



The Effect of Internet Media Utilization and Learning Motivation on Mathematical Reasoning Ability

Mohammad Nasrul¹, Achmad Noor Fatirul², Djoko Adi Walujo³
^{1,2,3}Universitas PGRI Adi Buana Surabaya

ARTICLE INFO

Article history:

Received Sept 28, 2022

Revised Okt 26, 2022

Accepted Nov 1, 2022

Keywords:

Internet Media Utilization

Learning Motivation

Mathematical Ability

ABSTRACT

The purpose of this study was to determine the test results: (1) Knowing the differences in the use of the internet on students' mathematical reasoning abilities, (2) Knowing the differences in learning motivation on students' mathematical reasoning abilities, and (3) Knowing the interaction between internet use and learning motivation on students' mathematical reasoning abilities. This experimental research was carried out using a 2x2 factorial design. The results of the calculation show that: (a) The use of internet media can increase students' ability to understand more deeply and be inspired by actual events, (b) The use of internet media students will be more motivated to understand the content of messages that can resemble facts or actual events, and (c)) the effect in the interaction to improve students' understanding of the subject matter between the use of learning media or students' learning motivation. Based on the results of this study, it was concluded that by using Internet Media Utilization. From the results of the analysis showed that between learning media and learning motivation both contributed jointly between learning media and learning motivation, meaning that the effect of interaction between learning media and learning motivation could increase students' ability to understand both in terms of the use of internet media and without using internet media and both students who have high motivation and those who have low motivation.

This is an open access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license.



Corresponding Author:

Mohammad Nasrul,
Universitas PGRI Adi Buana Surabaya,
Universitas PGRI Adi Buana Surabaya di Kampus Menanggal,
Jl. Dukuh Menanggal XII, Surabaya 60234 Jawa Timur, Indonesia,
Email: nasrulalfikri@gmail.com

1. INTRODUCTION

The development of technology and information, especially the internet at this time, should be able to be used by the world of education to make it a means of learning, both outside and inside the classroom. There are many alternative learning that can be raised from the use of this internet. One of them is the use of social media as a learning medium (Chusna, 2017; Irwandani & Juariyah, 2016; Nurkolis & Muhdi, 2020).

However, based on the results of a preliminary study conducted at SDN Gedangmas 02 Lumajang, it was found that teachers still have not taken advantage of the rapid development of the internet as a medium of learning in the classroom, especially in science learning. Generally, new teachers use offline media in the form of powerpoints and learning

videos. In fact, most of the internet support facilities (smartphones, wifi, laptops/computers) are owned by both teachers and students.

Students need new learning media so that the learning process in the classroom is not monotonous. Especially in science learning. One alternative solution that can be developed is the use of social media as a learning medium (Ahnaf et al., 2021; Karyati & Rahmawati, 2021; Kurniawati & Nita, 2018). Social media was chosen because it is a trend that is currently developing (Saputri & Guspatni, 2021; Sari, 2020; Wanda listiani et al., 2020).

Based on a survey conducted at SDN Gedangmas 02 Lumajang for science subjects, almost 99% of students have social media accounts such as facebook, twitter, and whatsapp and 97% of students always use the internet to do schoolwork. Based on the results of the survey, developers are trying to develop learning media assisted by social media whatsapp (Hadi, 2021; Hartinawanti et al., 2021; Wardhani et al., 2021).

Social media users in Indonesia currently mostly like the Whatsapp application, especially the category of teenagers and students (Baishya & Maheshwari, 2020; Dinata et al., 2020; Khasanah et al., 2021). This is because WhatsApp Messenger is an information technology application that has many benefits and is very easy as a communication tool. In WhatsApp Messenger there To achieve the quality as expected in the goals of National Education, education improvement must always be sought both in terms of quantity and quality. And this involves various parties involved in this process. Through the internet, anyone can freely access various information from various places. This information can be accessed in the form of text, graphics, sound or video. Internet stands for Interconnection Network which can be interpreted as a connection between computer networks. The Internet is a collection of various networks between computers around the world. In other words, the internet is formed from a combination of global LANs (Hardiyani, 2008). The Internet is an unlimited communication network that involves millions of personal computers spread all over the world. The facilities available on the internet network allow users to obtain information and communicate according to what is needed.

