consideration because it provides information about the outcomes of the achieved learning objectives.

In response to the previous statements, the researcher developed a learning media adapted from a game, complete with QR Code access. The QR Code printed on the learning media contains evaluations that can be accessed by students after using the developed learning media. The QR code acts as an access to evaluation questions to make it easier for students to work on the evaluation questions and it can allow teachers to find out the results of the work done by the students easily so that it is more efficient and does not waste any paper.

Considering the previous research by Ardilasari (2020) with the title "Development of Thematic Uno Stacko Media to Increase Learning Interest," concluded that the results of the product development consisting of stacko blocks, question cards, and stars have been good, and feasible through validation results, student and teacher responses. In addition, there is also research conducted by Anita et al. (2022) with the title "Uno Card to Improve the Ability to Understand Mathematical Concepts for Junior High School Students" and research conducted by Lumbantobing et al. (2022) with the title "Implementation of Snakes and Ladders Game Media to Increase Interest and Learning Outcomes of Elementary School Students in Border Region." Those research show that the development and application of game-based learning media can focus students' attention during the learning process, which indicates the students have a learning interest during the learning process. The implementation of game-based learning media can enhance conceptual understanding because the developed media contains learning material, questions, and discussions. It is completed with answer keys that help students understand the learning material being studied. Through the results of the previous research and considering that the development of learning media needs to be done and game-based media has a positive influence on interest and conceptual understanding, the development of game-based learning media with different learning material coverage and game models can be tried to be developed. The developed learning media focuses on the topic of the Human Respiratory

System, which is taught at the grade VIII of junior high school level. It is made in the form of the Uno Stacko game, equipped with question cards and material cards. The game can be used to support students' interest and conceptual understanding, in previous studies, there was not a media development equipped with QR Code to access evaluation questions after they finish using the developed media. The selection of the topic of the Human Respiratory System has some reasons because this topic can be considered difficult. After all, it contains concepts, symptoms, and events that are still abstract in characteristic (Setiadi & Putra, 2021). Therefore, the topic is still considered quite difficult for students to understand, thereby reducing students' interest in the learning process.

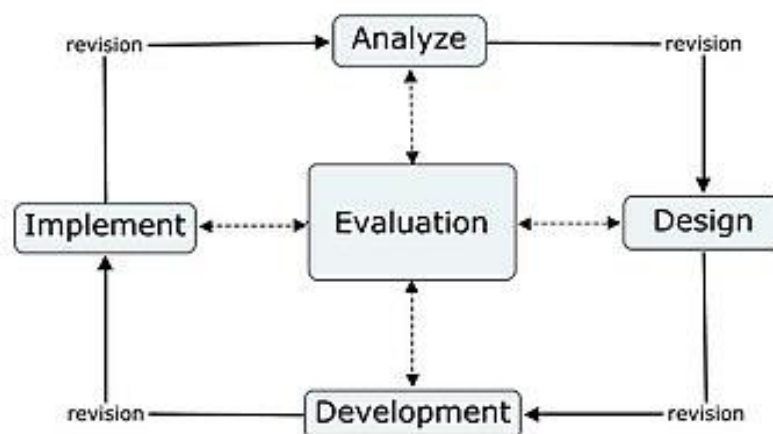
The needs analysis at SMP Negeri 2 Bululawang illustrates that media as a tool for the learning process was used with limited frequency by the teachers in teaching and learning activities. In learning, the teachers often only used textbooks, concept maps, and PPTs, or only used simple pictures. Furthermore, learning tended to use the lecturing technique, which led to teacher-centered and less fun for students. This can be seen from the result of the student needs analysis questionnaire, that 60% of students stated that learning still does not provide enjoyment for students in learning. The analysis of students' needs, also, obtained

information on the topic of the Human Respiratory System that 40% of twenty students in class VIII A stated the material on the human respiratory system was difficult to understand. It is supported by the results of an interview with a science teacher that students are still constrained in understanding the location and parts of the human respiratory organs.

Referring to the previous statements, the study tries to develop a learning media based on the Uno Stacko game, which was integrated with the QR Code, aiming to know the level of media feasibility and the effectiveness of the media testing in increasing students' interest and conceptual understanding. This research has an update from previous research, namely on the chosen topic in this learning media, which is the human respiratory system for the grade VIII level of junior high school, game systems, and the use of the QR Code, which can be accessed by students in testing the achievement of students' conceptual understanding after using the developed learning media.

