A Constructive E-Learning Design to Improve Learning Results in Early Childhood Sport and Physical Education

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Abstract: This research aims to explore the use of constructive e-learning design as a strategy to improve learning outcomes in early childhood physical education and sport. Through a research and development (R&D) approach using the ADDIE framework, a constructive e-learning design was developed and implemented in a student learning environment. Constructive e-learning design can be an effective solution to support learning in the field of early childhood physical education and sport, with the use of constructive e-learning design can improve student learning outcomes, by facilitating active and collaborative interactions between students, learning materials, and instructors.

Keywords: E-learning Design; Constructive; Learning Outcomes; Early Childhood Physical Education and Sport

INTRODUCTION

The development of information and communication technology (ICT) has significantly changed the paradigm of education, including in early childhood physical education and sport(Suyanto, 2020). With these advancements, e-learning has become an important alternative in the learning process, especially in today's digital era (Cyly Arrum Dalu & Rohman, 2019). To be effective and yield the best learning outcomes, e-learning in the context of early childhood physical education and sport calls for the appropriate methodology.

Constructive e-learning is an approach to learning that promotes active knowledge construction by students through interaction with learning content, instructors, and fellow students(Kumara & Dewangga, 2024). In this context, students are not only passive recipients of information, but also active knowledge builders involved in the learning process. By using digital technology, constructive e-learning facilitates a student-centred learning experience, allowing them to collaborate, discuss and create a shared understanding of the learning material(Dwijayani, 2019).

Interactive, collaborative and reflective are the foundations of constructive e-learning(Vrieling-Teunter, Hebing, & Vermeulen, 2021). Interactivity allows students to actively participate in learning through activities such as interactive assignments, online discussions, and simulations. Reflection allows students to evaluate and reflect on what they know, helps them internalise ideas and relate them to their own personal experiences, and collaboration allows them to broaden their understanding through the exchange of ideas and perspectives(Amanullah, 2020).

Constructive e-learning implementation has various benefits for students(Hrastinski, 2023). Since students now have more control over their education, one of them is to boost motivation and engagement. Constructive e-learning also helps students develop their critical thinking and concept understanding because they actively participate in creating their own knowledge. Furthermore, working together with classmates can help students develop their cooperation and social skills, which are critical in both the workplace and daily life(Sohil & Sohail, 2022)(Ashari, A, & Mappalotteng, 2022). Constructive e-learning, therefore, not only enhances learning outcomes but also equips students to become self-reliant, capable lifelong learners(Rahmat, 2019).

Previous research has highlighted various aspects of e-learning design that influence student learning outcomes(Nguyen, Tuunanen, Gardner, & Sheridan, 2021). Constructivism is a learning approach that highlights the active role of students in creating their own knowledge through interactions with teachers, other students, and learning materials. As such, it has gained significant attention in the creation of successful e-learning designs(Susilo, 2020). However, in the context of early childhood physical education and sport, research on constructive e-learning design is limited.

Although e-learning design has been studied in a variety of settings, there is still a lack of understanding regarding the specific application of constructivism principles to early childhood physical education and sport via e-learning platforms. By creating and evaluating a beneficial e-learning design that can maximize student learning outcomes in this field, this study seeks to close this gap.

This study's primary goal is to create a beneficial online learning environment and evaluate how well it can enhance students' learning outcomes in courses on early childhood physical education and sport. Furthermore, the goal of this research is to add to the body of knowledge regarding constructive e-learning design and its use in early childhood physical education and sport. It is therefore anticipated that this research will offer fresh perspectives and useful suggestions for the advancement of early childhood sports and physical education via e-learning platforms.

METHOD

This study uses a Research and Development (R&D) approach which is a suitable method to develop and test the effectiveness of constructive e-learning designs. This approach integrates the stages of analysis, design, development, implementation, and evaluation (ADDIE) to create a new product or innovation in an educational context. The research design can be seen in Figure 1.

Figure 1: Research design chart
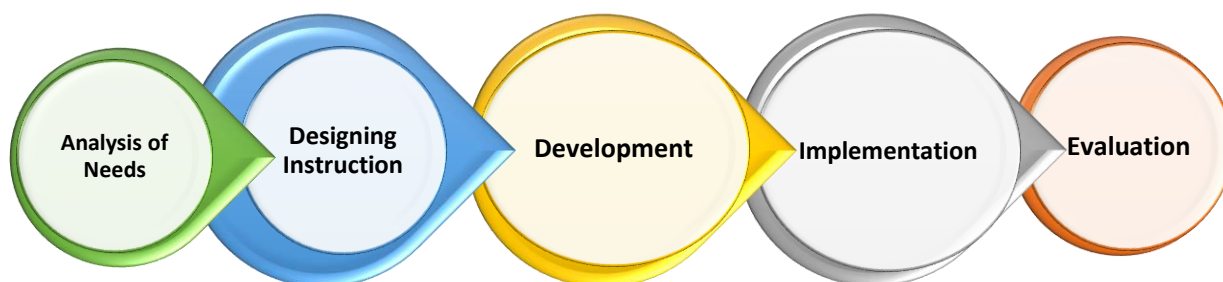
The research design table that provides an explanation of the needs analysis, instructional design, development, implementation, and evaluation can be seen in table 1.

