Journal of Sustainable Educational Technology and Innovation
Volume 2, Issue 1, 1-13.
E-ISSN: 3124-0747
https://ejournal.aps-tpi.org/jseti/index
https://doi.org/10.58723/jseti.v2i1.225

Doing Knowledge Online Learning Model in Media Production-Based Subjects: High and Low Students' Prior Knowledge Analysis

Rezi Ulya Fauziah*
National Taiwan University of Science and Technology, TAIWAN

Mujahidah Auliya Ihsani
Universitas Negeri Surabaya, INDONESIA

Jakfar Shodiq
National Pingtung University, TAIWAN

*** Corresponding author:**
Rezi Ulya Fauziah, National Taiwan University of Science and Technology, TAIWAN ✉ reziulya361@gmail.com

Article Info

Article history:

Received: March 23, 2026
Revised: April 12, 2026
Accepted: July 17, 2026

Keywords:

Constructivism
Doing knowledge
Learning performance
Media production
Prior knowledge

Abstract

Background: Technological innovations have transformed education by integrating digital tools and constructivist principles, fostering interactive and adaptive learning environments. Despite these advancements, challenges persist, particularly in hands-on subjects like media production, where traditional models often fail to bridge theory and practice.
Aims: This study proposed the doing knowledge online learning model, designed to enhance media production education through active learning and social interaction.
Methods: To evaluate the validity and effectiveness of the proposed model, the ADDIE Model was used as the instructional design framework, and a quasi-experimental design was employed for its implementation. A total of 80 students were assigned to two groups: the experimental group using the doing knowledge online learning model and the control group using the conventional learning model.
Result: Results indicated that experts rated the model with a 93% agreement, classifying it as "very good," indicating its high suitability for educational use. Additionally, students who learned with the doing knowledge online learning model had significantly better learning performance than those who learned with the conventional learning model. Moreover, even when categorized by high and low prior knowledge, students in the doing knowledge online learning model consistently outperformed their peers in the conventional learning group.
Conclusion: The doing knowledge online learning model is a valid and effective approach for improving students' learning outcomes in media production and has the potential to support more engaging and practice-oriented online learning.

To cite this article: Fauziah, R. I., Ihsani, M, A., Shodiq (2026). Doing Knowledge Online Learning Model In Media Production-Based Subjects: High And Low Students' Prior Knowledge Analysis. *Journal of Sustainable Educational Technology and Innovation, 2*(1), 1-13. https://doi.org/10.58723/jseti.v2i1.225

INTRODUCTION

Technological developments have significantly changed the educational landscape in recent years, providing new opportunities to enhance learning experiences through digital platforms and interactive tools (Siemens & Baker, 2012). Using technology along with constructivist theory, which says learning happens when students actively build knowledge through their experiences and interactions, is becoming very popular in today's educational studies (Harasim, 2017). This approach allows for the creation of learning environments that are not only interactive but also adaptive to individual learning needs, encouraging deeper engagement with content (Wang et al., 2023).

A crucial element of this integration is the concept of learning as a service, where educational experiences are designed to facilitate collaboration, social interaction, and practical application of knowledge (Salam et al., 2019). However, despite the promise of this approach, major challenges remain in practical application, particularly in subjects that require hands-on skills, such as media production. Media production-based subjects, including video editing, content creation, and multimedia design, require theoretical understanding and technical proficiency (Al-Hashimi et al., 2019). Conventional learning models often fail to provide adequate opportunities for students to practice and apply these skills, leading to a gap between theory and practice (De-Freitas et al., 2015).

To address these challenges, this study proposes the development of the doing knowledge online learning model, a pedagogical framework designed to enhance learning in media production-based subjects by encouraging active learning and social interaction. This model is built on constructivist principles emphasizing the importance of collaborative learning, where students actively engage with their peers to construct knowledge through shared experiences and problem-solving activities (Kalpana, 2014). By utilizing digital platforms, this model creates an interactive environment that bridges the gap between theoretical content and practical applications, allowing students to develop technical knowledge and skills more effectively (Fantinelli et al., 2024).

One of the main challenges in implementing this model is to overcome the variability in students' prior knowledge. In any learning environment, students have different levels of understanding, which can significantly affect their learning outcomes (Guo et al., 2014). Students with a strong foundation may find it easier to grasp new concepts, while those with limited prior knowledge may struggle to keep up (Glogger-frey et al., 2018). This difference can hinder the overall learning process, especially in a complex subject such as media production. To overcome this obstacle, this study analyzed students' prior knowledge to determine how much this learning model influences students with high and low prior knowledge.

This study is structured based on three main research questions:

1. How is the development of the doing knowledge online learning model reviewed from the ADDIE model?
2. Is there a difference between the doing knowledge online learning model and the conventional learning model, in terms of students' learning performance?
3. Is there a difference between the doing knowledge online learning model and the conventional learning model, in terms of students' prior knowledge?