## RESEARCH METHOD

The study used the R&D (Research and Development) method with the ADDIE model, which includes stages of Analyze, Design, Develop, Implementation, & Evaluation (Azari et al., 2023; Purnama et al., 2021).



**Figure 1.** ADDIE Development Stage

The research and development was applied as a method to support the product development activities by involving validity and effectiveness tests. The developed product or media was subjected to a feasibility test based on the results of the validity analysis of the media and the material, provided by an expert validator so that the produced media is capable and feasible. The effectiveness test was tested using a quasi-experimental design with Non-Randomize Posttest Only Control Group Design as the design used in measuring the student learning interest and Non-Randomize Pretest-

Posttest Control Group Design as the design used in measuring students' conceptual understanding. In this study, the students in class VIII A and VIII E were selected using the Non-Randomize technique, with a total of 23 students in each research class.

In the experimental class, the treatment was carried out by combining the learning delivered by the teacher with the use of the Uno Stacko learning media. On the other hand, in the control class, only conventional learning was usually carried out by the teacher, who only focused on explaining the learning material with textbooks spoken by the

teacher orally. The research involved the use of a trial class consisting of 25 students from class VIII B. This trial class aimed to test the legibility and practicality level of the learning media that was used, as well as the validity and reliability of the research instrument that was to be used.

Quantitative and qualitative data are the two types of data in this study. The qualitative data was obtained through the data from the analysis result of teachers' needs using a questionnaire technique, the result of interviews with teachers, comments and suggestions from lecturers who expert in validating media and material in the development stage. Meanwhile, quantitative data was obtained from the data of the student needs analysis result, material validation, and media validation, the data of students learning interest score, students' conceptual understanding data, students' legibility and practicality test data, as well as student response data. The study used a research instrument in the form of a Lesson Plan that was prepared previously. The learning instrument was used as a guide in coordinating and directing the learning activity in control and experimental classes by the researcher. In addition, the questionnaires used to analyze the needs of teachers and students, teachers interview guidelines, material validation questionnaires, media validation questionnaires, pretest-posttest question eligibility questionnaires, student legibility and practicality test questionnaires, student learning interest questionnaires, pretest-posttest questions, and student response questionnaires were used as an instrument in collecting research data.

The student's needs questionnaire instrument, material validation questionnaires on the aspects of the feasibility of the questions and the validity of the material concept, and the pretest-posttest question eligibility questionnaires adapted to the Guttman rating scale. The Guttman rating scale consists of two answer options, with a score of 1 on the Yes/True option and a score of 0 on the No/False answer option. Material validation instruments on language aspects, media validation questionnaires, student legibility and practicality questionnaires, learning interest questionnaires, and student response questionnaires used the Likert rating scale, which consists of four answer choices, namely Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The highest score, which is 4, is given to the Strongly Agree (SA) option, while the lowest score, namely 1, is given to the Strongly Disagree (SD) option (Agustin et al., 2021).

The data obtained through material validation test, media validation, practicality and legibility test, pretest-posttest question eligibility, and student

response test were calculated in the form of percentages with the following equation:

$$X_{total} = \sum Xi$$

$$percentage = \frac{X_{total}}{X_{max}} \times 100\%$$

(Lumbantobing et al., 2022)

After obtaining the calculation results, the data were interpreted using the interpretation scale guidelines in Table 1, Table 2, and Table 3.

**Table 1.** Validation and Feasibility of Pretest-Posttest Questions Scoring Criteria

Percentage	Category
0–20%	Highly Invalid/Highly unfeasible
> 25%–50%	Less Valid / Less Feasible
> 50%–75%	Sufficiently Valid/Feasible Enough
> 75%–100%	Highly Valid/Very feasible

Source: Adapted from Andriyani et al. (2020)

**Table 2.** Learning Media Practicality Percentage Criteria

Percentage	Category
75.01%–100%	Very Practical
50.01%–75.00%	Practical
25.01%–50.00%	Less Practical
00.00%–25.00%	Impractical

Source: Akbar in Kumalasan (2018)

**Table 3.** Legibility Percentage Criteria

Percentage	Category
0%–20%	Poor
20.1%–40%	Not good
40.1%–60%	Moderate
60.1%–80%	Good
80.1%–100 %	Excellent

Source: Sarip et al. (2022)

