Effectiveness of Learning Media: Navigation Website Based on Learning by Doing to Improve Economics Understanding of 12th Grade Students

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Abstract

This study aims to analyze the improvement of students' economic understanding through the use of a navigational website teaching medium based on *Learning by Doing* among Grade XII students at SMAS Tut Wuri Handayani Makassar. This study employed a quantitative approach using a pre-experimental method with a *one-group pretest-posttest* design. The research subjects consisted of six Grade XII students who participated in Economics learning using the navigational website teaching medium based on *Learning by Doing*. Data were collected using an economic understanding test administered before (*pretest*) and after (*posttest*) the learning process. The data were analyzed using N-Gain to determine the level of improvement in students' economic understanding. The results showed that the students' average *pretest* score was 51.67, while the average *posttest* score increased to 80.00, with an average increase of 28.33 points. The N-Gain analysis resulted in an average score of 0.62, which was categorized as moderate. Thus, the use of a navigational website teaching medium based on *Learning by Doing* showed an improvement in students' economic understanding after participating in the learning process.

Keywords: *Website Teaching Medium,* Learning by Doing, *Economic Understanding, Digital Learning.*

A. INTRODUCTION

The emergence of technology has led to changes in various ways of life, including in the field of education. The integration of technology in the educational process is not only limited to providing educational content but can also help create interactive and flexible ways of learning. This has encouraged teachers to design learning processes that not only involve students as information recipients but also allow learners to investigate, conduct experiments, and evaluate the information they acquire. Research on designing digital learning experiences shows that digital media can be used to shape students' behavior (Wong & Hughes, 2023).

The importance of active learning in the field of economics is becoming increasingly necessary because learning economics not only involves memorizing economic concepts but also understanding the relationships between different economic concepts and connecting them to real situations. Hands-on experience in learning economics allows students to see how various economic concepts can be applied in practical situations. For example, Gao (2021) implemented experiential learning concepts in an economics class by involving students in market research,

production, sales, and business performance evaluation.

Learning by Doing is one approach that can be used for this type of learning. In the Learning by Doing approach, student activities are seen as an integral part of the learning process, so besides gaining theoretical understanding, students also gain practical understanding through various activities where they apply the information they have learned. Research conducted by Iftikhar et al. (2022) proves that introducing online learning tools through the Learning by Doing approach provides opportunities to gain practical understanding.

However, the principle of Learning by Doing in a digital context needs to be well-managed so that the actions taken by students remain related to their learning goals. According to Skulmowski (2024), activity-based learning can benefit the learning process, but actions that are too complicated or unclear can add to students' mental load. That's why using digital media should provide proper instructions and guidance on how to carry out those actions.

One type of media that can be used to support these needs is a website as a learning tool. A website can integrate a homepage, objectives, material preview, videos, worksheets, evaluations, and reflections into one learning environment that can be accessed flexibly. In the context of economics learning, the use of technology also shows significant development. Recent research in economics education shows that technology can be used to expand learning opportunities while providing activities that encourage students not just to listen and memorize the material, but to engage in activities that deepen understanding and critical thinking skills (Sailer et al., 2024).

The use of digital media should be directed equally to achieve certain learning outcomes. Agasisti et al. (2023), in an experiment on financial education learning, showed that online-based learning can lead to increased levels of understanding among students after they go through the learning process. These findings suggest that implementing a digital learning environment can help equally in facilitating understanding mastery, depending on how the design is carried out according to learning objectives. Similarly, research has shown that an active learning approach where students contextualize economic principles boosts performance (Wong et al., 2022).

Even so, research on the use of digital media in education mostly focuses on the media design itself or the technology used, rather than on the integration of websites into learning navigation and the Learning by Doing concept, especially in high school economics education, which still needs further investigation. In Suratno's (2024) study, developing economic learning tools based on Learning by Doing allows students to grasp economic concepts through interactive, collaborative, and practical learning processes. However, this research focused on developing student participation sheets for 12th-grade high school students, and there's still a lot to explore regarding the use of the Learning by Doing concept through website media for 12th-grade students.