LITERATURE REVIEW

Constructivist Theory in Media Production

Constructivism, as a learning theory, emphasizes that knowledge is actively constructed by learners through their interactions with the world, rather than passively absorbed. Rooted in the work of Piaget and Vygotsky, the theory emphasizes that learners develop understanding by integrating new experiences with prior knowledge, forming unique interpretations of concepts (Shabani et al., 2010; Kazi & Galanaki, 2020). This student-centered approach has grown significantly over the past decade, with numerous studies highlighting its effectiveness in modern educational settings. Recent research emphasizes that constructivist learning environments, which encourage hands-on, experiential learning, enhance learning performance, leading to deeper knowledge retention (Jantakoon & Piriyasurawong, 2018). For example, in a study by (Wang et al., 2024), students engaged in maker activities, a key element of constructivism, showed significant improvements in learning performance, self-efficacy, and critical thinking.

Several studies have shown that constructivist approaches enhance student engagement and academic outcomes through active learning. For example, (Bagheri et al., 2013) found that project-based learning, a core constructivist strategy, resulted in significant improvements in students' learning outcomes and self-directed learning skills. Their study revealed that students who were actively engaged in real-world tasks demonstrated greater analytical skills compared to those in traditional lecture-based environments. Similarly, Allen (2014) observed that hands-on activities in online information literacy instruction using a constructivist approach enhanced critical thinking and knowledge retention. Students were better able to apply theoretical concepts to practical situations, leading to more meaningful learning experiences. These findings are further supported by Neo and Neo (2009), whose study showed that in multimedia-mediated constructivist learning, students constructed their own meaning, enhanced their social interaction, and improved their meaningful learning experience.

Constructivist learning has also been effectively applied in media production projects, where students take an active role in creating digital content. (Ornellas et al., 2014) explored how constructivist methods, such as experimentation and collaborative learning, enhance students' understanding of media production. Through projects such as filmmaking and multimedia design,

students are encouraged to construct knowledge by applying technical skills, reflecting on their work, and revising their output based on feedback. This iterative process not only enhances students' mastery of digital tools but also strengthens their storytelling and creative abilities. In a same context, Hung et al. (2004) showed that students involved in digital video production projects developed greater innovation and adaptability, and improved learning performance.

High and Low of Students' Prior Knowledge

Prior knowledge significantly impacts learning performance by influencing how students process and integrate new information. Students with high prior knowledge can more easily connect new concepts to existing mental frameworks, which facilitates deeper learning and problem-solving abilities (Mcnamara & Kintsch, 2012). They experience reduced cognitive load because their prior knowledge helps them navigate complex tasks more easily, leading to better academic outcomes (Van Merrienboer & Sweller, 2005). In contrast, students with limited prior knowledge often struggle to connect new information to their limited knowledge, leading to cognitive overload and challenges in understanding complex concepts. This necessitates additional instructional support to help these students bridge the knowledge gap and improve their learning performance (Tricot & Sweller, 2014).

Recent research over the past few decades has expanded our understanding of these dynamics. For example, (Mayer & Moreno, 2003) examined how prior knowledge influences learning in multimedia environments, finding that students with substantial prior knowledge were able to better manage cognitive load and utilize multimedia resources more efficiently. In contrast, students with low prior knowledge struggled with cognitive load when engaging with complex multimedia materials, which affected their learning outcomes. Song et al. (2016) further investigated the role of prior knowledge in complex multimedia learning and confirmed that students with substantial prior knowledge were able to integrate multimedia elements more effectively, leading to improved learning performance. Similarly, Endres et al. (2023) found that students with substantial prior knowledge demonstrated superior problem-solving skills and were more adept at applying learned concepts to new situations, which leads to higher intrinsic cognitive load.

These recent studies illustrate the relevance of prior knowledge in shaping learning performance and the quality of project outcomes, particularly in complex and practical tasks such as media production. This research emphasizes the importance of tailored teaching approaches that address students' varying needs based on their existing knowledge base.

METHOD

Experimental Design

Based on the research questions, there are three main discussion areas. The first research question focuses on the development of the doing knowledge online learning model, while the second and third research questions relate to its implementation. In this study, there are two stages: the first stage discusses the development of the learning model with the ADDIE model as an instructional design methodology, and the second stage discusses the implementation of the proposed learning model.

Stage 1: Development of the Doing Knowledge Online Learning Model

The research method contains items including the development model, development procedures, and product trials. Meanwhile, the product trial discusses the trial design, test subjects, types of data, data collection instruments, and data analysis techniques.

Development Model

The development model used in developing this online learning is the ADDIE model. The production process of a multimedia product is systematic and procedural. The stages must be done properly because the process at the beginning will affect the final result. Molenda (2003) revealed that the ADDIE model was a general learning model and is feasible to use in the research developed. This model is considered interactive and sequential when used in development research. This model was chosen because the ADDIE model is often used to describe a systematic approach to instructional

development. In addition, according to Rayanto and Sugianti (2020), The ADDIE model is a general learning model that works well for use in development research. The term was nearly the same as instructional system development. When used in development, the process was seen as step by step but also involved back and forth movement, where the outcomes from each step could bring learning and growth back to an earlier stage. The outcome of one stage became the starting point for the next stage. The ADDIE model has five steps: analysis, design, development, implementation, and evaluation (Figure 1).