Table 1. Research design

Stage	Description
Analysis of Needs	Identify student needs, material characteristics, and suitable e-learning platforms.
Instructional Design	Design constructive e-learning structures, content and activities.
Development	Create e-learning resources and get them ready for use.
Implementation	Implementing e-learning materials in a real learning environment.
Evaluation	Evaluate the effectiveness of the e-learning design through data collection and analysis.

Population and Sample

The population of this study were students who took early childhood physical education, sports, and health courses. The sample was selected by purposive or random sampling depending on the research needs and the availability of students who were willing to become research subjects.

Research Instrument

Questionnaire to collect data on students' needs and preferences related to e-learning. Assessment rubric to evaluate the quality and effectiveness of the developed e-learning materials. Interviews to obtain in-depth feedback from students and lecturers regarding their experiences in using e-learning.

Research Steps

Needs analysis: Data collection on student needs and characteristics of learning materials. Instructional Design: Development of a constructive e-learning design based on the analysis results. Development: Creation of e-learning materials based on the designed instructional design. Implementation: The use of e-learning materials in a real learning environment. Evaluation: Data collection and analysis of the effectiveness of e-learning design in improving student learning outcomes.

Data Analysis Techniques

Data will be analyzed using descriptive and inferential statistical techniques, depending on the type of data collected. Qualitative analysis will also be conducted to interpret qualitative data, such as interview results. The results of the analysis will be used to evaluate the effectiveness of the developed e-learning design and make recommendations for improvement if needed.

RESULTS AND DISCUSSION

Google search results with the search keyword "e-learning website" gave 20 specimen data which can be seen in Table 2.

Table 2. eLearning Software

No	E-learning Software	Website Address
1	Moodle	https://moodle.org
2	Edmodo	https://www.edmodo.com
3	ConnectEdu	https://www.connectedu.net
4	Blackboard	http://www.blackboard.com
5	SumTotalSystem	http://www.sumtotalsystems.com

6	CornerStone	http://www.cornerstoneondemand.com
7	Schoology	https://www.schoology.com
8	SuccessFactors (SAP)	http://www.successfactors.com
9	Collaborize Classroom	http://www.collaborizeclassroom.com
10	SkillSoft	http://www.skillsoft.com
11	Chamilo	https://chamilo.org
12	ATutor	http://www.atutor.ca
13	Instructure	http://www.instructure.com
14	Quipper School	http://www.quipperschool.com
15	Interactyx	http://interactyx.com
16	DigitalChalk	http://www.digitalchalk.com
17	Latitude Learning	http://www.latitudelearning.com
18	eFront	http://www.efrontlearning.net
19	Opigno	https://www.opigno.org
20	Meridian	http://www.meridianks.com

Of the 20 specimens selected, one was chosen for use in on-campus learning using Moodle, which has been established by muhammadiyah university sidoarjo as E-Learning based learning. In contrast, eight specimens were selected for design elements that have a different appearance and can be accessed through a desktop browser. Table 3 shows the number of specimens selected.

Table 3. Selected E-learning Specimens

No	E-learning Software	Website Address
1	Moodle	https://moodle.org
2	Edmodo	https://www.edmodo.com
3	Schoology	https://www.schoology.com
4	QuipperSchool	https://www.quipperschool.com
5	Succes Factors	http://www.successfactors.com
6	Chamilo	https://chamilo.org
7	Corner Stone on Demond	http://www.cornerstoneondemand.com
8	ATutor	http://www.atutor.ca
9	Efront	http://www.efrontlearning.net

