Islamic Journal of Integrated Science Education (IJISE), Vol. 4 No. 1, Maret 2025, pp. 33-42
DOI: https://doi.org/10.30762/ijise.v4i1.4947

Islamic Journal of Integrated Science Education (IJISE)

Program Studi Tadris IPA
Institut Agama Islam Negeri Kediri
e-ISSN : 2986-0865
https://jurnalfaktarbiyah.iainkediri.ac.id/index.php/ijise

EFFECTIVENESS OF DEEP LEARNING BASIC PHYSICS 1 USING A MULTI-REPRESENTATION APPROACH BASED ON YOUTUBE VIDIO WITH INFOGRAPHIC RESULTS

Fitroh Abdul Malik[1*], Rayya Nurfauziah[2], Siti Sofiah Tiska Pratama[3], Tita Nurhayati[4], Tri Isti Hartini[5], Cornelia Victoria Anghel[6]

[1]Universitas Muhammadiyah Prof. Dr. HAMKA, Jakarta, Indonesia
[2]Universitas Muhammadiyah Prof. Dr. HAMKA, Jakarta, Indonesia
[3]Universitas Muhammadiyah Prof. Dr. HAMKA, Jakarta, Indonesia
[4]Universitas Muhammadiyah Prof. Dr. HAMKA, Jakarta, Indonesia
[5]Universitas Muhammadiyah Prof. Dr. HAMKA, Jakarta, Indonesia
[6]Technical University of Cluj-Napoca, Romania

***Correspondence E-mail:** fitroh25.05@gmail.com

Abstract: The aim of this research is to create infographics based on YouTube videos and evaluate the effectiveness of basic Physics 1 lectures using the multiple representation (MR) approach as a deeper learning process for Uhamka physics education students. A multi-representation (MR) approach that uses representations such as verbal, images, graphics, mathematics and videos can help students gain mastery of Basic Physics 1 concepts, enhancing deeper learning by providing diverse and interactive teaching materials. Infographics and YouTube videos as learning media for Basic Physics 1 provide a clear and interesting visual picture, making it easier for students to master theoretical physics concepts and relate them to applications in the real world. The results of this research are in the form of infographics which show that students are able to convey the results of basic physics 1 learning via YouTube as an in-depth learning medium using a multi-representation (MR).
Keywords: Deep Learning, Multi Representation (MR) Approach, Youtube Videos, Infographics.

Article History:
Received: 16 January 2025; Revised: 21 March 2025; Accepted: 24 March 2025; Published: 31 March 2025

Citation (APA Style):
Malik, F. A., Nurfauziah, R., Pratama, S. S. T., Nurhayati, T., Hartini, T. I., & Anghel, C. V. (2025). Effectiveness of Deep Learning Basic Physics 1 Using A Multi-Representation Approach Based on Youtube Vidio With Infographic Results. *Islamic Journal of Integrated Science Education (IJISE)*, *4*(1), 33–42. https://doi.org/10.30762/ijise.v4i1.4947

INTRODUCTION

Basic Physics 1 is one of the basic courses that Physics Education students must take. However, it is not uncommon for physics to be considered a subject that has many fairly abstract concepts and requires in-depth understanding. This difficulty often causes a student's low interest in learning and lack of mastery of concepts in the Basic Physics 1 course. Therefore, an effective learning approach is needed to help Physics Education Study Program students understand the material in depth. Learning effectiveness is the level of success achieved from a particular learning method that is in accordance with the learning objectives that have been set (M. Rosar and J. Weidlich, 2022).

Learning effectiveness refers to the extent to which the educational or learning process succeeds in achieving the desired goals with adequate results. This can be assessed through achievement of learning objectives, level of student understanding, improvement of skills, and application of knowledge gained in real situations. The focus of learning is on the core or things that are of primary concern in the learning process. The learning process itself includes a series of activities, interactions and strategies applied in an educational context to help students gain knowledge, skills, understanding and competence. The effectiveness of learning is influenced by various factors, including competition and the attention paid to the learning itself (Alvira EM, et al., 2024). Learning effectiveness can be measured through four aspects: (1) student understanding and abilities, (2) lecturers' ability to manage learning, (3) student involvement, and (4) student responses to learning (Timor et al., 2020).

Deep learning is a complete way to learn something that is meaningful for someone to understand something and not forget it (Cambridge, 2024). Deep learning is expected to provide in-depth learning for students and is aimed at providing full, meaningful attention. Deep learning aims to provide a more meaningful, enjoyable learning experience for students, based on spiritual competence, faith and piety (Ausubel, 1963). Deep Learning (Zhang & Cao, 2021; He et al., 2021) aims to provide a more meaningful and enjoyable learning experience for students. Mindfull Learning, Meaningfull Learning, and Joyfull Learning are part of Deep Learning (Mulyani & Suardiman, 2018; He et al., 2021). This approach is in line with the multiple representation method, which encourages students to understand concepts and theories through YouTube as outlined in infographics. Students are invited to solve abstract and complex physics concepts in the real world, so that meaningfulness and Deep Learning can emerge.