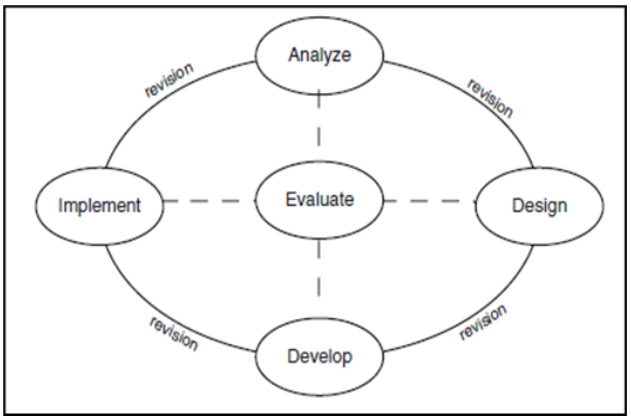

Figure 1. ADDIE Model

Development Procedure

In developing a media, several procedures must be carried out so that the product developed is appropriate and meets the needs. There are five stages of development procedures in developing learning media by applying the ADDIE model. These stages will be described in the following Figure 2 (Branch, 2009):

	Analyze	Design	Develop	Implement	Evaluate
Concept	Identify the probable causes for a performance gap	Verify the desired performances and appropriate testing methods	Generate and validate the learning resources	Prepare the learning environment and engage the students	Assess the quality of the instructional products and processes, both before and after implementation
Common Procedures	1. Validate the performance gap 2. Determine instructional goals 3. Confirm the intended audience 4. Identify required resources 5. Determine potential delivery systems (including cost estimate) 6. Compose a project management plan	7. Conduct a task inventory 8. Compose performance objectives 9. Generate testing strategies 10. Calculate return on investment	11. Generate content 12. Select or develop supporting media 13. Develop guidance for the student 14. Develop guidance for the teacher 15. Conduct formative revisions 16. Conduct a Pilot Test	17. Prepare the teacher 18. Prepare the student	19. Determine evaluation criteria 20. Select evaluation tools 21. Conduct evaluations
	Analysis Summary	*Design Brief*	*Learning Resources*	*Implementation Strategy*	*Evaluation Plan*

Figure 2. The Procedure of the ADDIE Model

Trial Subjects

The participants in this study consisted of individuals who were directly engaged in and contributed to the research process. In the development of this instructional program, the following groups were selected as the study participants:

a. Material experts were two people who come from lecturers from the State University of Surabaya, Educational Technology Study Program.
b. Learning design experts were two people who come from lecturers who are actively teaching at the State University of Surabaya, Educational Technology Study Program.

c. Students who will take the Photo Media Development course.

Data Type

The types of data collection used to determine the level of feasibility and effectiveness in this study are qualitative data and quantitative data. Both were obtained from feasibility tests and field tests.

Data Collection Instruments

The validation instrument used a Guttman scale to facilitate decisive assessment of the criteria. The questionnaire comprised 15 items aligned to each domain of expertise. For material experts, the assessment focused on three primary dimensions. Such as, content quality (6 items), alignment with learning objectives (5 items), and language appropriateness (4 items). Conversely, for Instructional Design Experts, the 15 items evaluated visual communication (5 items), navigation and usability (5 items), and instructional interaction (5 items). The reliability of the instrument was determined using the percentage of agreement method, which indicates a high consensus rate among validators.

a. Data were collected from the respondents through a questionnaire consisting of several written questions. This instrument was employed by the researchers to assess the feasibility of the developed product.
b. A test was a tool or systematic procedure for measuring student learning outcomes. The test was carried out to determine the difference or improvement that occurs in student learning outcomes before and after using online learning.

Data Analysis Technique

The Psychometrics instrument employed in this study was based on the Guttman scale. This scale provides dichotomous response options, such as "yes–no," "true–false," "ever–never," and "positive–negative" (Sugiyono, 2015). The questionnaire responses obtained from students, learning design experts, media experts, and material experts were analyzed using the following formula.

$$P = \frac{F}{N} \times 100\%$$

Notes:
P = Percentage
F = The frequency being sought for the percentage
N = Number of respondents multiplied by the highest score multiplied by the number of questions

The percentage scores were understood by connecting the results from the formula calculations to the standards used to evaluate how well online learning works. The levels of feasibility based on the revision criteria are listed in Table 1.

Table 1. Feasibility level of product revision criteria

Percentage	Category	Notation
81% - 100%	Very good	No revision
61% - 80%	Good	No revision
41% - 60%	Quite good	Revision
21% - 40%	Not good	Revision
0% - 20%	Not very good	Revision

Stage 2: Implementation of the Doing Knowledge Online Learning Model

To investigate the impact of the proposed model, an experiment was conducted on two classes in a media production subject in East Java, Indonesia. The purpose of the selected subject was to help students understand and develop knowledge and skills to organize information and improve their learning performance in media production.

Participants

The research took place at a higher education institution in East Java, focusing on the Department of Educational Technology. The participants were college students taking the Photography Media Development course. The study used a quasi-experimental approach, where 80 students from two classes were split into two groups: one group that received the treatment and another group that did not. The experimental group included 40 students who used the online learning model that focused on doing knowledge, while the control group had 40 students who followed the traditional learning method.

Experimental procedure

Figure 3 depicts the experimental technique for this study. Both the experimental and control groups participated in weekly 90-minute classes and activities over six weeks. In the first week, the control group received an introduction and basic knowledge of media production. In the second week, all students took a pre-test on media production to assess their initial abilities, which helped differentiate between students with high and low prior knowledge.