One of the goals of using the internet in education is to overcome the limitations of learning resources that have only been provided by schools and libraries can be equipped with virtual worlds. With the internet everything that happens around the world can be seen and known right away. This learning model becomes more dynamic, compared to the lecture method and focuses on educators explaining the material contained in printed books. Various kinds of information such as online libraries, online journals, magazines, and even text books that can be downloaded for free from various sites in the internet world. The conclusion from the above opinion is that the internet has met the criteria as a learning resource and allows the availability of online learning resources that can be accessed 24 hours a day and at an affordable cost.

The use of the internet is expected to help educators in increasing students' learning motivation, especially in mathematics. A subject that is unique and becomes an important focus at school is mathematics (Hanifah, Sa'adah, & Sasongko, 2019). According to Zaenab (2015), mathematics and mathematical reasoning are closely related to each other, because mathematical material is studied by reasoning and reasoning is learned by understanding mathematics. Reasoning is a thought process to state conclusions or create new explanations based on previous explanations (Sumartini, 2015). In growing the motivation to learn mathematics for elementary school students can be done by educators, where by showing the enthusiasm of educators in teaching the material being taught, because this is closely related to the motivation of students in learning. Because educators who have a great passion in teaching the material being taught, will affect the motivation of students towards the material being taught. It is impossible for an educator to raise the motivation of his students, if the educator does not have the motivation to provide mathematics subject matter.

An interesting field of study will foster a person's motivation to study it as well as possible, and conversely an inappropriate field of study can affect his motivation, which

will not attract students to learn more. Therefore, in teaching and learning activities, it is necessary for an educator to be able to present teaching materials as well as possible and as attractive as possible, if the teaching materials given to students are not interesting, there will be boredom to learn which results in decreased quality of learning. Until now, Mathematics is still referred to as a difficult subject for students to learn, especially students who experience learning dilemmas and are motivated to learn Mathematics. This happens because the lack of motivation comes from the students themselves, as well as the motivation that comes from educators as motivators who must be able to grow students' motivation for mathematics lessons, as well as a lack of understanding of how to actually operate Mathematics.

2. RESEARCH METHOD

This research is a quantitative research as stated by Sugiyono (2008) that quantitative method is a scientific/scientific method because it has fulfilled scientific principles, namely concrete/empirical, objective, measurable, rational and systematic. The research population is class VI students at SDN Kalipuro, Kec. Pungging Kab. Mojokerto. Data collection techniques that are often used in social research, including education are: (1) Questionnaire or questionnaire method; (2) interview method; (3) observation method; (4) documentary method; and (5) test method.

3. RESULTS AND DISCUSSIONS

The results of this study contain data presentation and hypothesis testing. All statistical calculation results are presented in the form of SPSS 20 output. This section will discuss hypothesis testing concerning differences in student understanding learning outcomes which are reviewed based on the level of learning motivation, namely low, medium and low motivation levels. tall. Then it will also be described about the learning outcomes of students' understanding abilities which are reviewed based on the media used, namely without using internet media with those using internet media and finally testing the interaction pattern between two factors, namely the joint influence between the learning media used and the level of interaction between the two factors. students' learning motivation on learning outcomes of students' understanding abilities.

Furthermore, the third, fourth and fifth lines are about the statistics of the hypothesis test which will be described below.