The instruments of interest and conceptual understanding went through the stages of validity and reliability testing. The validity level of the research instrument was calculated using the Pearson Product Moment formula. The pretest-posttest questions are valid if the r count is higher than the r table ( $r_c > r_t$ ) and invalid if the r count is less than the r table ( $r_c < r_t$ ). Then, instrument testing continued with the reliability test of the instrument items using the Cronbach Alpha method. The data of the student's learning interest was tested for normality and homogeneity as an initial prerequisite test before further analysis. The normality test was carried out using the Shapiro-Wilk method using the IBM SPSS 26 for Windows program. The Shapiro-Wilk test was chosen as the normality test for the data on the student learning interest because the amount of data was 23 (less than 30) (Yusiana & Prasetya, 2022). In addition,



the Levene test was carried out to test the homogeneity of the data.

After that, the data continued to the hypothesis testing using the t-test and independent sample t-test. The proposed hypotheses in this study are.

Ho: the result of the student's learning interest using the Uno Stacko learning media is not significantly different from the result of student's learning interest without using the media

Ha: the result of the student's learning interest using the Uno Stacko learning media is significantly different from the result of student's learning interest without using the media.

The conclusion refers to the result of the p-value. Ho is rejected if the p-value < 0,05 , whereas Ho is accepted if the p-value is > 0,05. The difference in the result of the learning interest of the two research classes was followed by testing the average percentage of student's learning interest in each indicator. The results of the average percentage of the student's learning interest are interpreted with the interpretation guidelines in Table 4.

**Table 4.** Student's Learning Interest Criteria

Percentage	Category
0%–20%	Very Weak
20.1%–40%	Weak
40.1%–60%	Enough
60.1%–80%	Strong
80.1%–100 %	Very Strong

Source: Putri & Adirakasiwi (2021)

Prerequisite analysis was carried out on the data of pretest-posttest on understanding improvement in the two research classes using a normality test and followed by a Wilcoxon non-parametric statistical test with the help of the IBM SPSS 26 for Windows program. The data on the result of the conceptual understanding test before and after the study is declared to be significantly different if a significance value is obtained (p

<0.05) and not significantly different if the significance value is (p > 0.05).

Testing with the Wilcoxon test was continued with the calculation of the N-gain test analysis on the pretest and posttest data of the two research classes. The improvement in the average conceptual understanding of the students in the two research classes will be identified through the N-gain test. The N-gain is calculated by using the following equation:

$$N - g = \frac{\text{posttest score} - \text{pretest score}}{\text{maximum score} - \text{pretest score}}$$

The result of the N-gain calculation was continued by interpretation into the criteria according to Hake (1998), which are presented in Table 5.

**Table 5.** Improvement in Conceptual Understanding Criteria

Coefficient Interval	Criteria
N-gain < 0.3	Low
0.3 ≤ N-gain ≤ 0.7	Moderate
N-gain ≥ 0.7	High

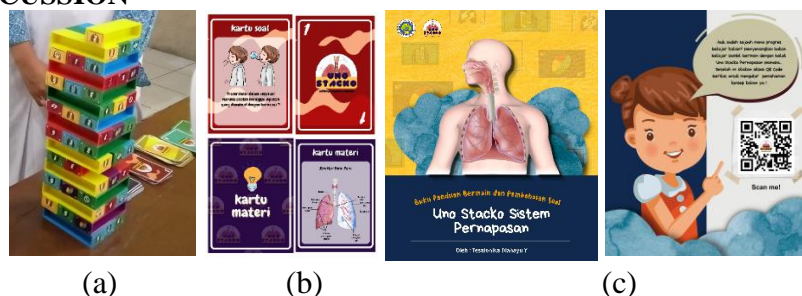
The students' responses testing was performed after testing the effectiveness of the learning media. The response test was carried out in the experimental class by giving a questionnaire at the end of the learning activity. The data of the student response was analyzed using the percentage technique for each indicator. After that, it performed an analysis of the average percentage and interpreted using the response guidelines in Table 6.

