Inductive Learning in The Digital Era : Assessing the Effectiveness of HTML 5 Package (H5P) Based Media on Learning Motivation and Responsibility

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Abstract: This study aims to analyze the effect of implementing an inductive thinking learning model using HTML 5 Package (H5P)-based learning media on students' learning motivation and responsibility. A quantitative approach was employed, with a sample of 90 students from class X, XI, and XII TKJ 1 SMK PGRI 13 Surabaya. Data collection utilized questionnaires, and data analysis was performed using linear regression assisted by SPSS. The results show that the t-value of 9.081 exceeds the t-table value (1.986), with a significance level of 0.000, which is less than α (0.05). This indicates that the inductive thinking learning model using H5P-based interactive learning media has a positive and significant influence on student learning motivation. Specifically, this model enhances learning motivation by making learning more interactive and engaging, encouraging independent and responsible learning, leveraging technology to boost motivation, and creating a more enjoyable and less monotonous learning experience. Furthermore, the results also reveal that the t-value of 3.707 exceeds the t-table value (1.986), with a significance level of 0.000, which is less than α (0.05). This suggests that the inductive thinking learning model using H5P-based interactive learning media has a positive and significant influence on students' learning responsibility. This model promotes learning responsibility by fostering independent and self-directed learning, enabling flexible access to materials through technology, enhancing engagement and responsibility through interactive media, and developing critical thinking skills that foster greater learning accountability.

Introduction

One of the problems with the quality of education in Indonesia is the less than optimal distribution of education quality. This can be seen from the gap in the quality of education between urban and rural areas, as well as between schools with adequate resources and those lacking (The World Bank, 2020). Several factors contribute to education quality issues in Indonesia, such as unequal teacher competence, lack of facilities in 3T areas, limited access to education for low-income students, and a curriculum that is not fully aligned with workforce needs or diverse student potential (Kemendikbudristek, 2022).

In addition to the above problems, the reality in the field proves that students have less desire to memorize, both in mathematics, language, science, and other subjects. Ormrod (2012) Several factors may contribute to students' lack of interest in memorization. Learning that relies heavily on rote memorization without conceptual understanding often feels boring and irrelevant. Students may not see the purpose or long-term benefit of memorizing material. When assessments overemphasize memorization, it can cause pressure and reduce genuine engagement. In the digital age, easy access to information also reduces the perceived

need to memorize. Additionally, content that lacks real-life relevance is often harder for students to retain.

According to Suhana (2014) Learning motivation is the driving force that encourages students to learn actively, creatively, effectively, and enjoyably. It helps shape changes in their thinking (cognitive), feelings (affective), and actions (psychomotor). When students lack motivation, it can cause serious problems, not only for themselves but also for the overall classroom atmosphere. Therefore, boosting student motivation is essential in the learning process.

Teachers and parents must work together to identify the causes of lack of motivation and implement appropriate strategies to arouse students' interest and enthusiasm for learning. A positive learning environment, relevance of the subject matter, interesting teaching methods, and providing constructive feedback are some of the factors that can contribute to increasing student motivation. Susetyarini et al. (2019) Indicators that show the level of a student's learning motivation. These indicators can be observed from the behavior and responses of students to the learning process. Here are some of them: (1) Involvement and Perseverance, (2) Attitudes and Feelings, (3) Behavior Outside the Classroom.

According to Setiawan (2017) Several factors influence students' learning motivation, including: (1) Student Aspirations – Motivation often stems from early aspirations. Achieving these goals boosts both intrinsic and extrinsic motivation. (2) Student Abilities – Confidence in their own abilities helps students stay motivated to pursue their goals and complete learning tasks. (3) Student Conditions – Physical and mental health greatly affect motivation. Healthy and emotionally stable students are more eager to learn. (4) Environmental Conditions – A supportive, safe, and comfortable environment—both at school and at home—enhances learning motivation. (5) Teacher's Role – Teachers who teach creatively, give clear explanations, and create a positive classroom atmosphere can significantly boost students' motivation.

Motivation plays a crucial role in learning because it drives and shapes student behavior. Positively motivated students have the energy and willingness to engage in learning activities. There is a strong, reciprocal relationship between learning motivation and student responsibility—motivation encourages students to take responsibility for their learning, while a strong sense of responsibility can, in turn, enhance their motivation (Lestari, 2018). Learning motivation has a significant influence on the level of student learning responsibility. Increasing student motivation is the key to fostering their sense of responsibility for their own education. Teachers and parents can play an important role in creating a learning environment that motivates and encourages students to take responsibility for learning (Restu, 2020).

