Journal of Higher Education and Academic Advancement
Homepage : https://journal.antispublisher.id/index.php/EJHEAA
Email : admin@antispublisher.com

e-ISSN : 3032-1123
JHEAA, Vol. 2, No. 8, August 2025
Page 367-373
© 2025 JHEAA :
Journal of Higher Education and Academic Advancement

The Utilization of Interactive Multimedia as a Physics Learning Media

Dede Yeni
Indraprasta PGRI University, Indonesia

Check for updates OPEN ACCESS

DOI : https://doi.org/10.61796/ejheaa.v2i8.1367

Sections Info

Article history:
Submitted: May 31, 2025
Final Revised: June 14, 2025
Accepted: June 28, 2025
Published: July 13, 2025

Keywords:
Information and communication technology
Physics learning
Interactive multimedia

ABSTRACT

Objective: *The purpose of this study is to: (1) investigate the use of interactive multimedia as a medium for physics learning, (2) investigate interactive multimedia models that can be applied in physics learning.* ***Method:*** *This research used a qualitative method with a literature approach.* ***Results****: The use of interactive multimedia in physics learning can help to illustrate physical phenomena clearly or visually, making them easier to observe and understand. Therefore, various limitations and difficulties in learning are expected to be overcome by using interactive multimedia.* ***Novelty:*** *To address this, the use of Information and Communication Technology (ICT)-based learning media in the form of virtual media or interactive multimedia is considered quite helpful in understanding both abstract and concrete physics concepts. Additionally, its use is engaging and more interactive for students.*

INTRODUCTION

Physics is the study of the properties and phenomena of natural forces and all interactions that occur within them [1], [2], [3], [4]. To study these phenomena, physics uses a process that starts from observation, measurement, analysis, and drawing conclusions. In physics learning, students often face difficulties in understanding the concepts. Therefore, tools are needed to support the success of learning, one of which is through the use of learning media.

According to [5], media is a tool for communication channels. Media comes from Latin and is the plural form of the word "medium," which literally means intermediary, that is, the intermediary between the source of the message and the message recipient [6], [7], [8]. According to Heinich, the media can include films, television, diagrams, printed materials, computers, and instructors. According to experts, media can also be defined as a technology that carries a message that can be used for learning purposes or to extend the role of the teacher, Schram. Media are various components in the student's environment that can stimulate them to learn, Gagne. Media is anything that can be used to convey messages that can stimulate the mind, attention, and willingness of students to learn, Miarso.

Learning is an activity that involves individuals in an effort to acquire knowledge, skills, and positive values by utilizing various sources for learning [9], [10], [11], [12], [13], [14]. Learning can involve two parties: students as learners and teachers as facilitators. The most important part of the learning activity is the learning process itself. In modern learning processes, students are not only communicators or message receivers but can

also act as communicators or message deliverers. In such conditions, two-way communication, or even multi-way communication, occurs.

Learning media is anything that can be utilized to convey messages and enhance the learning experience for students [15], [16]. According to experts, learning media can be defined as a technology that carries a message and can be used for learning purposes, Schram. Learning media can also be defined as a physical tool for delivering content or teaching materials, such as books, films, videos, slides, etc Briggs. Learning media consists of two important elements: hardware (equipment) and the message it conveys (message or software). Therefore, learning media requires equipment to present the message, but the most important aspect is the message or learning information carried by the media.

The development of Information and Communication Technology (ICT) has had a significant impact on various aspects of life, including in education. In education, the use of ICT has opened up new opportunities to facilitate the teaching and learning process, Lestari. Teachers now have access to a variety of digital tools and resources that can enhance student interaction and engagement in learning. By utilizing ICT, teachers can present teaching materials visually and interactively, adopt project-based or online collaborative learning methods, and facilitate communication and discussion among students.

The use of technology in the form of interactive multimedia can increase the efficiency and effectiveness of learning. In addition, technology also opens access to a wide range of educational resources such as instructional videos, e-books, and interactive learning materials, which can increase accessibility and diversity in learning content. Thus, the use of information and communication technology in education can bring significant benefits in improving the learning process, developing student skills, and preparing them to face the demands of a rapidly developing world. It is important for educators to continue developing their abilities to wisely and creatively use technology to create meaningful learning experiences for students.

RESEARCH METHOD

In this study, the method used is a qualitative approach with a literature review method. The research technique used for data collection is to search for materials related to the discussion from scientific journals, articles, and relevant books, both digitally and manually.

RESULTS AND DISCUSSION

The Utilization of Information and Communication Technology (ICT) in Physics Learning

In learning physics, most of them need teaching media or supporting tools to facilitate the understanding of the material, especially for materials related to natural phenomena. On the one hand, experimentation is one of the methods commonly used to facilitate understanding, but in reality this method has several obstacles including limited

time available, inadequate equipment and lack of students' response to what is being faced. Therefore, it is necessary to use Information and Communication Technology (ICT) as a learning medium in the form of virtual media or interactive multimedia. Where with this virtual media students can conduct experiments to prove a theory easily, clearly, and precisely.