**Table 6.** Student Response Criteria

Percentage	Explanation
80% ≤ score < 100%	Very Good
60% ≤ score < 80%	Good
40% ≤ score < 60%	Enough
20% ≤ score < 40%	Not Enough
0% ≤ score < 20%	Not Good

Source: Listiani & Prihatnani (2018)

**RESULT AND DISCUSSION**



**Figure 2.** The appearance of (a) Respiratory System Uno Stacko Block (b) Question card and materials design (c) Guidebook design and discussion of questions equipped with an evaluation QR Code

The findings of this research and development are based on the analysis result of the teacher's and student's needs at SMP Negeri 2 Bululawang, which was obtained information that:

1. There is still a need for the implementation of innovative and interesting media to increase the effectiveness of learning, considering that the use and the implementation of media by teachers is still limited.
2. The learning method is still focused on lectures, in which students are less enthusiastic about participating in learning activities.
3. Game-based learning media has never been implemented.

The development of the Human Respiratory System Uno Stacko learning media integrated with QR Code, which focuses on the Human Respiratory System topic intended for grade VIII SMP/MTs has been successfully developed and achieved feasible and valid. Uno Stacko is a game that involves assembling a tower from stacks of blocks with three blocks in each layer (Fauziyah et al., 2021). The Uno Stacko game is played by taking each block at a certain layer without breaking down the standing blocks, and the taken blocks must be put back on the top of the tower. The Uno Stacko game as a game-based media was chosen because it has the advantages, including make students enthusiastic and interested, stimulate students' thinking skills, increase concentration and building students' memory (Oktaviani et al., 2021). Moreover, Uno Stacko has a fairly high popularity among children and adolescents so through the development of this media, hopefully, it can be easily accepted by students and help the learning process in class. The results of the development of the Uno Stacko learning media consist of the development of the game display designs (media packaging display, Uno Stacko block display, question card, and material card design display), playing rules in the playing guides book, evaluation in the form of multiple-choice quizzes integrated with QR Code and the development of component questions and material in the question cards and material cards.

Figure 2(a) shows that the developed Respiratory System Uno Stacko media is a game-shaped learning media consisting of 45 colorful plastic-based block components, which are arranged to form a tower. Figure 2(b) is question cards and material cards that are connected to the Uno Stacko block. The question cards and materials contain questions and materials on the Human Respiratory System. The composition of the question cards consists of 28 cards, which are arranged based on the Basic Competency topic on the Human Respiratory System in grade VIII of junior high school in the curriculum 2013 for learning goals that might be used to support the

learning in the curriculum 2013 and "Merdeka" curriculum. The questions in the media are made in the form of a short essay questions and questions with descriptions that can be answered orally by students. The selection of the question form is intended to stimulate students to answer following the concept of the Human Respiratory System material. The Uno Stacko Respiratory System learning media is also equipped with material cards, consisting of twelve purple cards. Figure 2(c) presents the appearance of the guidebook and questions discussion.

The guidebook contains information, including the Uno Stacko Respiratory System media, the composition of the Uno blocks, the game system in general and in groups, and the discussion of each question listed on the question cards. When the game has been completed, students can access the QR Code which contains evaluation questions to measure conceptual understanding after the learning activities using the developed learning media. Evaluation questions are made in the form of an online form, which contains 22 multiple-choice questions that are valid and adapted to the cognitive domain (C2) of conceptual understanding. QR Code can be accessed with the help of the Scan QR Code application or online scanning through the Scan QR Code Online website. Packaging, block stickers, supporting cards (question cards and material cards), and playing guides were designed using the *Canva* application. After the media development stage was completed, the validation stage was carried out by media and material expert lecturers from the Science Education Study Program at the State University of Malang. The results of the material and media validation test are presented in Table 7 and Table 8.

**Table 7.** Material Validation and Pretest-Posttest Feasibility Result Data

No.	Scored Aspect	Percentage (%)
1.	Language aspect	96%
2.	Question feasibility aspect	100%
3.	Material card concept validity	100%
4.	Pretest-posttest questions feasibility	92%
	Average percentage	97%
	Scoring category	Highly Valid/ Very feasible

Table 7 showed that the Human Respiratory System Uno Stacko learning media obtained the result on the material validation scoring and the feasibility of the pretest-posttest questions with a score result of 97%. The results of the scoring fall

into the category of Highly Valid/Very feasible. Material experts provided suggestions, comments, and improvements on language aspect, including improving word writing, question discussions, and the cognitive domain of question coverage on the Human Respiratory System Uno Stacko question cards. The validity test of the Uno Stacko media was followed by the validity testing of the media by the media expert lecturers. The data from the media validation test results are presented in Table 8.