The core of this study is about applying a website with structured learning navigation and a Learning by Doing approach in the context of economics learning for 12th-grade students. This research not only aims to explore the use of technology as an educational tool but also to prove the efficiency of this technology as a tool that integrates content and activities in one medium. Therefore, this study aims to provide some empirical data on the effects of using a website as an educational medium with a Learning by Doing approach.

This research is carried out with the aim of finding out how effective a website-based Learning by Doing learning medium is in improving 12th-grade students' understanding of economics. The effectiveness of the learning medium will be measured based on changes in the participants' understanding of economics before and after the learning process conducted with the help of the medium.

B. LITERATURE REVIEW

1. Website-Based Digital Learning Media

Web-based learning media is defined by Salsabila and Aslam (2022) as the use of websites as a medium for delivering learning materials. Using Google Sites as this learning media means that the learning materials will be delivered in an online or digital setting. Based on research results, Google Sites-based web learning media is considered feasible according to evaluations from media experts and learning material specialists.

According to Wulandari et al. (2023), learning media using websites can be created as a platform that provides structured material and helps in students' learning activities. When making website-based media, it's important to pay attention to design, media, and content aspects so that the website can be used effectively for learning. Based on the validation results carried out by the researchers, it was concluded that website-based learning media falls into the very good category. Ummahhadi et al. (2023) showed that website-based learning media can be used as a tool to present learning materials in digital form and can be used to improve students' learning achievements.

Kusumawati and Prapanca (2023) said that developing learning media using websites should be done by paying attention to the feasibility of the media and the relevance of the content to the learning goals. Their research showed that website-based media is considered very valid and has contributed to improving the grades achieved by students. This means that websites can be used not only to present learning content but also as a learning tool. According to Anggraeni and Ekohariadi (2024), website-based learning media can be developed by integrating learning content and several learning models. Based on this research, website-based media can be used effectively and can bring changes to students' achievements.

Some of these studies have led to the understanding that digital teaching media using websites are learning media that use websites as a learning environment that organizes materials, learning resources, activities, and evaluations in an orderly way that students can access through digital devices. The website

media used in this study have several components, including Home, Learning Objectives, Reflection, Materials, Learning Videos, (Student Worksheets), Evaluation, and Reflection.

Regarding the digital teaching media aspect based on the website used in this study, it should be said that the media is adjusted to the characteristics of the media that has been created, which are: (1) Navigation, including easy access to menus and page switching; (2) Information Presentation, including clarity, accuracy, and consistency of the material; (3) Media Integration, including text, images, videos, Learning Understanding Product Documents (LKPD), and evaluations; (4) Appearance and aesthetics, including beauty, layout, and readability; and (5) Function and usability, including ease of use and the website's ability to support the Economics learning process.

It should be noted that in this study, the website is not considered just as a material archive but as a teaching medium with learning navigation. The website contains several elements such as home, objectives, materials, videos, worksheets, evaluation, and reflection. All these elements are combined in a sequence to allow students to follow the learning process step by step.

2. Learning by Doing Approach

According to Iftikhar et al. (2022), Learning by Doing is a learning method where students acquire skills through practice or hands-on activities. This method not only allows students to gain information but also to participate in activities related to their field. Research shows that using online learning tools based on the Learning by Doing principle can help students learn through practical activities and increase their participation in the learning process. Laverie et al. (2022) state that experiential learning is a type of learning where students engage in Learning by Doing. Through simulation activities, students gain learning experiences that allow them to acquire understanding and skills through participation in learning activities.

The use of the Learning by Doing method can be realized through activities that provide practical experiences for students in their learning, as explained by Colombelli et al. (2022). When this method is applied, students get involved in practical activities that help them develop various skills, including creativity, planning, financial awareness, resource allocation, and teamwork. Gao (2021) carried out experiential learning in Economics through hands-on activities involving market research, production processes, sales, and business performance evaluation. Through these activities, students can connect what they have learned about Economics in theory with their practical experiences.

Based on that perspective, the stages of Learning by Doing in this study are: (1) Understanding Learning Goals and Content, which is the learners' understanding of the concepts and objectives of the tasks they are going to do; (2) Observing/Exploring, where learners gather information from materials, videos, or other learning sources; (3) Doing the Task, where learners apply what they have learned by completing tasks or activities related to the lesson materials; (4) Assessing

Task Results, where learners practice or evaluate what they have learned; and (5) Reflecting, where learners connect their learning process with the lesson materials.