Throughout the learning activities, both groups were taught by the same instructor using identical teaching materials. The primary distinction between the groups lay in the learning model employed: the experimental group used the doing knowledge online learning model, while the control group followed a conventional learning model. In the experimental group, students engaged in project activities both inside and outside the classroom, with the freedom to select and access materials as needed. After completing their projects, they received learning materials and feedback from the teacher, which helped them better understand their mistakes and areas for improvement. The teacher also provided suggestions for future projects. In contrast, in the control group, students received learning materials and then conducted the project activities; however, they did not receive targeted feedback on their project outcomes. These activities continued for three weeks. In the final week, a post-test on media production was administered to evaluate the students' progress and understanding.

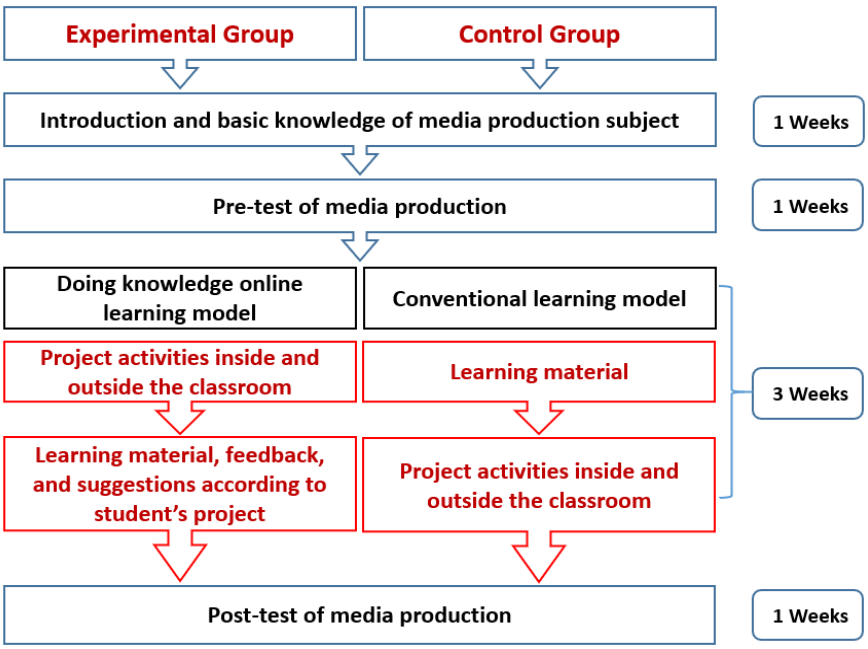

Figure 3. Experimental Procedure of the Study

RESULTS AND DISCUSSION

Results

ADDIE Model for the Development of the Doing Knowledge Online Learning Model

In this study, the ADDIE Model was used as the structure for designing instruction, and it included five steps: analysis, design, development, implementation, and evaluation. It was used to check and see how well the online learning model for doing knowledge is developing, as explained below.

Phase 1: Analysis

At the needs assessment stage, researchers found gaps after observing the photography course. In the course, students have difficulty when they are given theory first and then practice, especially material related to triangle exposure material and photo composition, because currently, students are used to automatic settings on various devices, so their understanding of diaphragm, speed, and ISO in using DSLR cameras is still not optimal. This can be seen from the practice scores of some students who master the triangle exposure, and almost 75% of students are not optimal in photo practice. So, a new learning model is needed with the hope that students can understand the material better.

Phase 2: Design

The second phase is design. At this phase, the syntax planning of the doing knowledge online learning model was carried out, as shown in Figure 4. Learning by applying the doing knowledge model was expected to help students in finding and transforming complex information as part of the competencies that must be achieved. With this model, students are not only passive recipients of information but also play an active role in exploring, understanding, and applying knowledge. This process allowed students to develop analytical and critical skills, which are essential for understanding complex concepts and preparing them to face challenges in the real world.

The doing knowledge online learning model has two main syntaxes designed specifically for lecturers and students. For lecturers, this syntax involves planning and implementing learning that involves giving practical and reflective tasks. As for students, this syntax involves active engagement in learning activities, from the exploration stage to the presentation of work. By following this structure, both parties can work synergistically to achieve the desired learning objectives, ensuring that the learning process is not only effective but also enjoyable and motivating.

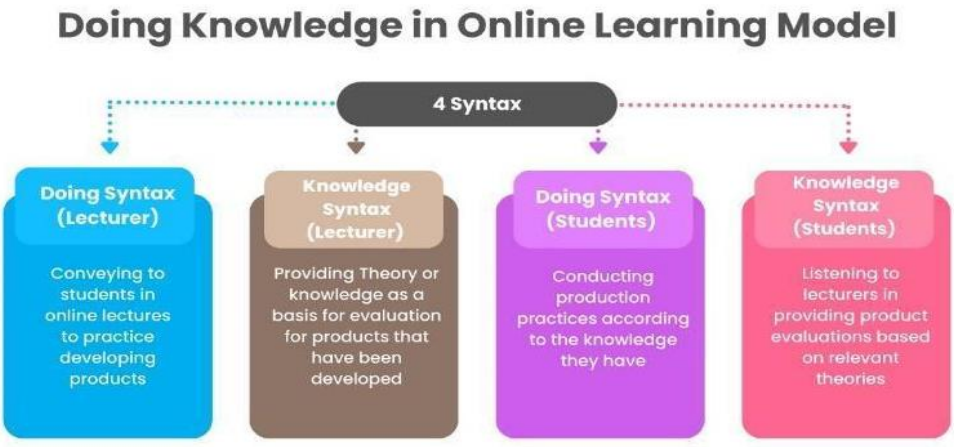

Figure 4. Syntax of Doing Knowledge Online Learning Model

Phase 3: Development

The third phase, development, is a crucial phase where all the necessary materials and resources to support the learning process are created and prepared. At this point, every component required for the learning model must be fully developed and ready for use, ensuring that it aligns with the instructional design established in the previous phases.