Discussion

The research results from Desak Made et al show that Moodle, an e-learning platform, can be used to improve the quality of interactive learning and support the implementation of blended learning(Anggraeni & Sole, 2018). The results of research conducted by Indra Wijaya and Abdul Hafis show that using moodle-based e-learning media can attract students and help them learn(Wijaya & Lubis, 2018). Nurul Anam's research results show that e-learning-based online learning can successfully improve student learning outcomes if all e-learning development evaluations have been conducted prior to its implementation (Anam, 2020). The research results from Hanim et al show that lecturers of the Faculty of Teacher Training and Education need strategic planning in developing e-learning platforms, including needs analysis, instructional design, technology used, and learning evaluation(Hanim, Geroda, Marhani, & Ruslan, 2023). Based on research proposed by Yeka that this study aims to determine student perceptions of the use of e-learning as a complement or substitute for face-to-face lectures. The result is that students consider that the use of e-learning as a complement or substitute for face-to-face lectures in class is motivating, easy to use, useful, efficient, interesting, and a necessity(Hendriyani & Effendi, 2015). Indra et al. argue that the purpose of this

study is to find out some psychological factors related to web-based e-learning interface design and how to make recommendations for web-based e-learning guidance matrix based on Kansei Engineering Type I. A total of 10 web-based e-learning examples, 20 Kansei Words, and 30 participants were involved in this study(Isa & Hadiana, 2017). From Giatman's research, he explained that the results of an interesting media were obtained and could help students focus more on learning by using moodle-based e-learning(Giatman, Sahara, Nafsiah, & Lubis, 2018). The results obtained from hasanah's research are concept mapping-based e-learning designs for heat and thermodynamics(Hasanah, Bakri, & Susila, 2023). According to Kumara, the e-learning model is a new breakthrough in the field of teaching and learning, because it is able to minimise differences in teaching methods and materials, thus providing a more consistent standard of learning quality(Kumara & Dewangga, 2024). E-learning system is absolutely necessary to anticipate the develop-ment of the era with the support of information technology where everything is heading to the digital era, both mechanism and content. Based on Rusmanto's research entitled "The Development of E-Learning Mod-ule Based on Project-Based Learning (PjBL) for Electric Motor Installation Course" with the results of the research it can be recommended that the E-learning module is an alternative teaching material in learning that can be used in learning in certain subjects(Rusmanto & Rukun, 2020). As seen in Figure 2, the initial look of E-Learning moodle umsida creates a welcoming impression for students to access and utilize E-Learning. From the introduction and sessions 1 through 8, there are various distinctions offered by the con-structive E-Learning design.

Figure 2. Initial view of moodle e-learning
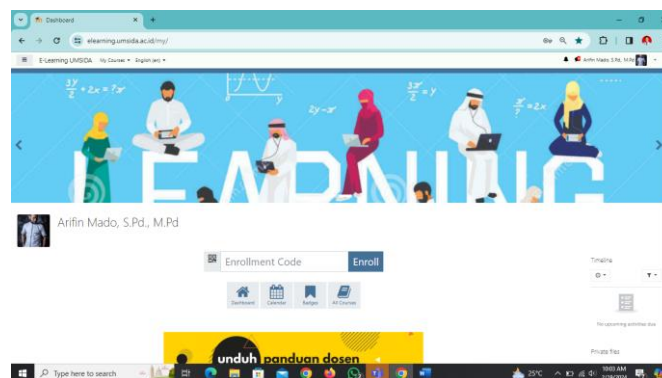
The design of the introduction provides an image related to the identity of the course that will be cov-ered in Figure 3. The design of the course identity image is made as interesting as possible with the aim that students are interested and not bored in accessing E-Learning. In the introduction section, it is equipped with an introduction video from the lecturer related to the course. This section also explains the 8-session asyn-chronous recovery system, where among them in sessions 3, 5, and 7 contain tasks that must be accessed and done by students. This section is about course identity which contains course descriptions, subject matter, course learning outcomes, assessments, and references. All learning materials in the form of PPT and pdf files are uploaded in the learning material column. This makes it easy for students to download the material that has been provided.
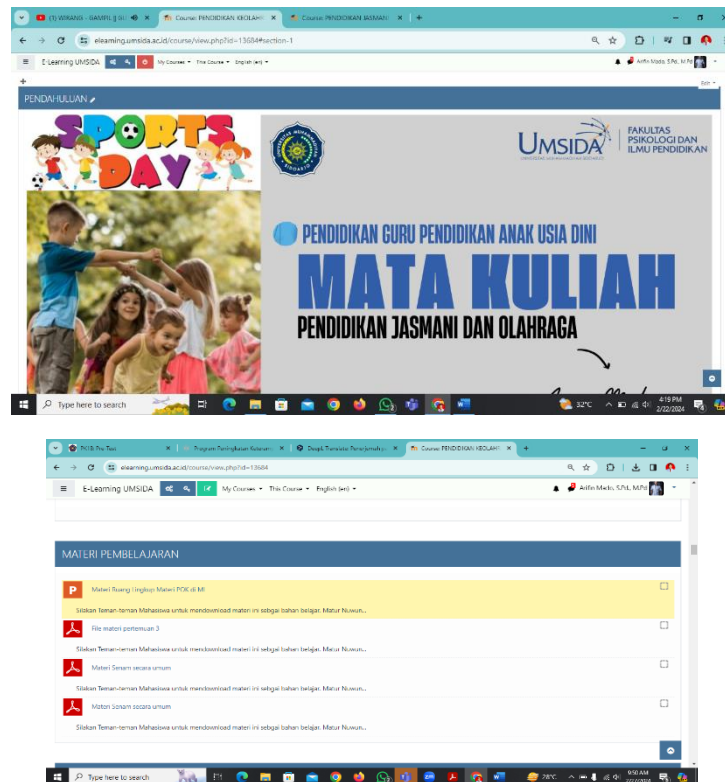
Figure 3. Introduction view

