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Utilization of LMS G-Site with Independent Learning Flow to Improve Critical Thinking Ability on Respiratory Materials

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Abstract

Independent Learning is an educational process that guides students to develop according to their nature to achieve safety and happiness. One of the characteristics of Pancasila student profiles is critical thinking, in the hope that students can mobilize and develop physical and spiritual strength in accordance with nature, era, and society. This happens because education does not provide the widest possible space for students. There needs to be a LMS G-Site with Independent Learning Flow to improve critical thinking skills. This study aims to analyze the use of the LMS G-Site with the Independent Learning flow to improve the critical thinking skills of high school students about human respiration. This study is conducted using Research and Development (R&D) model. The research design was carried out using the ADDIE development research design. The characteristic of LMS-G-Site is that there is an Independent Learning flow where in each flow, materials, learning videos and tasks in differentiated learning are provided. The use of the LMS G-Site with Independent Learning Flow is reflected in the post-test score (90.08%) which is higher than the pre-test score (63.83%) and the N-gain test result is 76% in the high category. As for student learning outcomes based on assignments as much as 80.43% of students got an assignment score in the very good category and as many as 19.57% students got an assignment score in the good category. Thus, the LMS-G-Site with Independent Learning Flow can be used as an alternative to improve students' critical thinking skills based on knowledge and students' skills in differentiated learning aspects.

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INTRODUCTION

The education obtained by students will lead them to become superior and virtuous human beings when they become students and after going into society. Every educator must believe and have the principle that children can learn independently if they are given the opportunity to find and determine their learning goals according to their nature (Ministry of Education and Culture, 2020). Education is a 'guidance' in the lives of students, meaning that the growth and development of children lies beyond the skills or will of both teachers and parents. Children are creatures, humans, and living things, so that they live and grow according to their own nature (Ministry of Education and Culture, 2020).

Critical thinking is the right basic ability for students to understand learning materials independently (Linanti, 2020). This supports the implementation of independent learning which is a program of the Ministry of Education and Culture of the Republic of Indonesia (Kemdikbud) which has been socialized directly by the Minister of Education under the name of the Motivating Teacher Program with the aim of realizing the Pancasila student profile. The Pancasila student profile is meant to create students who believe and be pious to God Almighty while also have noble character, creative, amenable to work together, have global diversity, think critically, and are independent (Ministry of Education and Culture, 2020). Students' lack of confidence in expressing ideas, thoughts and creativity might be due to teacher's less precise teaching strategies and teacher-centered learning (Oktaviani, 2017).

The learning applied by the teacher is still dominated by the knowledge aspect, which does not require students to be active and train students in independent learning so that students are not able to think critically. Students are still invited to memorize concepts without thinking about the process to find concepts. This affects the lack of students' ability to think critically to solve problems. Students' weak problem-solving ability is influenced by students' lack of critical thinking skills (Adnyana, 2021).

The material for the respiratory system in humans is one of the learning materials for biology. It is necessary to have oxygen be free of pollution and available in good quantity and quality, as all living things need oxygen in order to live. Students having cognitive understanding of the materials would mean a generation that would care about environment conservation (Taib et al., 2021).

Developing independent learning for students in order to improve their ability to explore information and arguments can be done by giving students the opportunity to observe what they know and do, so that they can reflect and implement it in the community. One strategy to realize this is through the Independent Learning Flow integrated with the LMS G-Site, which is oriented to the nature of students. Based on the explanation above, there is a need for research on Learning Media Development LMS (Learning Management System) G-Site with Independent Learning Flow to improve critical thinking skills in everyday life in the form of real actions that can be reported online.

METHODS

This research was conducted at the Islamic Center Senior High School and Al Irsyad Islamic Senior High School in Demak Regency. Research is carried out using the Research and Development model. The research subjects consisted of 48 students from Islamic Center Demak, consisting of 24 students from class XI MIPA 1 as control and 24 students from class XI MIPA 2 as a treatment class, while from Al Irsyad Islamic High School Demak, the observed students consisted of 31 students from class XI MIPA 1 the control class and 31 students from class XI MIPA 2 as the treatment class. From a total of 110 students, as many as 89 students filled out the questionnaire via google forms while the remaining 21 did not fill out the questionnaire because 12 students lived in the dormitory and were not allowed using smartphones, while 9 other students did not fill out the questionnaire because they did not have smartphones. The research design used in this study is ADDIE design (*Analysis, Design, Development, Implementation, and Evaluation*). The LMS G-Site is designed by implementing self-guided learning and each flow contains a critical thinking component to help students actively learn. Each flow contains an assignment or task that must be completed by students by applying differentiated learning according to student needs. The design used in this study is a one group pre test-post test design

with 2 class samples, experimental and control. It is presented in table 1.