The use of Information and Communication Technology (ICT) in Physics learning also opens up opportunities for teachers to design more creative and adaptive learning according to the needs of students. Thus, the integration of ICT media in Physics learning is one of the strategic steps in improving the quality of education and encouraging science literacy in the midst of today's rapid technological advancements. ICT-based learning media that can be applied in physics learning, such as interactive simulations, learning videos, animations, and other digital physics applications. Through this media, students not only understand the material verbally, but also visually and interactively, so that the learning process becomes more engaging, dynamic, and effective.

The use of multimedia in physics learning is one of the methods that can be used to describe physical phenomena clearly or visually so that they are easy to observe and understand. Various limitations and difficulties in learning can be overcome by using multimedia. The use of interactive multimedia in physics learning will greatly help students in understanding abstract and concrete concepts.

Interactive multimedia as a teaching material aims to: (1) clarify and simplify the presentation of messages so that they are not too verbalistic, (2) overcome the limitations of time, space, and sensory power of students, (3) can be used appropriately and variously, such as: increasing the motivation and passion for learning of students to master the subject matter as a whole, developing students' ability to interact directly with the environment and other learning resources, especially teaching materials that are based on *Information and Communication Technology* (ICT), allowing students to learn independently according to their abilities and interests. And allows students to be able to measure or evaluate their own learning outcomes, Rudi Susilana.

Interactive multimedia-based learning media provides opportunities for students to learn at their own pace and does not cause boredom because it is equipped with pictures and animations as well as various practice questions. There is repetition that must be done when the answer does not meet the grade standard to make students understand the material better. This interactive learning media can also be used as an alternative to classical and individual learning media.

Interactive Multimedia Models or *Computer Based Instruction* (CBI) That Can Be Applied in Physics Learning

The Computer Based Instruction (CBI) model is a learning model that uses computer media, laptops, *gadgets* or the like as learning materials or as auxiliary tools. This model has a distinctive feature of being interactive, so this model is often also called interactive multimedia. These models can be used in the process of learning physics. There are four basic models *of Computer Based Instruction* (CBI), which consist of simulation models, *games* models, *drill models*, and tutorial models.

1. Simulation model

The simulation model is one of the learning strategies that aims to provide a more concrete learning experience through imitations that are close to the actual form. "*simulation differs from both simulasis and drill and practice program in the interaction of the learners are not responses to question but rather decidsians they make in a role-playing simulation*", Lillie.

Simulations are divided into four main categories, namely: physical, methodical, situational, and process, Alessi and Trolip. The simulation model must present an interactive program between the user and the program as well as the reality of the simulated object must be maintained. The simulation model requires the accuracy of the data from the simulated real object even though the object in the simulation is made miniature, but it needs to be presented with a scale of comparison, both length, width, weight of shape, and process.

In physics learning, the simulation model can be applied, for example, to pressure by water (hydrology), in this material we can use flash player simulation or PhET application. The simulation model demands higher student interaction, when learning the material through simulation students not only see, but are directly involved in interacting with the program, students must be facilitated to try, observe, try again with different situations, as if students are involved in the simulation in real life.

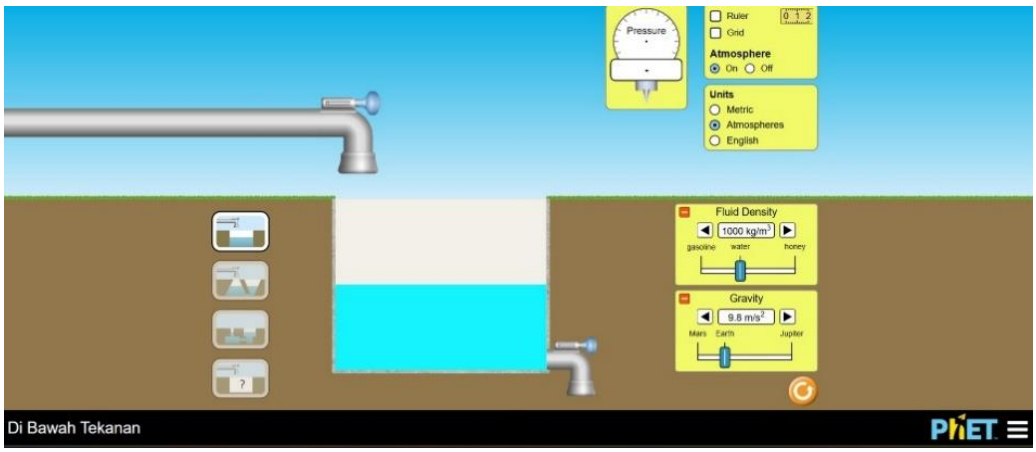

Figure 1. Simulation model of water pressure material using PhET.