According to Suratno (2024), the application of Learning by Doing in economics learning can be carried out through LKPD (Student Worksheet) that provides opportunities for students to interact, collaborate, and apply what they learn in those activities. Based on research results, LKPD based on Learning by Doing helps students understand economic material and increases their interest in learning.

Therefore, Learning by Doing in this study is understood as a learning method that makes students active participants in the learning process by observing, doing, applying, evaluating, and reflecting on the learning process. In this learning process, students can carry out activities through a navigation site that consists of materials, videos, LKPD, evaluations, and reflections so that they not only get economic material but also apply their learning through these activities.

C. METHOD

This study used a quantitative approach with a pre-experimental method and a one-group pretest-posttest design. The research was conducted at SMAS Tut Wuri Handayani Makassar with 12th-grade students taking Economics in the 2026/2027 academic semester. The research subjects consisted of six students selected using purposive sampling based on considerations that the students were taking 12th-grade Economics, received material that matched the media used, and had access to devices and the internet. The research design consisted of three stages: pretest (O_1), treatment (X), and posttest (O_2). The pretest was given to find out the students' initial understanding, then the students participated in learning using a Learning by Doing-based navigation website teaching media, and finally, a posttest was given to see the changes in economic understanding after the learning.

The research was carried out in several stages, namely preparation, pretest implementation, treatment, posttest, and data processing. In the preparation stage, the researcher prepared the teaching website, test instruments, and learning tools. The website includes several menus, such as the home page, learning objectives, apperception, material, learning videos, student worksheets (LKPD), exercises/evaluations, and reflection. During the learning process, students are guided to understand the objectives and material, observe and explore learning resources, carry out activities through the worksheets and exercises, apply economic concepts, complete evaluations, and do reflections. The research instrument is an economics understanding test in multiple-choice format given before and after the treatment. Data was collected through tests and documentation. Documentation serves as supporting data, including information on the number of students, classes, learning implementation, and the use of the teaching website. The pretest and posttest data were analyzed quantitatively to find out the changes in students' economic understanding. The main analysis used N-Gain with the formula:

$$\text{N-Gain } \frac{s(posttest)-s(Pretest)}{s\,(Maximum)-s\,(Pretest)}$$

With a maximum score of 100, the N-Gain values are then interpreted based on improvement categories, namely (G ≥ 0.70) as high, (0.30 ≤ G < 0.70) as medium, and (G < 0.30) as low. In addition to N-Gain, the research results are also presented by comparing the average pretest and posttest scores as well as the improvement in each student's score to give an idea of the changes in economic understanding after using the Learning by Doing-based navigation website teaching media.

D. RESULT AND DISCUSSION

This study was conducted to find out the improvement in the economic understanding of 12th-grade students at SMAS Tut Wuri Handayani Makassar after participating in learning using a Learning by Doing-based navigation website teaching media. The study used a one-group pretest-posttest design, so students' understanding was measured before and after the treatment. The research subjects consisted of six students who participated in the entire series of activities, ranging from the pretest, learning using the website media, to the posttest. The website teaching media used in learning was designed with navigation that allows students to follow the learning activities step by step. The results of measuring students' economic understanding before and after learning are presented in Table 1:

Table 1 Results of Students' Economics Pretest and Posttest Understanding

No.	Student Initials	Pretest	Posttest	Improvement
1	I	50	70	20
2	H	70	100	30
3	V	50	80	30
4	Z	50	90	40
5	A	30	60	30
6	Vs	60	80	20
Total		**310**	**480**	**170**
Average		**51.67**	**80.00**	**28.33**

Source: Data Processed by the Researchers from Pretest and Posttest Results (2026).

Based on Table 1, there is an increase in economic understanding for all students after participating in learning using the Learning by Doing-based navigation website media. The average pretest score of 51.67 increased to 80.00 in the posttest. Thus, there was an average score improvement of 28.33 points. This improvement occurred for all students, although the amount of increase varied.