**Table 8.** Media Validation Test Result

No.	Scored Aspect	Percentage (%)
1.	Media engineering aspect	90%
2.	Visual communication Aspect	89%
Average percentage		90%
Scoring category		Highly Valid/Very feasible

According to the results in Table 8, the Human Respiratory System Uno Stacko learning media was valid and feasible, as seen by the average percentage of 90% in Highly Valid/Very Feasible. Suggestions and comments were obtained through the validation by media expert lecturers, aiming to clarify the organ images on the Uno Stacko supporting card so that the image contrasts more with the background color of the card and it is easier to read.

After the media validation and revision stage was completed, the Uno Stacko learning media was tested in the trial class. It obtained a legibility percentage of 86.40% in the "Excellent" category. And, the practicality test percentage reached 88.00% in the criteria of "Very practical." The results of the validity test of the student interest questionnaire instrument obtained 21 valid questionnaire points. Meanwhile, the results of the reliability test obtained Cronbach Alpha values of 0.971 ( $\alpha > 0.6$ ) so that the interest questionnaire was reliable. The results of the pretest-posttest validation showed that 22 questions were valid. And, the Cronbach Alpha value was 0.963 ( $\alpha > 0.6$ ) so that the pretest-posttest questions were reliable.

**Prerequisite Analysis Test**

The data of interest and conceptual understanding was carried out in the analysis prerequisite test stage using the normality test. The results of the data testing are presented in Table 9.

**Table 9.** Normality Test Result of Interest and Conceptual Understanding Data

	Class	P-value	Category
Learning Interest	Control class	0.533	Normal
	Experimental class	0.063	Normal
Conceptual Understanding	Control class pretest	0.007	Abnormal
	Experimental class pretest	0.155	Normal
	Control class posttest	0.404	Normal
	Experimental class posttest	0.159	Normal

Based on Table 9, according to the result of the significance value analysis, a significance value of  $p = 0.533$  ( $p > 0.05$ ) was obtained in the control class. Meanwhile, in the experimental class, the result obtained  $p = 0.063$  ( $p > 0.05$ ) indicating that the data of learning interest in both classes meet the assumption of normality. After the data is normal, it continued with homogeneity testing using the Levene test, which shows a significance result of 0.801 and homogeneous data variant. A significant value of more than 0.05 was obtained in the result of the normality test for the aspect of conceptual understanding in the experimental class pretest, control class posttest, and experimental class posttest so that the data was distributed normally. But, in the control class pretest data, a significance value of  $p = 0.007$  ( $p < 0.05$ ) was obtained so that the data is abnormally distributed.

**Learning Interest Improvement**

The effectiveness test of the Uno Stacko media on the student learning interest in the control and experimental classes used the t-test, namely the Independent Sample T-test. The result of the t-test showed a significant value of  $p = 0.013$  ( $p < 0.05$ ) so the research hypothesis  $H_0$  rejected, and ( $H_a$ ) accepted the alternative hypothesis. This result indicates that there is a significant difference between the student's learning interests who learned using Uno Stacko integrated with the QR Code media and the students who learned only using the conventional method with lecturing. Based on the result, it concluded that the Uno Stacko learning media integrated with the QR Code on the topic of the Respiratory System used in the learning process was effective to help improve student's learning interest. This statement is supported by the average percentage result for each indicator of student's learning interest in Table 10

that the percentage of the experimental class is higher than the control class. The average result of the indicators of learning interest in the experimental class reached 81% with the "Very

Strong" criteria, while the control class reached 76% with the "Strong" criteria.

**Table 10.** Percentage of Learning Interest Per Indicator Result

Indicator	Total Number of Questions	Control Class Interest Percentage (%)	Experimental Class Interest Percentage (%)
Enjoyments	8	78	86
Student Interest	4	77	84
Student Attention	4	77	79
Student Engagement	5	73	76
Average		76	81
Category		Strong	Very Strong

Table 10 shows the student's interest in the control class with conventional lecture learning without the implementation of media is already in the "Strong" category due to the material of learning on the Human Respiratory System has been taught by the teacher before the research. The differences in the teaching delivery of the researcher compared to the previous teacher's teaching delivery become the factor influencing student's interest in the control class to have a strong category. However, the interest of students equipped with media shows higher results in the "Very Strong" category because using game-based media will easily make students feel happy and make the learning atmosphere interesting. Besides that, according to [Chen et al. \(2017\)](#), game-based media is a media that is easily accepted at all ages and is appropriate if applied at the junior high school level because basically students still like to play. The implementation of the Uno Stacko game-based media with group playing rules engages students actively in learning because it allows all students to interact with other students at the same time as well as with teachers who act as companions and regulators of the learning activity in the classroom.