Once the learning model has been developed, it undergoes a process of expert validation, where subject matter experts review and assess its quality, relevance, and effectiveness. After receiving expert feedback, the model is tested in a real or simulated environment to evaluate its practical application and to identify any areas for improvement before it is fully implemented. This ensures that the learning model is both functional and optimized for achieving the intended learning outcomes.

Phase 4: Implementation

The book was utilized during the data collection process involving students from the Educational Technology study program enrolled in the photo media development course. Instruments in the form of tests or non-tests were given to them to test the effectiveness of the media that had been developed. If there were still revisions or declared not feasible, the media will be revised in accordance with the input obtained.

Table 2. The ANCOVA Result of Learning Performance

Group	N	Mean	SD	Adjust mean	SE	F	η^2
Experimental	40	84.43	6.22	83.29	0.88	93.43***	0.55
Control	40	69.87	7.43	71.01	0.88		

*** p< .001

Phase 5: Evaluation

The last phase that must be done in the ADDIE development model is the evaluation phase. The results of the questionnaire data are calculated using the following formula:

$$P = \frac{F}{N} \times 100\%$$

Based on the results of the questionnaire completed by experts, the data presented in Table 2 were obtained. The experts rated the model with an approval percentage of 93%, classifying it as a "very good" description or highly suitable for use in the learning process.

Table 3. The result of the percentage score of the questionnaire

Percentage score	Category
93%	Very good

Analysis of Students' Learning Performance

The students' learning performance test was used to determine whether the two groups had different or the same learning performance. The homogeneity analysis of the within-group regression coefficients indicated that no significant difference was found between the two groups ($F = 2.21$, $p > .05$), indicating that the assumption of homogeneity was met. As a result, the analysis of covariance (ANCOVA) could be used to analyze the collected data by excluding the effect of the pre-test. As shown in Table 3, a significant difference was found between the two groups ($F = 93.43$, $p < .001$, $\eta^2 = 0.55$). The corrected mean scores of the experimental group were (83.29) and the control group (71.01) indicated that significantly higher learning performance was achieved by students taught through the doing knowledge online learning model than those who learned with the conventional learning model. Furthermore, the effect size (η2) for the ANCOVA results indicated a high effect size, based on the proposition developed by Cohen (1988).

Analysis of High and Low Students' Prior Knowledge

In this section, students' learning performance was categorized into two variables: high prior knowledge and low prior knowledge. This distinction is made to assess the impact of students' prior knowledge on their learning improvement when using the doing knowledge online learning model

compared to the conventional learning model. By analyzing these variables, the study aims to determine how prior knowledge influences learning outcomes in different instructional settings.

For students with high prior knowledge, the homogeneity of the within-group regression coefficients was first examined. The results indicated no significant difference between the two groups ($F = 0.82$, $p > .05$), demonstrating that the assumption of homogeneity was satisfied. Therefore, ANCOVA was employed to analyze the data while controlling for the influence of the pre-test scores. As shown in Table 4, a statistically significant difference was identified between the experimental and control groups ($F = 79.13$, $p < .001$, $\eta^2 = 0.69$). The adjusted mean score of the experimental group (87.54) was higher than that of the control group (75.39), indicating that students with high prior knowledge who were taught using the Doing Knowledge online learning model achieved significantly better learning outcomes than those who received instruction through the conventional learning model. In addition, the effect size (η^2) was categorized as large according to the criteria proposed by Cohen (1988).

For students with low prior knowledge, the homogeneity of the within-group regression coefficients was first examined. The analysis revealed no significant difference between the experimental and control groups ($F = 2.95$, $p > .05$), indicating that the assumption of homogeneity was satisfied. Consequently, ANCOVA was conducted to analyze the data while controlling for the influence of the pre-test scores. As shown in Table 4, a statistically significant difference was identified between the two groups ($F = 30.95$, $p < .001$, $\eta^2 = 0.45$). The adjusted mean score of the experimental group (79.04) exceeded that of the control group (67.06), demonstrating that students with low prior knowledge who were taught using the Doing Knowledge online learning model achieved significantly higher learning outcomes than those who received conventional instruction. In addition, the effect size (η^2) was classified as large according to the criteria proposed by Cohen (1988).

