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MOOC-Based Digital Teaching Materials with a Case Method Approach for Improving Students' Understanding of Hindu–Buddhist Kingdom History

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ABSTRACT

Digital teaching materials are increasingly needed to support flexible and interactive history learning in higher education. However, the integration of MOOC-based learning with case method pedagogy remains limited, particularly in topics related to the Hindu–Buddhist Kingdoms in Indonesia. This study employed a research and development design using the ADDIE model, consisting of analysis, design, development, implementation, and evaluation stages. The developed product was a MOOC-based digital teaching material that integrated historical content, visual media, maps, infographics, simulations, and case-based exercises. The implementation involved 33 students from History Education study programs in state universities in the Yogyakarta and Semarang regions. Data were collected through observation, interviews, focus group discussions, documentation, and pretest-posttest assessments. The quantitative data were analyzed using the Shapiro–Wilk normality test and the Wilcoxon Signed-Rank Test. The findings showed an increase in students' learning outcomes after the intervention. The mean pretest score was 70.00, while the mean posttest score increased to 83.06. The Wilcoxon Signed-Rank Test indicated a statistically significant difference between pretest and posttest scores ($p < 0.05$), suggesting improved understanding of the Hindu–Buddhist Kingdom material after using the MOOC-based digital teaching materials. The findings indicate that MOOC-based digital teaching materials integrated with the case method have potential as an alternative instructional resource for history learning in higher education. However, this study measured learning outcomes rather than critical thinking or 4C skills directly. Further studies using control groups and validated instruments are needed to examine broader competency development.

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1. INTRODUCTION

The rapid development of information and communication technology has transformed educational practices and encouraged higher education institutions to adopt more flexible, interactive, and student-

centered learning environments. In the context of 21st-century education, learning is no longer limited to the transmission of knowledge but is expected to facilitate active engagement, independent learning, collaboration, and problem-solving. The integration of technology into instruction provides opportunities for lecturers to design digital learning materials that are accessible beyond classroom boundaries and responsive to students' learning needs. In this regard, technological pedagogical content knowledge becomes essential because effective digital learning requires not only mastery of content but also appropriate pedagogical strategies and technological integration (Mishra & Koehler, 2006).

One form of technology-enhanced learning that has gained increasing attention is Massive Open Online Courses, or MOOCs. MOOCs provide structured online learning environments that may include learning modules, videos, reading materials, discussion forums, quizzes, and independent learning activities. Their flexibility allows students to access materials anytime and anywhere, making them relevant for higher education learning models that demand autonomy and continuous engagement. Ruipérez-Valiente (2020) explains that MOOC-based learning can support large-scale and flexible learning through digital platforms, although its effectiveness depends on instructional design, learner interaction, and contextual relevance. Therefore, MOOCs should not merely function as repositories of digital content but should be designed as pedagogically meaningful learning environments.

In history education, the use of digital learning materials is particularly important because historical learning requires students to understand chronology, causality, context, interpretation, and the relationship between past and present events. History learning should not be reduced to memorizing facts, dates, and figures; rather, it should develop students' ability to analyze historical sources, construct arguments, and reflect on historical values. Thorp and Persson (2020) emphasize that historical thinking is central to history education because it enables learners to interpret the past critically and meaningfully. Similarly, Wineburg (2018) argues that learning history requires disciplined ways of thinking, including sourcing, contextualization, and corroboration. These abilities are highly relevant to preparing students to become reflective and informed citizens.

Despite the potential of digital technology, history learning in many contexts still tends to rely on conventional approaches, such as lectures, textbooks, and teacher-centered explanations. Such approaches may limit students' opportunities to explore historical problems, discuss multiple perspectives, and relate historical materials to contemporary issues. This condition indicates the need for innovative teaching materials that combine digital accessibility with active learning strategies. The topic of the Hindu–Buddhist Kingdoms in Indonesia, for example, contains rich historical content related to political development, trade networks, cultural interaction, religious transformation, and heritage preservation. These materials can be meaningfully developed into digital learning resources supported by maps, infographics, simulations, and contextual cases.