Table 1. Research Design

Type	Pre Test	Treatment	Post Test
Treatment	01	X	02

The data on the results of the ease of implementing the G-Site LMS with Independent Learning Flow are obtained from the results of student test scores. According to Devi (2021), the test method is a technique for collecting data through assignments in written, oral and practical forms. Student test tasks in the form of pre-test and post-test and N-Gain test. The results of the analysis in percentages are adapted from (Ridwan et al., 2021), which is presented in table 2.

Table 2. Category of Ease of Use of LMS G-Site with Independent Learning Flow

No	Category	Notes
1	0,00 <N-Gain ≤ 0.29	Low
2	0,30 <N-Gain ≤ 0.69	Medium
3	0,70 <N-Gain ≤ 1.00	High

RESULTS AND DISCUSSION

Analysis of necessity in media development. Utilization of technology as a distance learning medium can be used by both teachers and students as distance learning needs so that students' needs in learning are met (Erni, 2020). Analysis of learning necessity that applies differentiated learning to meet students' learning needs according to their learning styles so that students get comfortable in learning, which would make the teaching and learning process become fun. This in turn would have an impact on students to make them develop critical thinking skills by learning independently, guided by distance learning models during the covid 19 pandemic. The results of the analysis of the need for the use of learning media can be seen in Figure 1.

(Source: LPMP Jatim)

Figure 1. Data on Online Learning Media of Interest (Source: Education Quality Assurance Agency (LPMP) East Java)

The survey results show that the online learning system platforms most used by teachers is the WhatsApp Group application (390 people: 28,14%) while another platform is a learning management system developed by schools, Zoom Cloud Meeting, That Quiz, Schoology, Kahoot, Zenius, Candy CBT, Cisco Webex Meeting, Classdojo, Kejar.id, Padlet, Quick Edu, Start Meeting, Talk Fusion and others. On the other hand, about 39 people (2,81%) have yet implemented the online learning system.

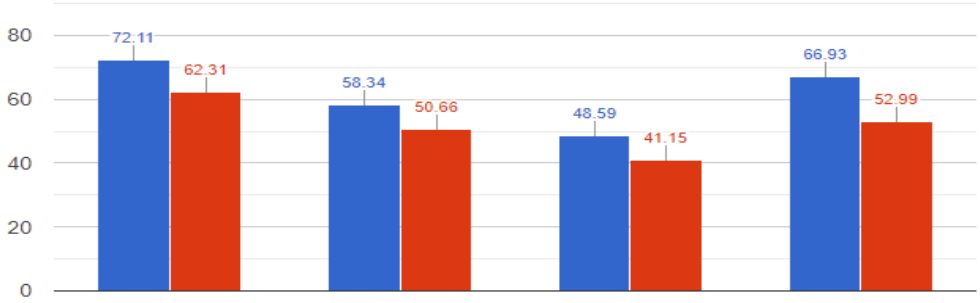

Figure 2. Graph of the percentage of students mastering the national exam material (Source: hasilun.puspendik.kemdikbud/2019)

Based on Figure 2, it shows that the scope of the material on the structure and function of living things at the provincial level is 58.34% and the national level is 50.66%. It means that the level of students' understanding of the material at the national level is still low so it needs to be improved.

Design. In this stage, instruments that will be used to assess LMS G-Site with Independence Learning flow media is developed. The instrument is prepared by taking into accounts module assessment aspects, such as content, language, presentation, and graphic feasibility as well as suitability with the approach used. The instrument that was prepared was in the form of LMS G-Site learning media assessment sheet with Independent Learning Flow and a response questionnaire. Furthermore, the instruments that have been prepared will be validated to obtain a valid assessment instrument.

Development. The LMS G-Site Media with the Independent Learning Flow development involves media experts so that they can provide suggestions and comments regarding the contents of media which will later be used as a benchmark for revision of LMS.

Figure 3. LMS G-Site view

In the initial view of the G-Site, various features will be displayed including the untitled site, enter site name and the title of the G-site according to the desired title. On the left side there are inserts, pages, themes, layouts and sharing icons to activate other features.

Implementation. Implementation was carried out as a trial of learning media which was made as a real step in implementing the developed learning media. The results of research on the ease of access of the LMS G-Site with the Independent Learning flow to improve students' critical thinking skills working on pre-test and post-test questions that contain critical thinking components in the experimental class consisting of 24 Islamic Center Senior High School students, and the experimental

class consisting of 31 Al Irsyad Islamic Senior High School students, totaling in 55 students in the experimental class. The pre-test scores aim to determine the students' initial abilities before the LMS G-Site is applied as a learning medium, while the post-test scores are used to determine students' abilities (determining students' classical completeness criteria) after the application of the G-Site LMS as a learning medium. The results of the pre-test and post-test scores for critical thinking abilities are presented in Table 3.