Table 1. ANOVA

Tests of Between-Subjects Effects					
Dependent Variable: Kemampuan Pemahaman					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Media	3428,776	3	1142,925	6,892	,000
Intercept	331927,460	1	331927,460	2001,668	,000
Media	1413,593	1	1413,593	8,525	,005
T_Motivasi	1709,733	1	1709,733	10,310	,002
Media * T_Motivasi	702,136	1	702,136	4,234	,044
Error	9286,224	56	165,825		
Total	363850,000	60			
Corrected Total	12715,000	59			

a. R Squared = ,270 (Adjusted R Squared = ,231)

To test the first hypothesis, it reads: The test criteria used are if the probability (significance) is greater than or equal to 0.05 then H_0 is accepted while if the opposite is if

the probability (significance) is less than 0.05 then H_0 is rejected (H_a is accepted). . And the results of the statistical tests listed in the fourth row of table 4.11 turned out to be the following results: The F value was obtained at 8.525 with a significance of 0.005. This shows that H_0 is rejected (H_a is accepted) meaning that there are differences in learning outcomes of understanding abilities between groups that use internet media and those who do not use internet media. \

To test the second hypothesis, it reads: The test criteria used are if the probability (significance) is greater than or equal to 0.05 then H_0 is accepted whereas if the opposite is if the probability (significance) is less than 0.05 then H_0 is rejected (H_a is accepted). The results of the statistical test listed in table 4.11 in the fourth row turned out to be as follows: The F value was obtained at 10.310 with a significance of 0.002. This indicates that H_0 is rejected (H_a is accepted), meaning that there is a difference in learning outcomes of understanding abilities between groups with low learning motivation and students who have high learning motivation.

To test the third hypothesis, it reads: The test criteria used are if the probability (significance) is greater than or equal to 0.05 then H_0 is accepted while if the opposite is if the probability (significance) is less than 0.05 then H_0 is rejected (H_a is accepted). From the statistical test results listed in the fifth row of table 4.11, the following results were obtained: The F value was obtained at 4.234 with a significance of 0.044. This shows that H_0 is rejected (H_a is accepted) which means that there is an interaction between learning media and students' learning motivation on the learning outcomes of students' understanding abilities, in other words that the learning media and the level of learning motivation, together can significantly improve the learning outcomes of students' understanding abilities.

- 1) Differences in Mathematics Comprehension Ability between those who were treated with internet media and those who were treated without using internet media.

The use of varied learning media allows interaction in the teaching and learning process so as to create reciprocal communication between teachers and students, and students with students. In fact, the size of the interaction varies depending on the media used.

Variations of learning media are variations of learning media in which a teacher has carried out learning activities by applying various media according to the wishes and characteristics of students then combined with the use of methods or strategies that will be used by collaborating in the form of discussions. In other words, where a teacher first conveys lesson material by presenting it verbally to students, then students are assigned to pay attention to the media presented in the form of impressions on the internet by paying close attention to what phenomena occur related to learning materials.

The F value obtained is 8.525 with a significance of 0.005. This shows that (H_a accepted) means that there is a difference in learning outcomes between the groups taught using the internet and using the internet.

Learning using internet media has been widely developed by experts who refer to the latest technological developments in the 21st century. This change contains multi-functional applications in the field of education and learning in the 21st century that are more realistic and can be carried out without having to change the existing curriculum and order.

One of the philosophies underlying the realistic approach is that art is not a complete set of rules or characteristics that students must learn. Internet stands for Interconnection Network which can be interpreted as a connection between computer networks. The Internet is a collection of various networks between computers around the world. In other words, the internet is formed from a combination of global LANs (Hardiyani, 2008). The Internet is an unlimited communication network that involves millions of personal computers spread all over the world. By using the Transmission Control Protocol/Internet Protocol (TCP/IP) and supported by communication media such as satellite and radio

packets, the internet has enabled communication between computers with unlimited distances (Oetomo, 2006). The facilities available on the internet network allow users to obtain information and communicate according to what is needed. There are several benefits of online learning, namely: (1) It can build very efficient communication and discussion between students and educators, (2) students can interact and discuss with each other without going through an educator, (3) can facilitate interaction between students and educators with parents, (4) the right means for holding exams and quizzes, (5) educators can easily provide material to students in the form of pictures and videos through various applications, (6) can make it easier for educators to make questions anywhere and anytime without any time limit (Firyal, 2020). On the other hand, according to Bilfaqih and Qomarudin (Bilfaqih, Y., & Qomarudin, 2015) explain some of the benefits of online learning as follows: (1) Improving the quality of education and training by utilizing multimedia effectively in learning, (2) increasing the affordability of education and quality training through the implementation of online learning, (3) reducing the cost of providing quality education and training through the use of shared resources.