Figure 4 shows the display in session 1 to session 8. In session 1 there is an introductory video from the lecturer regarding the material in session 1 and the attendance list and discussion forum, where students are asked to be active in the discussion forum by commenting on their own opinions. In session 2, there is an introductory video from the lecturer regarding the material in session 2 and the attendance list, discussion forum, video of learning materials, and post test in session 2 where students are asked to be active in the discussion forum by commenting on their own opinions and taking the post test. In session 3, there is an introductory video from the lecturer regarding the material in session 3 and the attendance list, discussion forum, video learning material, and post test in session 3 where students are asked to be active in the discussion forum by commenting on their own opinions and taking post tests and assignments in session 3. In session 4, there is an introductory video from the lecturer regarding the material in session 4 and the attendance list and discussion forum, where students are asked to be active in the discussion forum by commenting on their own opinions. In session 5, there is an introductory video from the lecturer regarding the material in session 5 and the attendance list, discussion forum, 3 videos of learning materials, as well as a post test in session 5 where students are asked to be active in the discussion forum by commenting on their own opinions and doing post tests and assignments in session 5. In session 6, there is an introductory video from the lecturer regarding the material in session 6 and the attendance list, discussion forum, learning material videos, and post test in session 6 where students are asked to be active in the discussion forum by commenting on their own opinions and taking the post test. In session 7, there is an introductory video from the lecturer regarding the material in session 7 and the attendance list, discussion forum, 1 video of learning material, and post test in session 7 where students are asked to be active in the discussion forum by commenting on their own opinions and taking post tests and assignments in session 7. In session 8 is the last session of E-Learning which there is an introductory video from the lecturer regarding the material in session 8 and attendance list, discussion forum,

learning material video, and post test in session 8 where students are asked to be active in the discussion forum by commenting on their own opinions and taking post tests.

Figure 4. Meeting session display
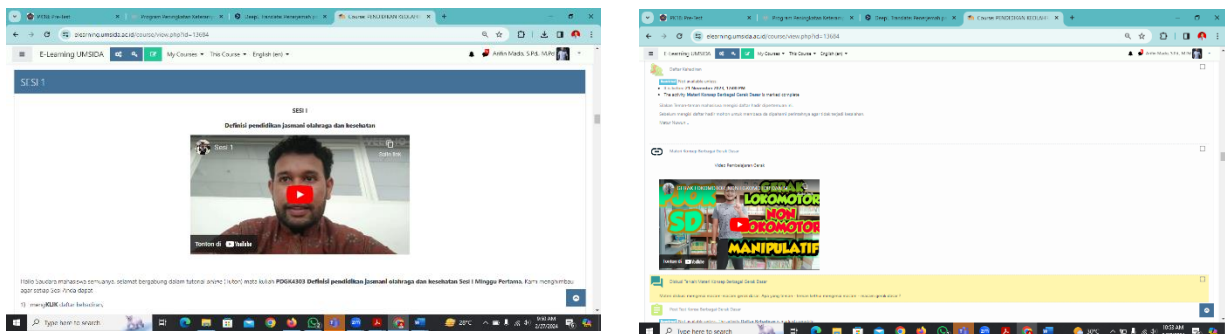
The final stage of this research is implementing the E-Learning design results to students to find out the learning outcomes in early childhood physical education and sports courses.

CONCLUSION

According to research conducted on constructive e-learning design in early childhood physical education and sport, it can be concluded that this method can be used significantly to improve student learning outcomes. Constructive e-learning design allows students to actively interact with learning materials, instructors, and fellow students, improving their understanding and mastery of lessons. Therefore, constructive e-learning design can be considered as a strategic step to optimise learning in early childhood physical education and sport. Ultimately, it will help students learn better.

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