Table 3. *Pretest and Posttest Scores* In Doing Critical Thinking Ability Test

No	Description	Pre-test Score (n=55)	Post-test Score (n=55)
1	Highest Score	88	100
2	Lowest Score	40	69
3	Average Score	63.83	90.08
	Total Completed Students	6	45
	Total Not-Completed Students	40	1
	Classical Completeness (%)	13.04	97.83

The data in table 3 shows that the results of the pretest have a score below the minimum completeness criteria, which is an average of 63.83%. Meanwhile, the post-test scores carried out after the application of the LMS G-Site learning media is 90.08%, which indicates an increase in the post-test average score compared to the pre-test average score. Based on the cognitive learning outcomes that were tested on students, the LMS G-Site has fulfilled one of the indicators of learning effectiveness as a learning medium on the Respiration System material. The application of the LMS G-Site as a learning medium shows that students' cognitive learning outcomes achieve classical completeness of 97.83 with a Minimum Completeness Criteria of 70.

The improvement of student learning outcomes before and after being given treatment was tested through the N-Gain test. The average score of the N-Gain test is 75.51% and the distribution of the N-Gain score of 0.76 is considered in the high category. To prove that there was an increase after being given treatment, the results of the N-Gain test are presented in Table 4.

Table 4. Students' N-Gain Test Result by Implementing LMS G-Site with Independent Learning Flow

N	*N-Gain* (%) Category Percentage		
	High	Mid	Low
55	27	23	5
N-Gain (100%)	26	22	5

Learning outcomes was obtained from pre-test and post-test scores. There was an increase in student learning outcomes, where the average pre-test score of students was 63.83 and the average post-test score was 90.08. Before learning begins, students are directed to open the LMS G-Site address with the independent learning flow which is shared by the teachers via mobile android. The teachers then explain how to use the G-Site LMS with the Independent Learning Flow.

Learning outcomes based on assignments in this study are based on the final results of the assignments about real action by applying differentiated learning where students can choose strategies or ways to carry out their duties using student learning styles according to their needs. Assignments given are in the form of making posters or flyers, recording video invitations, and writing essays about tree planting campaigns. Student assessment results based on assignments are presented in Table 5.

Table 5. Students' Critical Thinking Ability Based on Tasks on Real Action

No	Category	Criteria	Notes	
			Students	Score (%)
1	81.25%<score≤100%	Very Good	46	80,43
2	62.50%<score≤81.25%	Good	9	19,57
3	43.75%< score≤62.50%	Not So Good	0	0
4	25%< score ≤43.75%	Not Good	0	0
	Total		55	100

Assessment of learning outcomes is carried out through student activities in preparing real actions. Students are given a stimulus in the form of environmental pollution caused by human activities in the form of vehicle smoke, cigarette smoke and factory smoke. Then the students were asked to make an invitation or a campaign about planting trees so that the air quality is better and the respiratory system health is maintained. According to (Zulkarnaen et al., 2016) trees in open spaces have an ecological function to maintain oxygen quality. The existence of an open space full of trees will be used by the community as a location for fitness exercises because it has good oxygen quality (Mahanal, 2012). It can be seen from the results of the report in table 5 that 80.43% of students got the score in the very good category and about 19.57 % got the score in the good category. According to student learning outcomes from doing the final project, students have a high willingness to carry out real actions, discover and learn new things by looking for credible sources.

Evaluation on the LMS G-Site. Learning by using the LMS G-Site with the Independent Learning flow can improve critical thinking while increasing understanding of the material about respiration. This is in accordance with the opinion (Mahanal, 2012). This is reinforced by the opinion (Hotmaida, 2021) that independent learning is one of the government programs in creating a learning atmosphere in schools that is full of happiness for students so that students can feel safe and comfortable in the learning process, which in turn can improve their learning outcomes. This way, that personal values in students can be formed and developed so as to create good behavior habits in accordance with nature, era, and society (Nuriyatul, 2021). At the evaluation stage on the LMS G-Site, the features presented are classified as very easy to use by teachers in helping online learning. The LMS G-Site media is easy to operate and can be accessed easily on students' laptops and gadgets and helps students in guided independent learning and can improve critical thinking skills.

CONCLUSION

The ease of using the LMS G-Site with the Independent Learning flow to improve students' critical thinking skills in respiration material obtained pre-test, post-test and N-Gain scores. The results of the post-test scores were relatively higher than the pre-test scores, with pre-test scores having an average of 63.83 and post-test scores an average of 90.08 while the average score of the N-Gain test is 75.51%. The distribution of the N-Gain score of 0.76 is in the high category. Thus, the use of the LMS G-Site with the Independent Learning Flow is effective in improving critical thinking skills through differentiated learning through assignments and tasks in several Independent Learning flows.

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