Previous research has proven that: It was revealed by Fatirul (2012) that the use of the internet can improve student learning achievement in terms of cognitive style, Tiono Setyawan at.al. (2021) Online media can improve students' thinking skills. Leni Kristiana Dewi at.al (2021) Multimedia can increase students' achievement in critical thinking skills and improve their learning achievement. Fatirul, Subandowo (2021) concluded that learning using an LMS that is integrated with the internet will improve problem solving skills and students have critical and creative thinking skills. Maisyaroh at.al. (2019), that multimedia in internet social media can improve student learning outcomes and effectively achieve learning goals. Fatirul, Djoko (2020) resulted that media can be accessed via smartphones, making it easier for students to learn and download, so that students are comfortable and have fun in lifelong learning.

This provides an understanding of the results of research that has been carried out by previous research that anything including learning media using the internet will be able to improve results, learn, improve learning achievement, increase critical and creative thinking, and improve understanding abilities. This means that as students' needs, students want what is obtained in the learning process, they want convenience, comfort, learning anywhere and fun.

- 2) There is a difference between students who have high learning motivation and get better understanding ability learning outcomes than students who have low learning motivation.

Motivation is one of the important and decisive factors in the learning process, the success of educational organizations in achieving goals largely depends on the willingness of students to learn and achieve. Therefore, education providers, including teachers and parents, must strive so that the students they teach have high motivation to learn and excel. Motivation relates to a person's psychological factors that reflect the relationship or interaction between attitudes, needs, and satisfaction that occurs in humans.

Achievement motivation is an effort to achieve success, which aims to succeed in competing with a measure of excellence. The measure of excellence meant in this case is in the form of other people's achievements, but it can also be the person's own achievements that were achieved in the past. In other words, achievement motivation is one of the factors that greatly affects a person's behavior in doing a job, actions or activities towards achieving the goals that have been set.

Based on the definitions of achievement motivation and a description of the characteristics of highly motivated as stated above, it can be concluded that achievement motivation is the process of generating motion in a person to take action so as to achieve the best possible results.

And the results of the statistical tests listed in the fourth row of table 4.11 turned out to be the following results: The F value was obtained at 10.310 with a significance of 0.00.

This shows that the mean learning outcomes of students who have low and high levels of learning motivation are not identical or significantly different, meaning that there is a significant difference.

Some of the reasons underlying the importance of tutoring programs in schools according to Oemar Hamalik (2007): (a) All actions, including the act of learning art skills according to the type of action they want to do, students must do the act of learning, while he is not able to do it well. resulting in failure which means a loss, both the student concerned and the teacher, parents and society. That's why assistance/guidance on how to carry out learning activities needs to be given to students who need it, (b) Everyone of course experiences personal problems with different forms and manifestations that may greatly affect him, and can even foster unhealthy mental tendencies. which can hinder him from carrying out activities and to achieve success, (c) There is a desire from students to continue their studies to a higher level of education, then guidance is needed, and (d) Students who want after graduation will work in a company. Here guidance is needed to prevent the emergence of personal graduation and also less work productivity that causes losses

The main purpose of tutoring provided by the teacher is to develop all students' abilities so that they can successfully develop their lives at a more appropriate level or situation. Learning motivation serves to lead students through the process of providing assistance to individuals and groups so that they are able to adapt themselves well to school, family and society.

According to Oemar Hamalik, (2007) one of the repetition techniques is a review or reteaching which means repeating or re-learning the materials that have been taught with the intention of gaining understanding, expanding or deepening and clarifying the materials that have been taught.