One approach that has been widely developed to improve understanding of physics concepts in depth is the Multi Representation (MR) approach. This approach involves the use

of various forms of representation, such as verbal, pictorial, graphic, mathematical and video to help students understand fairly abstract physics concepts in more depth. Multi-Representation can have a positive influence on students' cognitive abilities which include low-level and high-level cognitive abilities. Understanding is one form of student cognitive learning. In the context of modern learning, media such as YouTube videos and infographics are potential tools to support this approach. (Hasbullah, et.al., 2023). Multiple representation (MR) according to Prain & Waldrip, (2007) is a way of representing a concept in various ways. MR includes, among other things, mathematical verbal representations, images or diagrams (pictorial), and graphic representations. Verbal representation is a way that good for stating a concept, definition or process verbally or in writing in words.

Visual media such as infographics and YouTube videos really help students understand difficult concepts in Basic Physics 1. Visualization can reduce ambiguity and increase information retention, which is especially important for courses that focus on abstract concepts (Lina Rahmawati & Septi Gumiandari, 2021).

Infographics are media or tools used to convey information visually, such as banners, billboards, posters, and the like. In the current era, the development of information technology is increasingly rapid, both in the world of education and in the surrounding community, which allows infographics to be disseminated via social media platforms such as Facebook, Instagram, Twitter, and others (Isla M, et al., 2022). The aim of this research is to find out how to build students' mastery of concepts in basic physics material 1 as a means of future information for further development of physics concepts in semester 2 courses.

Infographics help visualize complex data and information to make it easy to read and easy to understand, especially for information with long text, important images, and important numerical data (Ozdamli et.al., 2016). Infographics provide an informative and interesting visual depiction of abstract concepts in Basic Physics 1. This makes it easier for students to understand the material in depth. Infographics are an alternative delivery that can overcome the shortcomings they have and infographics are something that is very helpful in disseminating information, so that someone will easily understand the content of the information they receive so that it is very easy to remember (Harjito DA, 2015). Infographics are able to present information visually, so that the information is easier for students to understand. By using YouTube videos as the main source of learning and infographics as the final result, they play an active role, exploring, analyzing and presenting the information they have learned, thus creating in-depth learning (Saptodewo F., 2021).

YouTube is an internet application that is frequently visited by users of all groups and ages for various purposes. (Hartini TI, et.al., 2024) In the learning context, YouTube is often used as a teaching medium so that learning takes place in an interesting and not monotonous manner, with using YouTube, lecturers can display interactive, interesting and fun learning videos. Through YouTube, students can understand concepts more clearly (Arham M, 2021). Using YouTube as a learning medium makes it easier for educators to convey material concretely, with the aim of increasing students' motivation in learning. Using YouTube shows that there is a significant difference in students' learning motivation before and after using YouTube. YouTube not only serves as a source of visual information, but also stimulates positive and interactive responses, and offers innovative approaches to delivering material. The implication of these findings is that YouTube integration is an effective learning tool (Achmadi et al., 2024).

This research aims to determine the effectiveness of in-depth learning using the Multi Representation (MR) approach in learning Basic Physics 1 using YouTube videos and making infographics. This article attempts to measure the extent to which this approach can improve students' in-depth understanding. It is hoped that this article can contribute to the development of more effective teaching methods.

METHOD

This research is research using descriptive qualitative methods with a multiple representation (MR) approach which aims to analyze the effectiveness of using YouTube videos as the main source of learning and infographics as the final result of learning Basic Physics 1. The research location was carried out in the Uhamka Physics Education study program. Factors that influence learning effectiveness, such as teaching characteristics, learning environment, curriculum, technology, and student motivation, are very important for improving education (Razak SA, et al., 2023).

Learning physics requires methods that can encourage students to be more active and able to develop knowledge independently. There are various learning methods and media that can be used by lecturers to support physics learning, so that students can actively participate in the process (Harefa EB, 2022).

In the research, students are taught the basic physics concepts 1 that will be studied, namely measurement of unit quantities, dimensions, kinematics, dynamics of Newton's law, moment of inertia, fluids and introduction to modern physics. Then students create infographics about the material. Meaningful Learning: Encourages students to make

DOI: https://doi.org/10.30762/ijise.v4i1.4947

connections new concepts that will be taught with concepts they have previously understood (AUSUBEL, David Paul, 1963).