Table 4. The ANCOVA Result of High and Low Prior Knowledge of Students' Learning Performance

Variable	Group	N	Mean	SD	Adjust mean	SE	F	η^2
High prior knowledge	Experimental	26	87.27	4.64	87.54	0.78	79.13***	0.69
	Control	13	75.92	4.25	75.39	1.11		
Low prior knowledge	Experimental	14	79.14	5.35	79.04	1.75	30.95***	0.45
	Control	27	66.96	6.89	67.06	1.25		

*** p< .001.

Discussion

In this study, a Doing Knowledge online learning model was created, and its effectiveness was checked using an experiment. The ADDIE Model was used as the main structure for designing instruction to help assess and evaluate the model that was created. This learning method combines parts of flipped learning with hands-on learning through doing. The results show that students weren't just sitting back and taking in information; they were really involved in looking things over, figuring things out, and using what they learned (Bot et al., 2005; Tan & Kim, 2015). This aligns with (Gertrudix et al., 2019), who noted that learners achieve similar outcomes through individualized and differentiated activities based on their experiences, knowledge, skills, and habits when using technology. According to the evaluation phase of the ADDIE Model, experts rated the proposed model with a 93% approval rating, categorizing it as "very good" and indicating its strong suitability for use (Cheung, 2016; Li & Abidin, 2024)

This study found that students who used the Doing Knowledge online learning model performed better than those who used the traditional learning method. This result shows that the Doing Knowledge model greatly improved students' learning results when compared to usual teaching methods. These results align with the work of Bradberry and De-Maio (2019) and Velankanni (2024), who demonstrated that learning by doing not only improves student performance but also fosters the development of practical skills and insights that are essential for future career success. By actively engaging in the learning process, students can reflect on the material and feedback provided by their teachers, enabling them to self-evaluate and refine their abilities. This cyclical process of

learning, feedback, and self-improvement highlights the model's effectiveness in promoting both academic growth and the practical application of knowledge in real-world contexts.

In terms of students' prior knowledge, there are two categories: low and high prior knowledge. In this case, the pre-test score was a reference for categorizing student levels. Statistically, students who learned with doing knowledge online learning model not only had significantly better learning performance in high prior knowledge, but also in low prior knowledge compared to the conventional learning model. This addresses Siong et al. (2017) concerns about the need to analyze differences in students' prior knowledge, which impacts their problem-solving abilities and their capacity to apply learned concepts to new contexts (Endres et al., 2023). Nevertheless, a closer examination of Table 4 reveals that the average score of students with low prior knowledge who learned with doing knowledge online learning model was higher than students with high prior knowledge who learned with the conventional learning model. This indicates that the doing knowledge online learning model has a substantial impact on student development (Ayub et al., 2020; Donnelly, 2010).

Implications

This study contributes to the existing literature by presenting empirical evidence that the Doing Knowledge model effectively bridges the persistent gap between theoretical instruction and practical application in media production. Historically, educational frameworks in this field have strived to integrate abstract concepts into tangible technical skills. However, based on constructivist learning principles (Kalpana, 2014; Kazi & Galanaki, 2020), our findings indicate that integrating a "learning-by-doing" approach transforms students from passive recipients into active knowledge producers (Hung et al., 2004). By actively engaging in the production process, students can directly apply theoretical understanding to real-world multimedia tasks, which not only enhances their technical competencies and academic performance (Ayub et al., 2020; Velankanni, 2024) but also fosters crucial self-directed learning skills and creativity (Al-Hashimi et al., 2019; Bagheri et al., 2013). Consequently, the practical implication of this research is that educators and instructional designers should prioritize project-based environments and hands-on practice (Neo & Neo, 2009) to ensure that media production curricula have a strong pedagogical foundation and are practically relevant

Research Contribution

From a practical standpoint, this study presents a proven teaching method that educators can immediately implement to accommodate diverse learner profiles. Traditional media production instruction often struggles to simultaneously engage students with varying levels of prior knowledge. However, the proposed Doing Knowledge model provides a structured yet flexible framework that effectively supports both novice and advanced learners. For students with low initial proficiency, the structured phases in this model offer the necessary guidance and foundational practical experience to build technical skills and confidence.

Conversely, for students with high prior knowledge, the "learning by doing" approach provides the necessary freedom for independent learning and advanced creative problem-solving. By ensuring that teaching strategies can be systematically adapted to these varying foundational competencies, this research equips educators with proven and equitable tools to foster an environment where all students can achieve significant and measurable learning outcomes

Limitations

Although the research funding has given us some good information about how well the Doing Knowledge model works, this study has some shortcomings that we need to mention. The first thing to note is that the study only included 80 students from a particular group, which might mean the results can't be easily applied to a wider or more varied population. The second part is that the intervention took place over a short period of six weeks. Using a long-term approach might lead to different outcomes when it comes to how well technical skills are remembered over time and how much students stay interested and involved.

Suggestions

Future research should address these constraints by employing larger, multi-institutional samples and extending the intervention period across a wider variety of multimedia subjects. Additionally, applying the Doing Knowledge model to other complex subjects would be valuable to further validate the effectiveness.

CONCLUSION

Based on the results of the research and discussion, this study concluded that the online learning model was suitable for implementation, according to experts who rated the proposed model with 93% agreement, classifying it as "very good". Furthermore, significantly higher learning outcomes were achieved by students who were taught using the Doing Knowledge online learning model compared with those who were instructed through the conventional learning model. Moreover, when the students were grouped according to high and low levels of prior knowledge, those enrolled in the Doing Knowledge online learning model still demonstrated superior performance to their counterparts in the conventional learning group.

ACKNOWLEDGMENT

The authors sincerely acknowledge the institutions and colleagues whose valuable insights contributed to the completion of this study. No specific grant from public, commercial, or not-for-profit funding agencies was received to support this research.