Previous research has proven as has been done, among others: Dawson R. Hancock (2010) which proved that graduate students who were exposed to verbal praise well administered by a professor performed significantly better on exams administered by the professor, spent more time to do homework and show higher motivation to study in class than the receptive students. no verbal praise. Characteristics of effective verbal praise that contributed to these results, the potential uses of verbal praise as reinforcement of student motivation and direction for future research are discussed, Teresa K. Debacker & R. Michael Nelson (2010) concluded that from motivation Boys have higher scores than girls' motivation in terms of perceived abilities and stereotyped views about science. Ari Riswanto, Sri Aryani (2017) get students' motivation to learn in two subjects that are used as references, in the class they have very good and very good motivation, it is important for students to get facilities so that they can generate better learning motivation.

3) There is an interaction between the use of learning media and learning motivation on learning outcomes of understanding abilities

Students who have learning motivation can be seen through the attitude of these students in terms of liking to choose learning media, because it needs to be realized that the selection of learning media is closely related to the subject matter being studied, so it can be said that the selection of the right learning media will be able to generate student learning motivation.

From the statistical test results listed in the fifth row of table 4.11, the following results were obtained: The F value was obtained at 4.234 with a significance of 0.044. This shows that there is an interaction between the use of learning media and learning motivation to increase student understanding ability learning outcomes, in other words that learning media and learning motivation levels, together can significantly improve students' understanding ability learning outcomes.

Medial learning aims to equip students with knowledge that can be flexibly applied (transferred) from one problem to another and from one context to another. Defining transfer is the ability to think and argue about new situations through the use of prior

knowledge. It can have a positive connotation if learning or problem solving is improved through the use of prior knowledge through modern learning media that can be accessed anywhere with a smartphone (lifelong learning). It can have a negative connotation if prior knowledge significantly interferes with the learning process. Transfer can also occur in one context through the assignment of tasks that are closely related to the subject matter, or certain situations, and then used in other contexts.

If the learning media is applied with high motivation, it will be able to improve the main learning outcomes at the level of understanding ability. This is reinforced by the opinion of M. Nur, (2000) that in order for learning to occur, students must take action on the new information and connect the new information with prior knowledge, namely the coding process strategy which is often called the repeat strategy.

Previous research that has been carried out has proven that the use of learning mode has a good influence on increasing learning achievement, among others what has been done by Syaiful Islam et al. (2018) found that the application of a learning model that had a significant effect on increasing learning motivation turned out to be the basic capital for the next response in the form of increasing student achievement. However, it should be realized that motivation is a complex psychological factor. Debra K. Meyer & Julianne C. Turner (2006) argue for a more integrated model that describes emotion as part of a collective experience that can explain emotion in terms of motivation and learning — as an integrated process, Graham (1991), "Theory of motivation worthy of educational psychology must be able to combine emotions. However, the classroom is the site of several affective experiences with motivational significance, including feelings associated with the success or failure of achievement, as well as acceptance or rejection by others.

From the opinion above, it can be concluded that in order for learning to occur that can improve learning outcomes, it is necessary to have a real approach to the learning model used. The research results show that the contextual art learning process has shown satisfactory results.

4. CONCLUSION

Based on the results and discussion on research on the Effect of Internet Media Utilization and Learning Motivation on the Mathematical Reasoning Ability of Class VI Students at SDN Kalipuro District. Pungging Kab. Mojokerto". it can be concluded that: (a) the use of internet media can increase students' ability to understand more deeply and be inspired by actual events, (b) use of internet media students will be more motivated to understand the content of messages that can resemble facts or actual events, and (c)) Which has a stronger influence in the interaction to improve students' ability to understand the subject matter between the use of learning media or students' learning motivation. From the analysis results show that between learning media and learning motivation both contribute jointly between learning media and learning motivation, meaning that the effect of interaction between learning media and learning motivation can improve students' understanding abilities both in terms of using internet media and without using the internet. internet media and both students who have high motivation and those who have low motivation.