The case method is a relevant pedagogical approach for strengthening history learning because it encourages students to analyze real or contextual problems, discuss alternative interpretations, and formulate reasoned conclusions. Case-based learning allows students to connect historical knowledge with complex situations that require interpretation and decision-making. Reyes-Parra et al. (2024) highlight the importance of historical and critical thinking in educational contexts, particularly in helping students analyze evidence and develop reasoned judgments. Through case-based activities, students are not only expected to understand historical content but also to engage in inquiry, discussion, and reflection. This approach is consistent with constructivist learning theory, which views learners as active constructors of knowledge through experience, interaction, and reflection (Schunk, 2012, 2022).

Based on this background, the development of MOOC-based digital teaching materials integrated with the case method is considered a promising alternative for improving students' understanding of history, especially on the topic of the Hindu–Buddhist Kingdoms in Indonesia. However, the implementation of such digital teaching materials needs to be examined empirically to determine whether they are associated with improved student learning outcomes. Therefore, this study aims to develop MOOC-based digital teaching materials using the ADDIE model and to examine changes in students' understanding before and after the implementation of the learning materials. The study focuses

specifically on students' learning outcomes, while broader competencies such as critical thinking and 4C skills are positioned as potential areas for further investigation using more specific and validated instruments.

2. METHODS

This study employed a research and development (R&D) design using the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation. The R&D approach was selected because the study aimed to develop MOOC-based digital teaching materials and examine their implementation in history learning. The ADDIE model provided a systematic framework for identifying learning needs, designing instructional materials, developing digital learning products, implementing the product in a learning setting, and evaluating their impact on students' learning outcomes.

The study was conducted in History Education study programs at state universities in the Yogyakarta and Semarang regions. The participants were 33 undergraduate students who took part in the implementation of the MOOC-based digital teaching materials on the topic of the Hindu–Buddhist Kingdoms in Indonesia. The participants were selected purposively based on their relevance to the learning topic and their involvement in the course in which the developed materials were implemented. The study focused on students' understanding of historical content before and after the learning intervention.

The development process followed the five stages of ADDIE. In the analysis stage, the researchers identified learning needs through observation, interviews, focus group discussions, and documentation. This stage examined existing history learning practices, students' learning difficulties, the availability of digital resources, and the need for more interactive teaching materials. The analysis also focused on the suitability of the Hindu–Buddhist Kingdom topic for digital and case-based learning.

In the design stage, the researchers prepared the structure of the MOOC-based teaching materials. This included determining learning objectives, organizing the content sequence, preparing storyboards, selecting media components, and designing case-based learning activities. The materials were designed to include historical explanations, maps of Hindu–Buddhist Kingdom distribution, trade and shipping route maps, infographics, summaries, visual media, simulations, and case-based exercises. The case method was integrated to encourage students to analyze historical problems and connect historical values with contemporary issues.

In the development stage, the instructional design was converted into MOOC-based digital teaching materials. The product was developed for access through digital devices such as computers, laptops, and mobile devices. The learning materials included textual content, visual materials, maps, infographics, videos, and practice questions. The developed product was reviewed and revised based on feedback related to content accuracy, language clarity, media presentation, and instructional suitability. Revisions were made to improve the quality and usability of the product before implementation.

In the implementation stage, the MOOC-based digital teaching materials were used in history learning activities. Before the intervention, students completed a pretest to measure their initial understanding of the Hindu–Buddhist Kingdom material. They then participated in learning activities using the developed MOOC materials and case-based tasks. After the intervention, students completed a posttest to measure changes in their understanding after using the digital teaching materials.

In the evaluation stage, the researchers evaluated both the development process and the implementation results. Formative evaluation was carried out during the analysis, design, and development stages through feedback and revision. Summative evaluation was conducted by comparing students' pretest and posttest scores. The evaluation focused on whether students' learning outcomes improved after the use of the MOOC-based digital teaching materials.