AUTHOR CONTRIBUTION STATEMENT

Conceptualization was carried out by R.U.F., M.A.I., and J.S. Methodology was developed by R.U.F. and M.A.I. Data collection was conducted by M.A.I. and J.S., while data analysis and interpretation were performed by M.A.I. and J.S. The original draft of the manuscript was prepared by R.U.F., and the review and editing process was undertaken by M.A.I. and J.S. Supervision was provided by R.U.F., M.A.I., and J.S. All authors have read and approved the published version of the manuscript.

REFERENCES

Al-Hashimi, S., Muwali, A. Al, Zaki, Y., & Mahdi, N. (2019). The Effectiveness of Social Media and Multimedia-Based Pedagogy in Enhancing Creativity among Art , Design , and Digital Media Students. *International Journal of Emerging Technologies in Learning (IJET)*, *14*(21), 176–190. https://doi.org/https://doi.org/10.3991/ijet.v14i21.10596 Sama'a

Allen, M. (2014). Promoting critical thinking skills in online information literacy instruction using a constructivist approach. In *Critical Thinking Within the Library Program* (pp. 20-37). Routledge. https://doi.org/10.1080/10691310802176780

Ayub, A., Khan, S. S., & Akhtar, S. (2020). An analysis of learning by doing (teaching pedagogy) and its impact on students' scores at the elementary level. *New Horizons*, *14*(2), 159–174. https://doi.org/DOI:10.2.9270/NH.14.2(20).09

Bagheri, M., Zah, W., Ali, W., Chong, M., Abdullah, B., & Daud, S. M. (2013). Effects of Project-based Learning Strategy on Self-directed Learning Skills of Educational Technology Students. *Contemporary Educational Technology*, *4*(1), 15–29. https://doi.org/https://doi.org/10.30935/cedtech/6089

Bot, L., Gossiaux, P. B., Rauch, C.-P., & Tabiou, S. (2005). Learning by Doing : a teaching method for active learning in scientific graduate education. *European Journal of Engineering Education, 30*(105–119), 1–39. https://doi.org/. https://doi.org/10.1080/03043790512331313868

Bradberry, L. A., & De-Maio, J. (2019). Learning by doing: The long-term impact of experiential learning programs on student success. *Journal of Political Science Education, 15*(1), 94-111. https://doi.org/10.1080/15512169.2018.1485571

Branch, R. M. (2009). *Instructional design: The ADDIE approach*. Springer Science & Business Media. https://doi.org/https://doi.org/10.1007/978-0-387-09506-6

Cheung, L. (2016). Using the ADDIE Model of Instructional Design to Teach Chest Radiograph Interpretation. *Journal of Biomedical Education*, *2016*(1).

https://doi.org/http://dx.doi.org/10.1155/2016/9502572
Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Erlbaum. Google Scholar
De-Freitas, S. I., Morgan, J., & Gibson, D. C. (2015). Will MOOCs Transform Learning and Teaching in Higher Education ? Exploring Issues of Engagement , Course Retention and Quality in Online Learning Provision. *British Journal of Educational Technology*, *46*(3), 455–471. https://doi.org/https://doi.org/10.1111/bjet.12268
Donnelly, R. (2010). Interaction analysis in a ' Learning by Doing ' problem-based professional development context. *Computers & Education*, *55*(3), 1357–1366. https://doi.org/10.1016/j.compedu.2010.06.010
Endres, T., Lovell, O., Morkunas, D., Rieß, W., & Renkl, A. (2023). Can prior knowledge increase task complexity ? – Cases in which higher prior knowledge leads to higher intrinsic cognitive load. *British Journal of Educational Psychology*, *93*(November 2022), 305–317. https://doi.org/10.1111/bjep.12563
Fantinelli, S., Cortini, M., Fiore, T. Di, Iervese, S., & Galanti, T. (2024). Bridging the Gap between Theoretical Learning and Practical Application : A Qualitative Study in the Italian Educational Context. *Education Scinces*, *14*(2), 148. https://doi.org/https://doi.org/10.3390/educsci14020198
Gertrudix, F., Rivas, B., & Gertrudix, M. (2019). Active methodologies: learning by doing. *European Commission*, 1–27. https://doi.org/10.5281/zenodo.3870989
Glogger-frey, I., Deutscher, M., & Renkl, A. (2018). Student teachers ' prior knowledge as prerequisite to learn how to assess pupils ' learning strategies. *Teaching and Teacher Education*, *2*, 1–15. https://doi.org/10.1016/j.tate.2018.01.012
Guo, J., Yang, L., & Ding, Y. (2014). Effects of example variability and prior knowledge in how students learn to solve equations. *European Journal of Psychology of Education*, *29*, 21–42. https://doi.org/10.1007/s10212-013-0185-2
Harasim, L. (2017). *Learning theory and online technologies*. Routledge. https://doi.org/10.4324/9781315716831
Hung, H. K., Keppell, M., & Jong, S. Y. (2004). Learners as producers: Using project-based learning to enhance meaningful learning through digital video production. *In Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education* (pp. 428-436). ASCILITE. https://www.ascilite.org/conferences/perth04/procs/pdf/hung.pdf
Jantakoon, T., & Piriyasurawong, P. (2018). Flipped classroom instructional model with mobile learning based on constructivist learning theory to enhance critical thinking (FCMOC model). *Journal of Theoretical and Applied Information Technology, 96*(16), 5607-5614. http://www.jatit.org/volumes/Vol96No16/30Vol96No16.pdf
Kalpana, T. (2014). A Constructivist Perspective on Teaching and Learning : A Conceptual Framework. *International Research Journal of Social Sciences*, *3*(1), 27–29. http://www.isca.in/IJSS/Archive/v3/i1/6.ISCA-IRJSS-2013-186.pdf
Kazi, S., & Galanaki, E. (2020). Piagetian theory of cognitive development. *The Encyclopedia of Child and Adolescent Development*, 6–7. https://doi.org/10.1002/9781119171492.wecad364
Li, C. L., & Abidin, M. J. B. Z. (2024). Instructional design of classroom instructional skills based on the ADDIE model. *Technium Social Sciences Journal*, *555*, 167–178. https://doi.org/https://doi.org/10.47577/tssj.v55i1.10676
Mayer, R. E., & Moreno, R. (2003). Nine Ways to Reduce Cognitive Load in Multimedia Learning. *Educational Psycologist*, *38*(1), 43–52. https://doi.org/https://doi.org/10.1207/s15326985ep3801_6
Mcnamara, D. S., & Kintsch, W. (2012). Learning from texts : Effects of prior knowledge and text coherence. *Discourse Processes*, *13*(43), 37–41. https://doi.org/https://doi.org/10.1080/01638539609544975
Molenda, M. (2003). In search of the elusive ADDIE model. *Performance Improvement, 42*(5), 34-37. https://doi.org/10.1002/pfi.4930420508
Neo, M., & Neo, T. K. (2009). Engaging students in multimedia-mediated constructivist learning–Students' perceptions. *Journal of Educational Technology & Society, 12*(2), 254-266. https://eric.ed.gov/?id=EJ836304