REFERENCES

- Dawood, O., Rea, J., Decker, N., Kelley, T., & Cianciolo, A. T. (2021). Problem-Based Learning About Problem-Based Learning: Lessons Learned from a Student-Led Initiative to Improve Tutor Group Interaction. *Medical Science Educator*, 31(2). <https://doi.org/10.1007/s40670-021-01259-1>
- Edwards, N., King, J., Pfeffer, S., Lovric, E., & Watling, H. (2021). Teaching disability using problem-based learning in the international context: utility for social work. *European Journal of Social Work*. <https://doi.org/10.1080/13691457.2021.1954890>

- Eyal, L., & Gil, E. (2022). *Hybrid Learning Spaces — A Three-Fold Evolving Perspective*. https://doi.org/10.1007/978-3-030-88520-5_2
- Ezaldeen, H., Misra, R., Bisoy, S. K., Alatrash, R., & Priyadarshini, R. (2022). A hybrid E-learning recommendation integrating adaptive profiling and sentiment analysis. *Journal of Web Semantics*, 72. <https://doi.org/10.1016/j.websem.2021.100700>
- Gunawan, W., Mastroah, I., Septantiningtyas, N., Wiyarno, Y., & Atiqoh, A. (2022). Pengaruh Strategi PBL dan Motivasi Belajar terhadap Hasil Belajar Bahasa Inggris. *Jurnal Basicedu*, 6(4), 6023–6029. <https://doi.org/10.31004/basicedu.v6i4.3122>
- Huang, J., & Zhou, Q. (2022). Partitioned hybrid learning of Bayesian network structures. *Machine Learning*. <https://doi.org/10.1007/s10994-022-06145-4>
- Kaewsrisai, K. (2022). Active blended learning management in music subject based on the hybrid learning framework for primary 4 students at Ban Nong Du School, Thawat Buri District, Roi Et Province. *Linguistics and Culture Review*, 6. <https://doi.org/10.21744/lingcure.v6ns2.2073>
- Khan, M., Naeem, M. R., Al-Ammar, E. A., Ko, W., Vettikalladi, H., & Ahmad, I. (2022). Power Forecasting of Regional Wind Farms via Variational Auto-Encoder and Deep Hybrid Transfer Learning. *Electronics (Switzerland)*, 11(2). <https://doi.org/10.3390/electronics11020206>
- Kim, S. H., Park, D. Y., & Lee, K. H. (2022). Hybrid Deep Reinforcement Learning for Pairs Trading. *Applied Sciences (Switzerland)*, 12(3). <https://doi.org/10.3390/app12030944>
- Morgado, M., Mendes, J. J., & Proença, L. (2021). Online problem-based learning in clinical dental education: Students' self-perception and motivation. *Healthcare (Switzerland)*, 9(4). <https://doi.org/10.3390/healthcare9040420>
- Salmanpour, M. R., Shamsaei, M., Hajianfar, G., Soltanian-Zadeh, H., & Rahmim, A. (2022). Longitudinal clustering analysis and prediction of Parkinson's disease progression using radiomics and hybrid machine learning. *Quantitative Imaging in Medicine and Surgery*, 12(2). <https://doi.org/10.21037/qims-21-425>
- Sengupta, D., Ali, S. N., Bhattacharya, A., Mustafi, J., Mukhopadhyay, A., & Sengupta, K. (2022). A deep hybrid learning pipeline for accurate diagnosis of ovarian cancer based on nuclear morphology. *PLoS ONE*, 17(1 January). <https://doi.org/10.1371/journal.pone.0261181>
- Xu, B., Guo, F., Xing, L., Wang, Y., & Zhang, W. A. (2022). Accelerated and Adaptive Power Scheduling for More Electric Aircraft via Hybrid Learning. *IEEE Transactions on Industrial Electronics*. <https://doi.org/10.1109/TIE.2022.3150107>.