In addition, the Uno Stacko media, which consists of block components, colorful questions, and a material card display, will make it easy for students to focus their attention. Supported by [Sujarwo & Oktaviana \(2017\)](#), the use of color can improve students' ability to carry out cognitive tasks, motivate students to learn, and affect students' memory performance. The design of the question and material cards of the Uno Stacko media, which is equipped with attractive pictures and pictures that support the explanation of the material, also makes students interested. According to Gardner in [Arlandi \(2014\)](#), one form of intelligence that students possess is Visual-Spatial intelligence, which can be developed by learning in the form of images so student learning processes can be intertwined more easily. In line with this, according to [Khairroh et al. \(2014\)](#), the use of attractive images and colors in learning media will

increase interest, help memory performance, and provide a more meaningful message to readers.

**Conceptual Understanding Effectiveness Test**

The effectiveness test of the learning media on the students' conceptual understanding used the non-parametric Wilcoxon Test because one group of data in the control class pretest data was not normally distributed. The result of the effectiveness test of the students' conceptual understanding data are presented in Table 11.

**Table 11.** Wilcoxon Test Result of Pretest-Posttest Data

	Experimental Class	Control Class
Z	-4.147 <sup>b</sup>	-3.925 <sup>b</sup>
Significance	0.001	0.001

Based on Table 11 of the Wilcoxon test result on the students' conceptual understanding data in both classes, there is a difference in the test result before and after learning. This result is seen from the significance value of p-value = 0.001 (p < 0.05). The N-gain test was carried out to find out the value of the improvement of the conceptual understanding of the two research classes. The result of the N-Gain test analysis is presented in Table 12.

**Table 12.** N-Gain Test Analysis Result

	Pretest average	Posttest average	N-Gain average	Category/interpretation
Control class	32.8	52.2	0.28	Low
Experimental class	33.0	54.1	0.32	Moderate

Based on Table 12, the control class shows an increase in conceptual understanding by obtaining an average N-gain result of 0.28, classified as "low" criteria. Meanwhile, the experimental class obtained a higher result with an average N-gain



result of 0.32 and falls into the criteria of "Moderate." From the result of the N-gain calculation in the control class and experimental class, the increase in conceptual understanding in the experimental class with the lecture method assisted by the implementation of the Respiratory System Uno Stacko learning media gives a higher result so that it is more effectively used to support the improvement of the student's conceptual understanding compared to learning only using lectures that focus on delivering material from textbooks.

The application of the Uno Stacko learning media will easily focus students' attention so that learning material will be learned easily by students. As the impact, it can help students to be able to distinguish, compare, and conclude the material, which will further increase their understanding (Slameto, 2010). The Uno Stacko learning media containing questions will stimulate students to be able to think and encourage students to solve problems in the form of questions that they receive. So, it can increase the understanding of the material being studied. In addition, the teachers play as a regulator of the game and give their support for each discussion of the game, which make students' understanding stronger. The Involvement of students directly in learning with game-based media will increase student retention of the material because the learning process becomes more meaningful (Lubis & Simatupang, 2014). Through the Uno Stacko media, which contains questions and material, students can practice and understand the material that is provided in the media in a more enjoyable way and without a sense of coercion. So, students will concentrate easily. The conventional method of lecturing and the teacher only focusing on delivering material using textbooks will give the impression of monotonous learning because the material will only be listened to by students. So, it reduces student's involvement in the class. Monotonous learning makes students feel bored, and eventually, they will easily ignore the material explained by the teacher. In line with Nurdiana et al. (2022), the neglect shown by students indicates that students lack of interest in the learning, which make their understanding of the material difficult to achieve.

### **Students' Response Test**

The students' response test of learning with the implementation of Uno Stacko media was carried

out in the experimental class after the learning was finished. The average data for each student response questionnaire indicator is presented in Table 13. It is the understanding compared to learning using the lecturing method that focus on delivering material from textbooks.