2. Model *Games*

Model *games* are learning models based on computers, laptops, *gadgets* or the like using games, which aim to provide an atmosphere or environment that provides learning facilities to increase students' abilities. For learning *games*, better known as *Instructional Games*, this has a basic component as a motivational generator by giving rise to how to compete to achieve the expected learning goals.

Model *games* have a clear goal from the beginning of the game, the goal has been explicitly stated so that the student knows the purpose of the game. The purpose is not solely for entertainment, but the learning objectives taken from the curriculum used.

Indicators of goal achievement can be seen from the success of students to pass all challenges in the *games* as well as from the *scores* obtained.

Of the many model *game* applications, angry birds is one of the most popular game applications today that is widely used in physics learning. For example, in business materials and energy. In the angry birds game, birds are styled by using catapults to slide or move to the target. This is a form of effort made by catapults against angry birds.

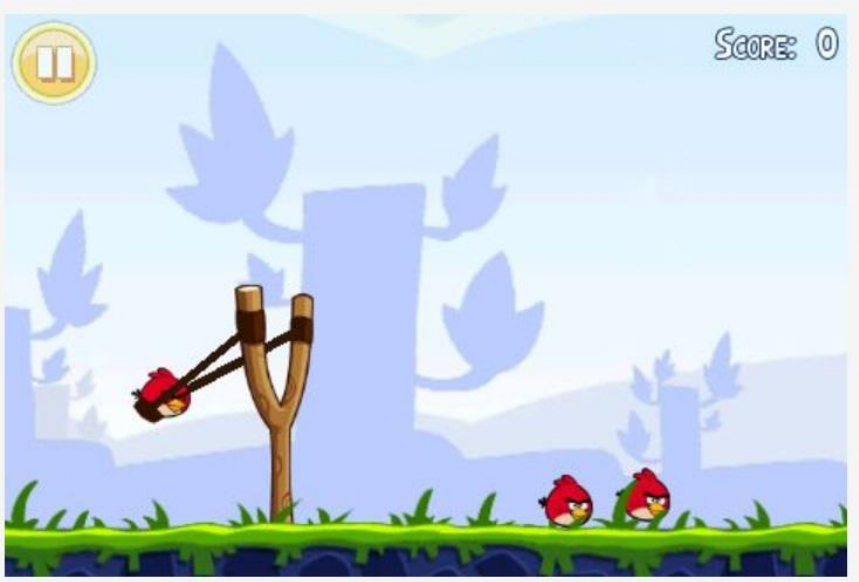

Figure 2. Model games with the Angry Birds games app.

3. Model *Drill*

Model *drill* is a learning model using the help of computers, laptops, or the like which aims to provide learning experiences to students through the provision of practice questions to test students' performance through the speed of completing practice questions provided by the program.

Although this model presents questions, it does not aim to evaluate students' final learning outcomes like summative tests, but the test is basically a presentation of learning materials presented in the form of practice questions. The more often students answer and practice to work on the questions, the more they will master the learning material. This is in line with the philosophy of *Connecsionism* learning theory from Throndike that learning will be successful if it uses three laws, namely (1) *low of readiness*, (2) *low of exercise*, and (3) *low of good effect*. The second law indicates that learning requires a lot of repetition and drilling, especially in lower class students who have still slow absorption compared to the upper class, and materials that are considered difficult and should be given frequent repetition.

The drill *model* in physics learning is a learning model that emphasizes repeated practice to improve students' understanding and skills in physics concepts. This method aims to form habits in the application of physics formulas and principles, so that students can more easily and quickly solve problems. In terms of implementation, students have first been equipped with theoretical knowledge. Then by still being guided by the teacher,

students are asked to practice it so that they become proficient and skilled. Before the *drill* method is given, *a pre-test* is carried out to find out the abilities of each student.

4. Model Tutorial

The tutorial model is learning using the help of computers, laptops or the like where students are conditioned to follow a programmed learning flow with the presentation of material and practice questions. The tutorial model requires students to master the material completely, so that before each segment of the material is mastered, they cannot continue to the next material. The tutorial contains: objectives, materials, and evaluation. The purpose of the tutorial model is to provide a complete understanding (*mastery learning*) to students about the subject matter studied.

The tutorial model basically follows a *branching or branching* type programmed learning pattern. In this type, information or subject matter is presented in small units and each unit is completed with an evaluation. The program will respond to students' answers to find the next step, Nana Sudjana.

Tutorials in computer learning are intended as a substitute for tutors (humans) whose learning process is provided through text, graphics, sounds, videos, and animations that also provide question points and problems, if the student's response is wrong then the computer will repeat the previous material or will automatically return to the previous slide and will continue to repeat as long as the user has not succeeded. Hamalik revealed that the use of the tutorial model can encourage students to be active in learning activities, both independently and in groups and allow students to solve learning problems independently, so that the physics learning process can be centered on students.