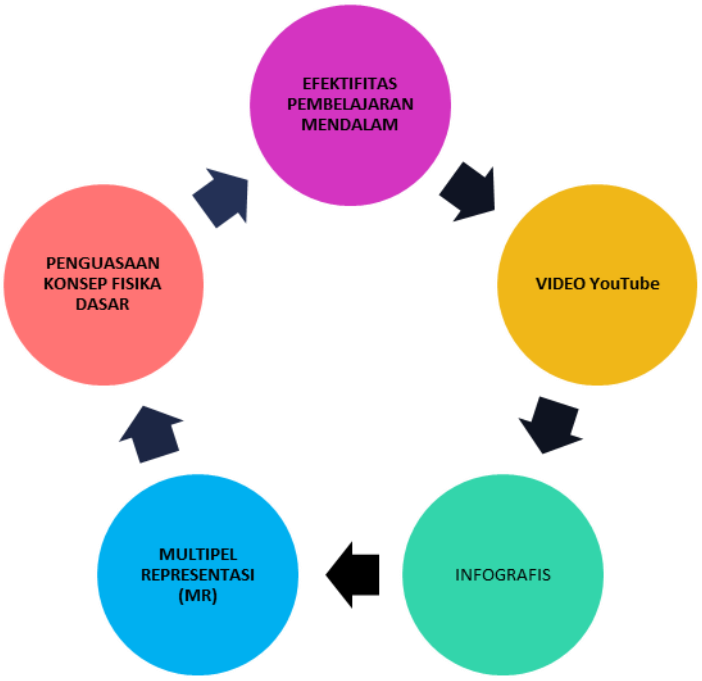

Figure 1. Research Flow

Figure 1 explains the flow of research to create effective in-depth learning, where meaningful learning is created using a multiple representation approach using YouTube videos so as to produce students' ability to create infographics that can increase students' mastery of concepts in studying Basic Physics 1.

FINDING AND DISCUSSION

Effectiveness measures success based on achieving learning objectives. High effectiveness means the results are close to the goal, while low means it is far from the goal. However, learning effectiveness is influenced by various factors, and understanding these factors is important for improving teaching and education.

The MR approach has proven effective in increasing understanding of Basic Physics 1 concepts. By utilizing various representations, students can capture information in various ways. This is in line with learning theory which states that people have different learning styles. By providing variety in teaching materials, different learning needs can be met.

The research results showed that students experienced increased mastery of Basic Physics concepts 1. Students who studied using the Multiple Representation (MR) approach showed a deeper understanding.

DOI: https://doi.org/10.30762/ijise.v4i1.4947

Student involvement in using YouTube videos as the main source of learning and infographics as the final result of learning can actually increase student involvement. They feel more motivated and interested during the learning process, creating an interactive learning atmosphere. Students provided positive feedback on this learning method, stating that the infographics and YouTube videos made the material easier to understand.

The following are the results of the infographic created by Physics Education Study

(a) (b)

Figure 2. (a) Dynamics of Newton's Law (b) Moment of Inertia

Figure 2 (a) This infographic discusses "Dynamics of Newton's Laws". Newton's laws are like basic rules in physics that explain the motion of an object. In the infographic above, students can see important points, starting from Newton's first, second, to the third, and this infographic also shows examples of the application of Newton's laws in everyday life.

Figure 2 (b) This infographic discusses "Moment of Inertia". For physics students, this moment of inertia is very necessary to explain the rotational motion of objects. From the infographic above, students can learn about the meaning of moment of inertia, the formula & unit of moment of inertia, factors that influence the moment of inertia.

DOI: https://doi.org/10.30762/ijise.v4i1.4947

(a) (b)

Figure 3. (a) Fluids (b) Modern Physics

Based on **Figure 3** (a), this infographic discusses "Fluid". Fluid is a substance that flows and changes shape. The infographic above explains information about fluid material that students can study, because it includes material about density, pressure, Pascal's law.

Based on **Figure 3** (b), this infographic discusses "Modern Physics". Where modern physics is a science that discusses the behavior of matter and energy on an atomic scale. The infographic above explains information about modern physics that students can understand.

CONCLUSION

The Multi-Representative (MR) approach which uses the main learning source in the form of YouTube videos and the final result in the form of infographics has been proven to improve overall understanding. In depth about Basic Physics concepts 1. The results of the method above show great potential for improving the quality of Physics Education in higher education, making it an effective and innovative alternative in the learning process. Deep learning can increase the effectiveness of YouTube media in studying basic physics 1 by focusing on mastering concepts, not just memorizing. Through infographics, students can access visual explanations that make it easier to understand complex physics concepts, as well

as actively participate in experiments, demonstrations and discussions to deepen their understanding and mastery of basic physics concepts 1.

REFERENCES

Achmadi, M. Basri, Janiarti (2014). Efektivitas Pembelajaran Berbasis Youtube Terhadap Peningkatan Motivasi Belajar Akuntansi Keuangan Peserta Didik SMKN 1 Sanggau. *Jurnal Visi Ilmu Pendidikan. Vol 16*, No 1 Januari (2024) Halaman 227-235.