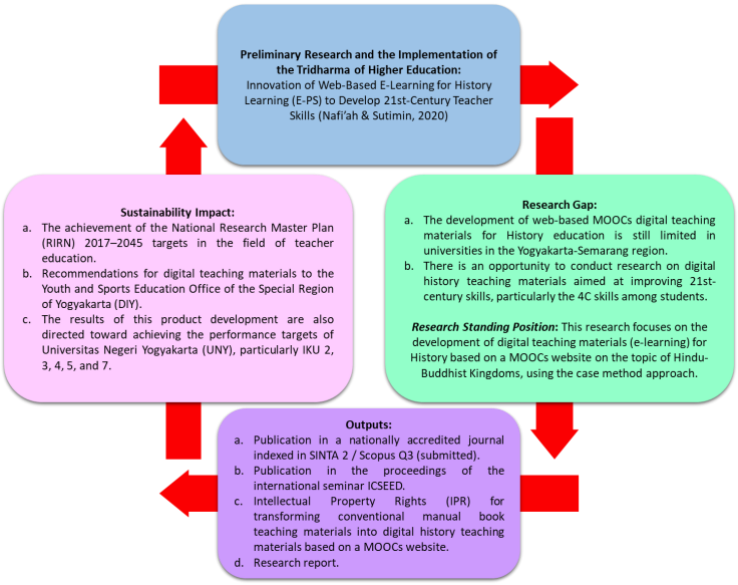

Figure 1. Research mindset

At the data analysis stage, data analysis techniques are used, including data collection, data reduction, data presentation, verification, and conclusion.

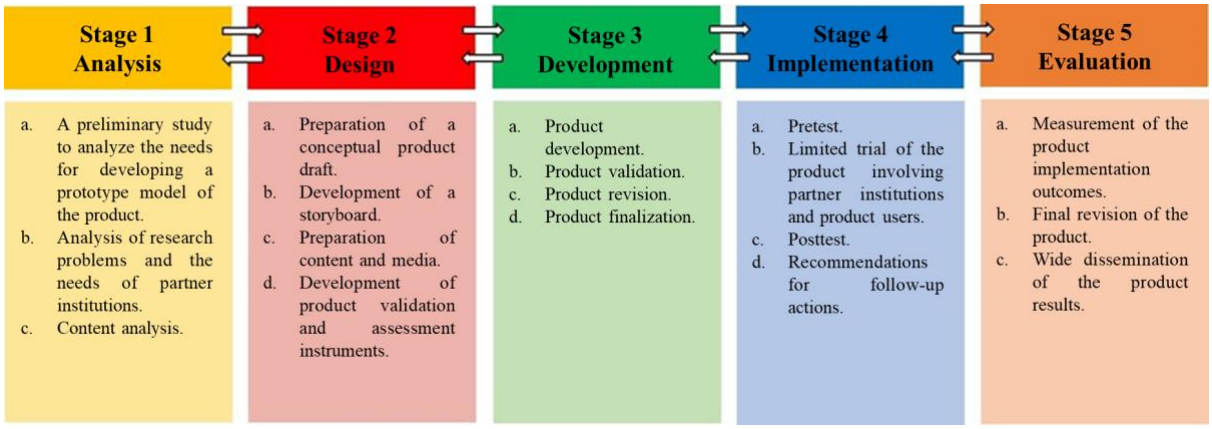

Figure 2. Stages of application of the ADDIE model

The description of the stages of implementing the ADDIE model, as proposed by Branch (2009), includes the following steps:

1. Phase I Analyze: (a) to reveal an outline of the research carried out, (b) construct the research problem, (c) find research gaps, (d) look for novelties in this research, (d) explain the standing position and state of the art of the research. To sharpen the analysis of the results of the literature study, the research team also conducted observations and interviews with research resource persons including: (1) Lecturers of the History Education Study Program at State University in Yogyakarta-Semarang, (2) Education Staff (Tendik) of the History Education Study Program at State University in Yogyakarta-Semarang, (3) Students of the History Education Study Program at State University in Yogyakarta-Semarang. The determination of resource persons is carried out purposively with the criteria of the capacity of the resource person in the authority, the scope of the research problem, and access to data information needed in the research.
2. Stage II Design: This stage is carried out by preparing a storyboard to compile a series that will be carried out at the development stage. Storyboard making is also carried out for effectiveness and ease in the product development process. In addition, content preparation is carried out by creating designs that will be used as the main material for making MOOC websites. Content preparation is

carried out to simplify and speed up the product preparation process. In addition, the content compiled must also be based on accurate sources and according to needs. The next stage is the creation of instruments that will be used to collect research data.