Tutorial models in physics learning can be done with a learning approach that uses step-by-step guides in the form of interactive media, to help students understand concepts and solve physics problems. This model can be a written tutorial, a video, or an interactive app designed to guide students through the learning process. The tutorial model can be applied for example to motion material, namely by giving students a video tutorial that can explain the concepts of force and motion, then show examples of problems about the calculation of friction force.

CONCLUSION

Fundamental Finding : The use of Information and Communication Technology (ICT) as a learning medium in the form of virtual media or interactive multimedia is very necessary in the physics learning process. Where with this virtual or interactive multimedia media students can conduct experiments or experiments to prove a concept or theory easily, clearly, and precisely. There are four basic models of Computer Based Instruction (CBI) or interactive multimedia that can be used in physics learning, namely: simulation model, game model, drill model, and tutorial model. **Implication :** Thus, the use of multimedia in physics learning has great potential to improve the quality of learning and student learning outcomes. **Limitation :** However, it is important to choose and use the right multimedia and integrate it well in learning strategies. **Future Research**

: It is necessary to further investigate which of the four interactive multimedia models—simulation, game, drill, or tutorial—is most effective in different physics topics and learning contexts, and how these can be optimally aligned with various student learning styles and curriculum goals.

REFERENCES

[1] D. Sutopo and Mardiyana, "Pengembangan Media Pembelajaran Fisika untuk Mempermudah Pemahaman Konsep," *Unnes Phys. Educ. J.*, vol. 8, no. 1, pp. 15–22, 2019.

[2] A. Rizki and B. Setiawan, "Penerapan Media Interaktif dalam Pembelajaran Fisika di Sekolah Menengah Atas," *J. Ilm. Pendidik. Fis. "Lensa,"* vol. 6, no. 2, pp. 105–112, 2018.

[3] F. K. dan Ilmu Pendidikan Universitas Palangka Raya, "Materi Fisika Dasar: Hakikat dan Ruang Lingkup Fisika," 2020.

[4] P. K. Bandung, "Fisika Dasar untuk Mahasiswa Kesehatan," 2021.

[5] R. Heinich, M. Molenda, J. D. Russell, and S. E. Smaldino, *Instructional Media and Technologies for Learning*. New Jersey: Pearson Education, 2005.

[6] M. Ramli and R. Abdurrahman, "Pengembangan Media Pembelajaran Menurut Konsep Teknologi Pembelajaran," *TIFTK J. Teknol. Pembelajaran*, vol. 6, no. 1, pp. 45–56, 2018.

[7] Suparlan, "Peran Media dalam Pembelajaran di SD/MI," *PENSA J. Pendidik. dan Ilmu Sos.*, vol. 1, no. 2, pp. 180–193, 2019.

[8] N. Mahnun, "Media Pembelajaran (Kajian terhadap Langkah-langkah Pemilihan Media dan Implementasinya dalam Pembelajaran)," *J. Pemikir. Islam*, vol. 37, no. 1, pp. 27–45, 2012.

[9] D. Liandiani, "Penggunaan Media Visual dalam Proses Pembelajaran," *Al-Tadzkiyyah J. Pendidik. Islam*, vol. 7, no. 1, pp. 173–184, 2016.

[10] R. Susilana and S. Riyana, "Pengembangan Media Audio Pembelajaran Bahasa Indonesia," *JMTP J. Media dan Teknol. Pendidik.*, vol. 1, no. 1, pp. 0–216, 2014.

[11] R. Rohani, "Problematika Kurangnya Media Pembelajaran di SD," *JPST J. Pendidikan, Sains dan Teknol.*, vol. 1, no. 2, pp. 178–184, 2022.

[12] A. Djamaluddin and M. Wardana, "Belajar dan Pembelajaran," *Repos. IAIN Parepare*, pp. 1–35, 2018.

[13] U. Amelia and et al. Alwis, "Hakikat Belajar dan Pembelajaran dalam Konteks Pendidikan," *IMEIJ: Indo-Intellectual*, 2024.

[14] S. Riyana, "Latar Belakang Pembelajaran," *E-Prints UMS*, pp. 1–10, 2023.

[15] M. M. Moto, "Pengaruh penggunaan media pembelajaran dalam dunia pendidikan," *Indones. J. Prim. Educ.*, vol. 3, no. 1, pp. 20–28, 2019.

[16] N. Rohima, "Penggunaan media pembelajaran untuk meningkatkan keterampilan belajar pada siswa," 2023.

***Dede Yeni (Corresponding Author)**
Indraprasta PGRI University, Indonesia
Email: dedeyeni0304@gmail.com