The student with the initials Z had the highest improvement, which was 40 points, from a pretest score of 50 to a posttest score of 90. Student H improved by 30 points, from 70 to 100. Student V went from 50 to 80, while student A increased from 30 to 60. Meanwhile, students I and Vs each had a 20-point increase. These results show that after participating in learning using the website media, no student experienced a decrease in scores.

Besides comparing the average pretest and posttest scores, the improvement in economic understanding is analyzed using N-Gain. This analysis is used to find out the level of students' understanding improvement by taking into account the initial score and the maximum score that can be achieved. The N-Gain calculation results are presented in Table 2:

Table 2 Results of N-Gain Analysis of Students' Economic Understanding

No.	Student Initials	Pretest	Posttest	N-Gain	Category
1	I	50	70	0.40	Medium
2	H	70	100	1.00	High
3	V	50	80	0.60	Medium
4	Z	50	90	0.80	High
5	A	30	60	0.43	Medium
6	Vs	60	80	0.50	Medium
Average		**51.67**	**80.00**	**0.62**	**Medium**

Source: N-Gain was calculated based on students' pretest and posttest scores (2026)

Based on Table 2, the average N-Gain score is 0.62, which falls into the medium category. Out of the six students who participated in the learning, two students achieved N-Gain in the high category: student H with 1.00 and student Z with 0.80. Meanwhile, the other four students scored N-Gain in the medium category: student I with 0.40, student V with 0.60, student A with 0.43, and student Vs with 0.50. No student scored N-Gain in the low category.

These results show that using a Learning by Doing-based navigation website as a teaching media improves the economic understanding of all the students in the study. Even though the overall improvement is in the medium category, the posttest results show that students' abilities after the learning are at a higher level compared to their abilities before the learning.

Looking at the change in average scores, the increase from 51.67 to 80.00 shows that students not only improved individually but also experienced overall improvement after receiving the treatment. These findings serve as a basis to discuss how the characteristics of website media and the application of the Learning by Doing approach can help students understand economic material through a more active learning process

The research results show that using a Learning by Doing-based navigation website as a teaching medium can improve the economic understanding of 12th-grade students at SMAS Tut Wuri Handayani Makassar. This is evident from the increase in the average pretest score from 51.67 to 80.00 in the posttest, an improvement of 28.33 points. Additionally, the average N-Gain score of 0.62 falls into the medium category. These findings indicate that after students participate in learning using the website media, their economic understanding improves compared to their condition before receiving the treatment.

This improvement can be explained by looking at the media features used in this study. The website developed during the research process not only functions as

a platform for storing learning resources but also as a medium that shows the learning process. The order of elements includes learning objectives, prior knowledge, materials, learning videos, worksheets, evaluation, and reflection. With the help of this structure, learners can proceed through the stages of the learning process, starting with understanding the learning objectives, receiving information, taking action, checking knowledge, and reflecting on the learning process.

These results align with the idea of website-based learning media proposed by Salsabila and Aslam (2022), where a website can be used as a medium to present learning materials in a digital environment. Likewise, Wulandari et al. (2023) have shown that website-based learning media can offer materials systematically, making it easier for students to learn. On the other hand, Ummahhadi et al. (2023) demonstrated that website-based media can provide learning materials digitally and contribute to improving student learning outcomes. So, the results from this study confirm previous research findings which state that a website is not just a source of information but more than that, it is a learning medium.

Improving students' understanding is also related to applying the Learning by Doing approach. In this study, students were not only directed to read the materials available on the website, but also engaged in various learning activities through videos, worksheets, exercises, assessments, and reflections. These activities give students the chance to use the information they have learned in more concrete ways. This way, the learning process doesn't just stop at receiving information, but continues with doing, applying, evaluating, and reflecting on the learning outcomes.

These results align with the research by Iftikhar et al. (2022), which shows that the Learning by Doing approach in an online learning environment can give students the opportunity to gain knowledge through hands-on practice and direct activities. In this study, the activities carried out by students became an important part of the learning process, so students don't just receive information passively. The same thing can be seen in this research, when the website is used to guide students in doing learning activities, not just reading the material.