3. Phase III Development: The development stage is carried out based on the results of the initial needs analysis and design that will be used as the main material for development. The development of MOOCs websites is carried out in accordance with research steps and procedures. Products are developed in the form of Android, desktop, and PC-based MOOCs. After the finished product, expert validation is carried out using instruments that have been developed to obtain assessment results and input. Based on the validation results, the product is revised to produce a more perfect product. Expert validation is carried out to obtain assessments, suggestions, inputs, and comments from experts on the developed product. Based on the results of the validation, the product is repaired according to the suggestions and input of experts. The aspects that the assessment is carried out include: assessment of content, materials, and language.
4. Phase IV Implementation (Implementation): The implementation stage is carried out on people living in the research area. Implementation is carried out by conducting a pretest before using the MOOCs website, and a posttest after using the MOOCs website. The trial is carried out after the product is declared feasible by an expert. The trial was carried out by providing a test of knowledge and public response to the developed product. The results of the product trial are then calculated to obtain the results of a community-based assessment of the product before the final stage.
5. Phase V Evaluation: In this stage, the researcher conducts several stages of evaluation. Every development process needs evaluation to get maximum results. In this study, evaluation is carried out after the analysis process is carried out, after product design, analysis after the development process at the revision stage based on expert input, and finally, evaluation of the implementation of the product that has been developed. After evaluation and revision based on the test results, the product can be disseminated.

Data were collected using observation, interviews, focus group discussions, documentation, and pretest-posttest assessments. Observation was used to identify learning conditions and student engagement during implementation. Interviews and focus group discussions were used to gather information about learning needs and responses to the developed materials. Documentation was used to support the development and implementation process. The pretest and posttest were used to measure students' understanding of the Hindu–Buddhist Kingdom topic before and after the intervention.

The quantitative data from the pretest and posttest were analyzed using descriptive and inferential statistics. Descriptive statistics were used to calculate the mean, standard deviation, minimum score, and maximum score. Before conducting the difference test, the Shapiro–Wilk test was used to examine data normality because the sample size was fewer than 50 participants. Since one of the datasets did not meet the assumption of normality, the Wilcoxon Signed-Rank Test was used to determine whether there was a significant difference between students' pretest and posttest scores. The significance level was set at 0.05. The qualitative data from observation, interviews, focus group discussions, and documentation were analyzed through data reduction, data presentation, and conclusion drawing to support the interpretation of the development and implementation process.

3. FINDINGS AND DISCUSSION

3.1 Findings

This study was conducted to evaluate the effectiveness of innovative learning models in improving student learning outcomes in History among university students. History learning in the context of the Merdeka Curriculum can be understood not only as a process of transferring knowledge about past events, but also as a space for developing historical thinking skills, analyzing the chronology of events, cause-and-effect reasoning, and understanding the values of local and national wisdom. In line with

the changing paradigm of modern learning that places students at the center of learning activities, this study applies learning strategies that require active student involvement through exploratory activities, reflective discussions, and problem-solving based on historical cases. The goal is for research participants to follow a series of learning stages designed to stimulate thinking skills, cooperation, and reasoning abilities. The learning process begins with orientation and identification of prerequisite concepts, followed by exploration of the material through visual learning media, study of historical documents, and interaction in discussion groups. In the final stage, students reflect and formulate conclusions related to the historical phenomena studied. Therefore, this study does not merely measure cognitive abilities quantitatively, but also reflects the quality of the learning process that is active and meaningful.

The pretest was conducted before the treatment to measure students' initial abilities related to the material. The average pretest score was 70.00 with a standard deviation of 9.199, indicating that, in general, students had sufficient basic understanding, but there were still variations in mastery of the material between individuals. After the innovative learning process was implemented, a posttest was conducted to evaluate the students' final level of mastery of the material. The posttest results recorded an average of 13.06 points, indicating a substantial increase in understanding of historical concepts after the treatment was given. The higher distribution of pretest scores indicates that the learning approach was able to reach students of various ability levels. This also shows that innovative learning strategies not only benefit high-achieving students, but also students who were previously in the medium and low ability categories. Thus, this learning model has the potential to improve learning outcomes. The following are the results of statistical tests on the pretest and posttest results conducted in this study:

3.1.1 Normality Test

Table 1. Descriptive Statistics

Statistic	Pretest Value	Posttest Value
Valid (N)	33	33
Missing	0	0
Mean	70.000	83.061
Standard Deviation	9.199	10.886
Shapiro–Wilk	0.926	0.938
P-value (Shapiro–Wilk)	0.027	0.058
Minimum	55.000	65.000
Maximum	84.000	99.000

The normality test is carried out to find out whether the data of the pretest and posttest results are distributed normally before the test is different. Based on the results of the analysis using the Shapiro-Wilk test on JASP software, the value of $p = 0.027$ for the pretest value variable and $p = 0.058$ for the posttest value variable was obtained. The decision-making criterion is that if the value of $p > 0.05$, then the data is normally distributed, while if $p \leq 0.05$, then the data is not normally distributed. Thus, it can be interpreted that the pretest data is not normally distributed because the p-value is less than 0.05, while the posttest data is normally distributed because the p-value > 0.05.