Ausubel, David Paul (1963). *The Psychology of Meaningful Verbal Learning, Grune and Stratton*. New York.

Cambridge, (2024). *Brainstorming Deep Learning*, 28 Nov 2024.

Dwipraptono Agus Harjito &Dian Pravitasari, (2015). Pembuatan Infografis Dusun Krajan I. *Jurnal Inovasi dan Kewirausahaan.* Volume 4 No. 2, Mei 2015 Halaman 123-126 *Seri Pengabdian Masyarakat 2015 ISSN: 2089-3086.*

Eka Puspita Sari (2017). *Pengembangan Media Berbentuk Infografis Sebagai Penunjang Pembelajaran Fisika SMA Kelas X.*

Envilwan Berkat Harefa (2022). Efektivitas Pembelajaran Daring Mata Kuliah Fisika Di Perguruan Tinggi. *Jurnal Pendidikan Vol. 1*–No. 1, Mei (2022), IPage 75-83 E-ISSN (2829-6222) & P-ISSN (2829-8004).

Erina Mifta Alvira, Arel Vaganza, Andromeda Putri, Bagus Setiawan (2024). Analisis Permasalahan Belajar: Faktor-Faktor Efektivitas Proses Pembelajaran Pada Siswa. *Jurnal Pendidikan Dan Ilmu Sosial. Vol. 2* No. 1 Januari 2024. e-ISSN :2985-7716, p-ISSN :2985-6345, Hal 142-153.

Febrianto Saptodewo. (2021). *Desain Infografis Sebagai Penyajian Data Menarik.*

Hasbullah, Abdul Halim, & Yusrizal. (2023). *Penerapan Pendekatan Multi-Representasi Terhadap Pemahaman Konsep Gerak Lurus.*

Lina Rahmawati & Septi Gumiandari. (2021). *Identifikasi Gaya Belajar (Visual, Auditorial, dan Kinestetik) Mahasiswa Tadris Bahasa Inggris Kelas 3F IAIN Syekh Nurjati Cirebon*

M. Rosar and J. Weidlich, “Creative students in self-paced online learning environments: an experimental exploration of the interaction of visual design and creativity,” *Res. Pract.*

Technol. Enhanc. Learn., vol. 17, no. 1, pp. 1–24, 2022, 10.1186/s41039-022-00183-1.

Muhammad Isla, Risti Puspita Sari Hunowu.(*2022).* Infografis Sebagai Media Informasi Protokol Kesehatan Diera Pandemi Covid-19 Di Kecamatan Marisa Kabupaten Pohuwato. *Jurnal Ilmiah Komputer Grafis, Vol.15,* No.2, Desember 2022.

Mulyani, N. S. R. D., & Suardiman, S. P. (2018*). Efektifitas Pendekatan Deep Learning Terhadap Kontrol Diri Dalam Menggunakan Internet Pada Remaja. Pendidikan Nasional*, 23–31.

Mutmainnah Arham. (2021). *Efektivitas Penggunaan YouTube Sebagai Media Pembelajaran*.

Ozdamli, F., Kocakoyun, S., Sahin, T., & Akdag, S. (2016). Statistical Reasoning of Impact of Infographics on Education. *12th International Conference on Application of Fuzzy Systems and Soft Computing (pp. 370-377). Vienna: Elsevier.*

Prain, V., and Waldrip, B.G. (2007). "An exploratory study of teacher' perspectives about using multi modal representations of concepts to enhance sience learning". *Canadian Jounal of Science, Mathematics and Technology Education*.

Safira Amalia Razak dan Ahmad Rivauzi (2023). Efektivitas Pembelajaran Pendidikan Agama Islam di SMKN 10 Paadang. *Jurnal Pendidikan Tambusai, Volume 7* Nomor 1, ISSN: 2614-6754 (print), ISSN 2614-3097 (online).

Timor, A. R., Ambiyar, A., Dakhi, O., Verawardina, U., & Zagoto, M. M. (2020*).* Effectiveness of problem-based model learning on learning outcomes and student learning motivation in basic electronic subjects. *International journal of multi science*, 1(10), 1-8.

Tri Isti Hartini, Imas Ratna Ernawati, Martin, Nuraeni Nanda Sari, Nunik Dwi Septiani & Elsa Sagani (2024). *Effectiveness Of Representation-Based Mechanics Lectures Using YouTybe Content on Concept Mastery*.

Zhang, X., & Cao, Z. (2021). A Framework of an Intelligent Education System for Higher Education Based on Deep Learning. *International Journal of Emerging Technologies in Learning, 16*(7), 233–248. https://doi.org/10.3991/ijet.v16i07.22123