The findings of this study are also supported by Gao (2021), who applied experience-based learning in economics education through activities that involved students in market research, production, sales, and business performance evaluation. This approach allows students to connect the economic concepts they learn theoretically with more practical experiences. Although the activities in this study took different forms, the principle used is the same: giving students the opportunity to apply knowledge through learning activities. Therefore, the increase in grades in this study can be understood as one of the results of a learning process that gives students space to connect economic material with the activities they do.

Research conducted by Wong et al. (2022) also confirmed these findings. Using simulations in economics learning can provide a more authentic learning experience because students can understand concepts through activities that mimic real life. This means that economics learning can be made more authentic when students learn concepts both in theory and in practice through activities.

In addition, Sailer et al. (2024), through a systematic review of learning activities in technology-assisted learning, showed that learning technology can facilitate various types of learning activities that actively involve students. This supports the findings of the current study because using website media not only facilitates content delivery but also various types of learning activities in a single digital environment. Providing content, videos, workbooks, tests, and reflections allows students to interact more with the learning material.

The research results also show that the improvement in understanding is not the same for every student. Student Z achieved the highest increase of 40 points and an N-Gain of 0.80, while students I and Vs only improved by 20 points. This difference indicates that using the same media does not necessarily lead to identical levels of improvement for every student. Initial ability, speed of understanding the material, engagement during the learning process, and students' ability to follow activities on the website can all be factors that influence the results obtained. This can also be seen from student H, who had a relatively high initial score of 70 and then reached 100 on the posttest with an N-Gain of 1.00.

These results can be linked to Skulmowski's (2024) view that activity-based learning has the potential to support the learning process, but learning activities need to be designed with clear instructions and structure. Activities that are too complex or unfocused can actually increase students' cognitive load. In this study, the website navigation, which was arranged step by step, became an important part because students could follow the sequence of activities from objectives, materials, videos, worksheets, evaluations, to reflections. Thus, the Learning by Doing activities were not given separately, but placed within a structured learning flow.

The findings of this study are also in line with Colombelli et al. (2022), who showed that the Learning by Doing approach can provide learning experiences through students' direct involvement in various activities. In that study, students had the opportunity to develop knowledge and skills through practical experience. This reinforces the results of this study, showing that student involvement in learning activities is one of the key aspects of implementing Learning by Doing.

When looking at research from the perspective of digital media, the findings of Anggraeni & Ekohariadi (2024) show that there are several web-based learning media that can be applied alongside certain learning models to help improve student learning outcomes. This is relevant to this study because the web pages considered are not standalone digital learning media but rather an integration of the Learning by Doing model. Therefore, the effectiveness of the media depends not only on the use of the website itself but also on its design, which should be able to guide the students' learning activities.

However, the fact that the N-Gain value is 0.62 and falls into the medium category means that the improvement in students' understanding cannot be considered high. This means that implementing a Learning by Doing-based website has significant potential to enhance students' understanding of economics, but there is still a possibility that the results of this experiment could be influenced by factors

such as the small number of participants, the time required for learning, students' initial abilities, their involvement in learning activities, and the condition of devices and internet connection.

Overall, the research results show that integrating websites with Learning by Doing can create a more structured and active economic learning process. Websites provide a digital environment that combines materials and activities, while Learning by Doing gives students the chance to apply knowledge through learning activities. The combination of both is seen in the increase of the average student score from 51.67 to 80.00 and an N-Gain score of 0.62. Therefore, the findings of this study support the view that using technology in learning will be more meaningful if it's not only used to deliver information but also designed to engage students in activities that allow them to understand, apply, evaluate, and reflect on the knowledge they gain.

E. CONCLUSION

A website with interactive learning navigation that uses Learning by Doing allows students to learn economic concepts through various activities such as accessing materials, watching videos, completing Learning Worksheets (LKPD) and exercises, evaluations, and reflections. Based on the results of this study, there was an improvement in the economic understanding of 12th-grade students at SMAS Tut Wuri Handayani Makassar after using this teaching medium. This can be seen from the pretest score of 51.67, which increased to 80.00 in the posttest, with an average increase of 28.33. The N-Gain test results show an average of 0.62, which falls into the medium category. Therefore, the use of a website navigation that incorporates Learning by Doing has shown an improvement in students' understanding of economics.

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