The average pretest score of students is 70.00 with a standard deviation of 9.199, while the average posttest score is 83.06 with a standard deviation of 10.886. This shows that after treatment, there is an increase in the average score of student learning outcomes. However, because one of the variables did not meet the assumption of normality, the test of the difference in learning outcomes between the pretest and the posttest was then analyzed using an alternative non-parametric test, namely *the Wilcoxon Signed-Rank Test*, as a substitute for *the Paired Sample T-Test.*

3.1.2 Wilcoxon Signed-Rank Test

Table 2. Wilcoxon Signed-Rank Test

Measure 1	Measure 2	W	Z	df	p-value	Rank-Biserial Correlation	SE Rank-Biserial Correlation
Pretest Value	Posttest Value	0.000	-5.012	—	< .001	-1.000	0.197

Based on the results of the analysis using *the Wilcoxon Signed-Rank Test* on the JASP software, the Asymp.sig value was obtained. (2-tailed) = 0.000 > of significance level 0.05. These results show that there is a significant difference between pretest and posttest scores. This means that the treatment given in the learning process can have a real influence on student learning outcomes. Thus, the null hypothesis (H_0) stating that there was no difference in learning outcomes before and after treatment was rejected, while the alternative hypothesis (H_1) was accepted. These findings indicate that the learning approach applied is able to significantly improve students' understanding and learning outcomes.

Table 3. Descriptive Statistics of Pretest and Posttest Scores

Variable	N	Mean	SD	SE	Coefficient of Variation
Pretest Value	33	70.000	9.199	1.601	0.131
Posttest Value	33	83.061	10.886	1.895	0.131

In the *Ranks table*, it is shown that the majority of students experience an increase in scores between pretest and posttest results. The data shows that the number of *Positive Ranks* is higher than *Negative Ranks* and *Ties*, which means that most students get higher posttest scores than pretest scores. This pattern illustrates the tendency to increase learning outcomes after the implementation of the learning methods used. In other words, learning strategies have been shown to encourage students to be more active and understand the material in depth, so that their grades have significantly increased.

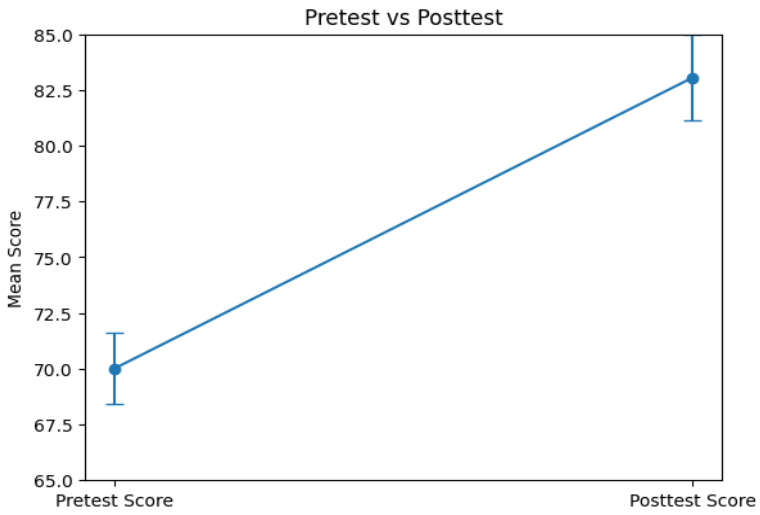

Figure 3. Pretest vs Posttest

The Test Statistics table shows a value of Z = -4.236 with a p-value = 0.000 ($p < 0.05$). A negative Z-value indicates that the posttest data is generally higher than the pretest data. Meanwhile, the significance value far below 0.05 confirms the existence of a very significant difference between the two data groups. Thus, it can be concluded that the learning treatment provided is effective in improving student learning outcomes. These results also reinforce the previous conclusion that the increase in grades did not occur by chance, but rather as a direct result of the learning interventions carried out.