Ornellas, A., César, P., & Carril, M. (2014). A methodological approach to support collaborative media creation in an e- learning higher education context. : *: The Journal of Open, Distance and e-Learning*, *16*(48), 37–41. https://doi.org/10.1080/02680513.2014.906916

Rayanto, Y. H. (2020). *Penelitian pengembangan model ADDIE dan R2D2: Teori & praktek*. Lembaga Academic & Research Institute. https://books.google.co.id/books?id=pJHcDwAAQBAJ&printsec=frontcover&source=gbs_atb#v=onepage&q&f=false

Salam, M., Nurfatimah, D., Iskandar, A., Hanani, D., & Ibrahim, A. (2019). Service learning in higher education : a systematic literature review. *Asia Pacific Education Review*, *20*, 573–593. https://doi.org/10.1007/s12564-019-09580-6

Shabani, K., Khatib, M., & Ebadi, S. (2010). Vygotsky ' s Zone of Proximal Development : Instructional Implications and Teachers ' Professional Development. *English Language Teaching*, *3*(4), 237–248. https://doi.org/https://doi.org/10.5539/elt.v3n4p237

Siemens, G., & Baker, R. S. D. (2012, April). Learning analytics and educational data mining: Towards communication and collaboration. In *Proceedings of the 2nd International Conference on Learning Analytics and Knowledge* (pp. 252-254). https://doi.org/10.1145/2330601.2330661

Siong, G. E., & Thow, V. S. (2017, June). The effect of using the "Learning-By-Doing" approach on students' motivation in learning digital electronics. In *Proceedings of the 13th International CDIO Conference*. University of Calgary. https://www.cdio.org/knowledge-library/documents/effect-using-learning-doing-approach-students-motivation-learning

Song, H. S., Kalet, A. L., & Plass, J. L. (2016). Interplay of prior knowledge, self-regulation and motivation in complex multimedia learning environments. *Journal of Computer Assisted Learning, 32*(1), 31-50. https://doi.org/10.1111/jcal.12117

Sugiyono. (2015). *Metode penelitian pendidikan*. Alfabeta.

Tan, L., & Kim, B. (2015). Learning by doing in the digital media age. In *New Media and Learning in the 21st Century: A Socio-cultural Perspective* (pp. 181-197). https://doi.org/10.1007/978-981-287-326-2_12

Tricot, A., & Sweller, J. (2014). Domain-specific knowledge and why teaching generic skills does not work. *Educational Psychology Review, 26*, 265-283. https://doi.org/10.1007/s10648-013-9243-1

Van-Merrienboer, J. J., & Sweller, J. (2005). Cognitive load theory and complex learning: Recent developments and future directions. *Educational Psychology Review, 17*, 147-177. https://doi.org/10.1007/s10648-005-3951-0

Velankanni, A. L. E. X. (2024). Analyzing the students' academic performance by learning and doing technology. *Educational Administration: Theory and Practice, 30*(5), 1263-1266. https://doi.org/10.53555/kuey.v30i5.3071

Wang, S., Christensen, C., Cui, W., Tong, R., Yarnall, L., Shear, L., & Feng, M. (2023). When adaptive learning is effective learning: Comparison of an adaptive learning system to teacher-led instruction. *Interactive Learning Environments, 31*(2), 793-803. https://doi.org/10.1080/10494820.2020.1808794

Wang, X., Key, Z., & Zhejiang, J. (2024). Promoting students ' creative self-efficacy , critical thinking and learning performance : An online interactive peer assessment approach guided by constructivist theory in maker activities. *Thinking Skills and Creativity*, 101548. https://doi.org/https://doi.org/10.1016/j.tsc.2024.101548