The application of the Uno Stacko learning media will easily focus students' attention so that learning material will be learned by students so that understanding can help students distinguish, compare, and conclude the material, which will increase their understanding (Slameto, 2010). The Uno Stacko learning media contains questions that will stimulate students to be able to think and provide encouragement for students to solve problems in the form of questions. So, it is able to increase the understanding of the material. In addition, the teachers play as a regulator of the game and give their support for each discussion of the game with lectures, which can make students' understanding stronger. The Involvement of students directly in learning with game-based media will be able to increase student retention of the material they are learning because they experience a more meaningful learning process (Lubis & Simatupang, 2014). Through the Uno Stacko media containing questions and material, students could practice and understand the material that is provided in the media in a more enjoyable way and without a sense of coercion. As a result, students will concentrate easily. The conventional method of lectures with the teacher only focusing on delivering material through textbooks will give the impression of monotonous learning because the material will only be listened to by students which reduces students' involvement in the class. Monotonous learning makes students feel bored, and eventually, they will ignore the material explained by the teacher. In line with Nurdiana et al. (2022), the neglect shown by students indicates that students lack of interest in the learning, so students' understanding of the material will be difficult to achieve.

### **Students' Response Test**

The students' response test of learning with the implementation of Uno Stacko media was carried out in the experimental class after the learning was completed. The average data for each student response questionnaire indicator is presented in Table 13.

**Table 13.** Students' Response Indicator Average

Indicator	Total Number of Question	Response Percentage (%)	Response Criteria
Format	8	81	Very Good
Relevance	5	84	Very Good
interest	6	82	Very Good
Satisfaction	5	79	Good
Self-confident	2	81	Very Good
Overall indicator average		81.2	Very Good

Table 13 showed that the use of Respiratory System Uno Stacko integrated with QR Code learning media generally obtained very good responses from the students, seen from the overall indicator average result of 81.2% with the response criteria "Very Good." The relevance indicator obtained the highest response percentage of 84%, so the Uno Stacko learning media is declared relevant to use and useful in increasing students' interest in learning. Also, it can be used as a tool to help to improve the students' conceptual understanding, and in line with the student preferences for learning that is interesting and triggers enthusiasm for learning. The format indicator obtained a percentage result of 81% with the "Very Good" criteria. The interest indicator obtained a percentage of 82% with the "Very Good" criteria. These results indicate that the learning media can attract students' attention to learning. According to Hasan et al. (2021), learning that is fun and free from boredom will be easily created through learning media that can attract students' attention. The level of student self-confidence that was reflected in the self-confidence indicator obtained a percentage of 81% in the "Very Good" criteria. Satisfaction indicators obtained a percentage of 79% in the "Good" criteria. The level of satisfaction shown by the students illustrates that the learning media has succeeded in creating a fun learning atmosphere to supports the success of learning. In line with the research by [Ardiansyah \(2022\)](#), student satisfaction is supported by the contribution of learning media, with learning interest being an important factor that plays a role in creating student satisfaction.

The Uno Stacko learning media that was implemented has the advantage of increasing student interest in learning because it is adapted from a popular game. And, through the growing interest, students' concentration becomes more preserved, so it makes a better students' understanding. In addition, the QR code can easily access the evaluation questions. However, in its development, the Uno Stacko game-based learning media is still ineffective if applied in a too big group because not all of the students can feel using the media directly. So, there are still some students in

the group who do not take part or participate in the group. In addition, the use of Respiratory System Uno Stacko media requires more time to implement.

### CONCLUSION

Based on the research and development, Uno Stacko game-based learning media integrated with the QR Code which contains material on the Human Respiratory System at grade VIII of junior high school level was feasible and valid to be applied in class. The Respiratory System material on Uno Stacko learning media makes it easy for students to build interest because the learning media is packaged in the form of a game that can embrace students. So, they can be active in learning activities. In addition, the developed media consists of packaging component appearance, blocks, question cards, and material cards that are designed in colorful and pictorial ways so that it is attractive to students. The developed Uno Stacko media can increase conceptual understanding because it contains questions and material contained in the form of cards. As a result, it can stimulate students to think and solve the problems in a fun way because they can learn while playing. The implementation of the Uno Stacko learning media is carried out at the end of learning activities to strengthen the learning activities on the topic of the Human Respiratory System that has been studied previously.

Suggestions on the developed learning media and for further research are (1) In future research, it can extend the duration of time for applying the media so that all students have more opportunities to play directly with the learning media. (2) In the implementation of the Uno Stacko media in the classroom, other learning models besides lectures can be used to support joint learning by applying the developed Respiratory System Uno Stacko media. (3) The development of game-based learning media can be carried out with various adaptations of different games and materials, so that it can be used to help improve students' interest and conceptual understanding.

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