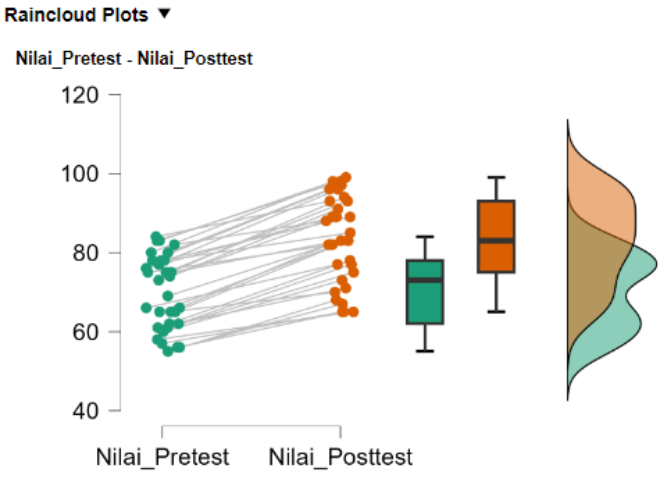

Figure 4. Raincloud Test

The comparison diagram shows an increase in the average score of student learning outcomes after treatment. The average pretest score of 70.00 increased to 83.06 in the posttest. This increase shows the positive impact of the learning strategies applied to students' understanding of History concepts. The consistent increase in almost all samples reinforces *the results of the Wilcoxon* test that the difference is statistically significant. Thus, it can be said that the learning approach used succeeds in creating a more effective learning atmosphere and supports the achievement of student competencies.

Based on the results of data analysis using *the Wilcoxon Signed-Rank Test, it* was found that there was a significant difference between student learning outcomes before and after being given learning treatment. The average pretest score of 70.00 increased to 83.06 on the posttest, with the test results showing an Asymp.sig value. (2-tailed) = 0.000 which is smaller than the significance level of 0.05. This shows that the learning treatment provided is able to have a positive and significant impact on improving students' History learning outcomes. The majority of students experienced an increase in scores after the application of the learning method, which was reflected in the positive dominance of the ranks in the test results.

3.2 Discussion

The findings of this study indicate that the implementation of MOOC-based digital teaching materials integrated with the case method was associated with improved students' understanding of the Hindu–Buddhist Kingdoms in Indonesia. This improvement is reflected in the increase in the mean score from 70.00 in the pretest to 83.06 in the posttest. The Wilcoxon Signed-Rank Test also showed a statistically significant difference between students' scores before and after the intervention. These results suggest that the developed digital teaching materials provided a more supportive learning environment for students to access, explore, and review historical content through structured online resources and case-based learning activities.

The improvement in students' learning outcomes may be explained by the characteristics of MOOC-based learning, which offer flexibility, accessibility, and structured digital content. Through the MOOC platform, students were able to access learning materials beyond the limitations of classroom time and space. This flexibility is important in higher education because students are expected to develop greater autonomy in managing their learning process. MOOC-based environments can support independent learning through modular content, videos, discussion activities, quizzes, and other interactive resources, although their effectiveness depends on the quality of instructional design and learner engagement (Ruipérez-Valiente, 2020). In this study, the integration of maps, infographics,

summaries, simulations, and case-based exercises may have helped students understand historical concepts in a more visual, contextual, and meaningful way.

The findings are also consistent with the technological pedagogical content knowledge framework, which emphasizes the importance of integrating technology, pedagogy, and subject matter in effective teaching practice (Mishra & Koehler, 2006). The use of MOOC technology alone does not automatically improve learning outcomes. Its educational value depends on how digital tools are aligned with learning objectives, historical content, and appropriate pedagogical strategies. In this study, the case method served as the pedagogical foundation that connected digital materials with analytical learning activities. This combination allowed students not only to receive information but also to engage with historical problems, examine relationships between events, and interpret historical phenomena.

From the perspective of history education, the case method is relevant because history learning requires more than memorization of facts and chronology. Students need to understand causality, context, continuity, change, and the relationship between historical events and contemporary life. Historical thinking involves the ability to analyze evidence, contextualize events, and construct reasoned interpretations (Wineburg, 2018). Similarly, Thorp and Persson (2020) argue that history education should help learners develop meaningful ways of thinking about the past rather than simply reproduce historical information. Therefore, case-based activities in the MOOC materials may have supported students in making connections between historical knowledge and broader social or cultural issues.

The significant increase in posttest scores also aligns with constructivist learning theory. Constructivism views learning as an active process in which students build knowledge through experience, interaction, and reflection (Schunk, 2012, 2022). In the context of this study, students interacted with digital materials, explored historical cases, and completed learning tasks that encouraged them to organize and reconstruct their understanding. Such activities may help students move from passive reception of information toward more active meaning-making. This is particularly important in history learning, where students are expected to interpret past events based on evidence and context.

Although the findings show positive results, the interpretation must remain cautious. The study used a one-group pretest-posttest design without a control group. Therefore, the increase in scores cannot be attributed solely to the MOOC-based digital teaching materials with full causal certainty. Other factors, such as repeated exposure to the material, students' prior knowledge, lecturer support, or external learning activities, may also have contributed to the improvement. For this reason, the results are best interpreted as evidence of improved learning outcomes after the intervention rather than definitive proof of the intervention's effectiveness.

It is also important to clarify that this study primarily measured students' cognitive learning outcomes related to the Hindu–Buddhist Kingdom material. Although the MOOC-based materials were designed to support learning activities associated with 21st-century competencies, this study did not directly measure critical thinking, creativity, communication, or collaboration using standardized and validated instruments. Consequently, claims regarding the improvement of 4C skills should be stated carefully. Future research should include specific instruments or performance-based rubrics to assess these competencies more accurately.

Overall, the findings suggest that MOOC-based digital teaching materials integrated with the case method have potential as an alternative instructional resource for history education in higher education. The approach supports flexible access to materials, encourages active engagement with historical cases, and provides opportunities for students to develop deeper understanding of historical content. Future studies should involve larger and more diverse samples, apply experimental or quasi-experimental designs with control groups, and include validated measures of historical thinking, critical thinking, and other 21st-century skills. Such studies would provide stronger evidence regarding the broader educational impact of MOOC-based case method learning in history education.

4. CONCLUSION

This study developed and implemented MOOC-based digital teaching materials integrated with a case method approach for history learning on the topic of the Hindu–Buddhist Kingdoms in Indonesia. The main finding shows that students' learning outcomes improved after the intervention, as indicated by the increase in the mean score from 70.00 in the pretest to 83.06 in the posttest, with the Wilcoxon Signed-Rank Test confirming a statistically significant difference between the two scores. These results suggest that the developed MOOC-based teaching materials have potential as an alternative digital learning resource to support students' understanding of historical content in higher education. However, this study has several limitations. The sample size was relatively small and limited to students from selected universities in the Yogyakarta and Semarang regions, which restricts the generalizability of the findings. In addition, the study used a one-group pretest-posttest design without a control group, so causal claims regarding the effectiveness of the intervention should be made cautiously. The study also measured cognitive learning outcomes rather than directly assessing critical thinking or other 4C skills using validated instruments. Future research is recommended to involve larger and more diverse samples, employ experimental or quasi-experimental designs with control groups, and use validated instruments or performance-based assessments to examine the impact of MOOC-based case method learning on historical thinking, critical thinking, and broader 21st-century competencies.

REFERENCES

Adewale, M. D., Azeta, A., Abayomi-Alli, A., & Sambo-Magaji, A. (2024). Impact of artificial intelligence adoption on students' academic performance in open and distance learning: A systematic literature review. *Heliyon, 10*(22), e40025. https://doi.org/10.1016/j.heliyon.2024.e40025

Aploludin, A., Hiasa, F., Marlina, S., Husnita, L., Ristiani, R., Nurbaya, N., Tarmon, G., Listiani, H., Inayah, S., Supriyadi, E., Nuraeni, Z., Prasetyaningrum, D. I., Rusli, T. S., Kurniadi, E., & Pujiadi, P. (2024). *Strategi pembelajaran inovatif*. EDUPEDIA. https://www.researchgate.net/publication/383242431_STRATEGI_PEMBELAJARAN_INOVATIF

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

Bytautas, M. (2022). The manifestation of students' critical thinking in socially sensitive sexuality education curriculum. *Pedagogika, 146*(2), 184–208. https://doi.org/10.15823/p.2022.146.10

Castro, M. P. (2020). Challenge based learning: Innovative pedagogy for sustainability through e-learning in higher education. *Sustainability, 12*(10), Article 4063. https://doi.org/10.3390/su12104063

Coccia, M. (2019). Why do nations produce science advances and new technology? *Technology in Society, 59*, Article 101124. https://doi.org/10.1016/j.techsoc.2019.03.007

Field, A. P. (2024). *Discovering statistics using IBM SPSS Statistics*. Sage. https://books.google.com/books/about/Discovering_Statistics_Using_IBM_SPSS_St.html?hl=id&id=83L2EAAAQBAJ

Garcés-Prettel, M. (2020). Influence of family and pedagogical communication on school violence. *Comunicar, 28*(63), 73–82. https://doi.org/10.3916/C63-2020-07

Ho, F. K. W. (2015). Physical activity improves mental health through resilience in Hong Kong Chinese adolescents. *BMC Pediatrics, 15*, Article 48. https://doi.org/10.1186/s12887-015-0365-0

Kaluge, L., Ni, F. O., & Malang, K. (2025). Implementation of inquiry-based history learning as an effort to improve the critical thinking skills of SMAN 1 Penukal students. *International Conference on Interdisciplinary Studies, 1*(1), 255–265. https://doi.org/10.31316/icis.v1i1.9286

Lorenzo, F. (2017). Historical literacy in bilingual settings: Cognitive academic language in CLIL history

narratives. *Linguistics and Education, 37*, 32–41. https://doi.org/10.1016/j.linged.2016.11.002

Lyddon, W. J., & Alford, D. J. (1993). Constructivist assessment: A developmental-epistemic perspective. In G. J. Neimeyer (Ed.), *Constructivist assessment: A casebook* (pp. 31–57). Sage Publications. https://psycnet.apa.org/record/1995-98218-002

Malay, I., Sihotang, S. Y., Sembiring, T., Febriansyah, D. A., & Khairunisa, V. (2024). Increasing student learning motivation in junior high school students through collaborative learning methods. *Proceeding of International Conference on Education, Society and Humanity, 2*(1), 1718–1722. https://ejournal.unuja.ac.id/index.php/icesh/article/view/8096

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Pratama, A. W. (2025). Optimalisasi efektivitas pembelajaran matematika melalui integrasi pendekatan realistic mathematics education (RME) dan metode STEAM di Madrasah Tsanawiyah. *Prosiding Seminar Nasional Pendidikan FPMIPA*. https://prosiding.ikippgribojonegoro.ac.id/index.php/fpmipa/article/view/3285

Reyes-Parra, P. A., Navarro-Roldán, C. P., & Fernández, A. S. (2024). Historical and critical thinking in the educational context: A systematic review. *Panta Rei, 18*, 269–291. https://doi.org/10.6018/pantarei.611711

Ruipérez-Valiente, J. A. (2020). Using multi-platform learning analytics to compare regional and global MOOC learning in the Arab world. *Computers & Education, 146*, Article 103776. https://doi.org/10.1016/j.compedu.2019.103776

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology, 61*, Article 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Schunk, D. H. (2012). *Learning theories: An educational perspective*. Pearson. https://books.google.com/books/about/Learning_Theories.html?hl=id&id=FZq4cQAACAAJ

Schunk, D. H. (2022). *Learning theories: Educational perspectives* (8th ed.). Pearson.

Susilo, A., & Sarkowi, S. (2018). Peran guru sejarah abad 21 dalam menghadapi tantangan arus globalisasi. *Historia: Jurnal Pendidik dan Peneliti Sejarah, 2*(1), 43–50. https://doi.org/10.17509/historia.v2i1.11206

Thorp, R., & Persson, A. (2020). On historical thinking and the history educational challenge. *Educational Philosophy and Theory, 52*(8), 891–901. https://doi.org/10.1080/00131857.2020.1712550

Vhalery, R., Setyastanto, A. M., & Leksono, A. W. (2022). Kurikulum Merdeka Belajar Kampus Merdeka: Sebuah kajian literatur. *Research and Development Journal of Education, 8*(1), 185–201. https://doi.org/10.30998/rdje.v8i1.11718

Wineburg, S. S. (2018). *Why learn history (when it's already on your phone)*. University of Chicago Press.

Yin, R. K. (2014). How to do better case studies: With illustrations from 20 exemplary case studies. In L. Bickman & D. J. Rog (Eds.), *The SAGE handbook of applied social research methods* (pp. 254–282). Sage. https://doi.org/10.4135/9781483348858.n8