According to Mustari (2014) Responsibility is a person's awareness of their duty to carry out assigned tasks properly and accept the consequences of their actions. According to Susetyarini et al. (2019), individual responsibility is a key foundation for both personal and social development. Without it, efforts may lack direction, social intelligence may be limited, and the learning process may become ineffective. Therefore, teaching responsibility from an early age is essential to shaping successful individuals who contribute positively to society.

The attitude of responsibility for learning plays an increasingly crucial role and can be said to be the main key to achieving ideal learning goals. Current learning is increasingly shifting from the traditional passive model (students as recipients of information) to a more active and student-centered model. Therefore, students are required to take the initiative and be responsible for their own learning process. This is in accordance with the opinion of Rochmah & Kustiningsih (2021) The attitude of responsibility is the awareness and

willingness of an individual to carry out the tasks and obligations given to him, and dare to bear the consequences of the actions that have been taken. The attitude of responsibility involves more than just completing tasks, but also includes the awareness, willingness, and courage to accept the consequences of one's own actions. Syafitri (2017) Indicators of student learning responsibility include: (1) Doing learning tasks routinely without being told (2) Being able to explain the reasons why they have to study (3) Not blaming others when they have difficulty studying (4) Being able to determine how to study from several alternatives (5) Carrying out tasks alone without help (6) Being able to make decisions that are different from other people's decisions (7) Having a strong interest in studying (8) Respecting and appreciating school regulations (9) Being able to concentrate when studying.

Inductive thinking learning is an approach that encourages students to draw general conclusions from specific observations. In simple terms, students "think from the bottom up" by analyzing concrete examples and forming broader concepts. This process starts with specific facts or cases and gradually leads to generalizations or overall conclusions (Rusmini et al., 2024). Inductive learning is a thinking process that moves from specific observations to general conclusions. Hilda Taba introduced the inductive thinking model to help students develop concept-building and task-completion skills. This model strengthens cognitive habits and enhances thinking abilities. Although it involves exploring large amounts of information, it is effective across various subjects, including social studies, science, and language (Sirait & Sihombing, 2017). Prasong et al. (2022) explains that learning media is anything used in learning activities to involve students' thoughts, feelings, interests, and attention so that interactive pedagogical communication between teachers (or media) and students takes place effectively and efficiently. Pagarra et al. (2022) Learning media is a tool used by teachers as an intermediary to convey material to students who are learning well and effectively.

Kristanto (2016) the function of learning media is as (1) a tool for delivering messages that can be more standardized (2) Different interpretations are avoided (3) The learning process becomes clearer and more interesting. Meanwhile, according to Saleh et al. (2023) The main function of learning media is to create conditions for students to capture knowledge accurately and deeply, develop cognitive capacity and shape students' personalities. In the learning process, teaching aids generally prove their major role in all stages and create students' motivation and interest in learning.

Teaching materials are a key component in both online and offline learning. In offline settings, materials like books and modules are commonly used, but teachers also often include PowerPoints, videos, and other aids to suit different student learning styles and make lessons more engaging. The choice of materials is based on the learning goals and the nature of the subject. With technological advancements, teaching materials can now be enhanced using features like those offered by HTML5 Package (H5P) to create more interactive and effective learning experiences (Handoko, 2020).

Lendeng et al. (2021) said that interactive learning media is a learning program that combines several elements, such as text, images, videos, and animations, to systematically achieve learning objectives using computers and enable active interaction between users and the system. Pravitasari and Yulianto (2017) said that the use of interactive learning media can make learning more fun and efficient so that students can more easily understand the material presented. Chen et al. (2021) also stated that the use of HTML 5 Package (H5P) interactive content has provided significant benefits, such as increasing the visibility and accessibility of resources and placing students' needs on good learning content. HTML 5 Package (H5P) interactive content provides many projects that can be used as learning media. H5P

interactive content offers various types of activities such as quizzes, drag and drop, interactive videos, and others that encourage students to actively participate in the learning process, unlike static content such as plain text or video.

H5P encourages active and constructive learning by requiring students to interact with content, solve problems, and apply their understanding (Bakri, 2021). Its immediate feedback feature supports self-assessment and independent learning. Interactive elements like visualizations and practice tasks help students grasp complex concepts (Afifah et al., 2022). Since H5P is HTML5-based, it is accessible across devices and integrates easily with LMS platforms like Moodle, Canvas, and WordPress. With over 50 content types, including quizzes and branching scenarios, H5P supports various subjects and learning goals. Its gamification and interactivity boost student motivation and make learning more engaging and enjoyable (Chen et al., 2021).

SMK PGRI 13 Surabaya has implemented the inductive thinking learning model supported by technology such as computers, internet access, and H5P-based interactive media. However, initial observations show that students in grades X, XI, and XII TKJ 1 still have low levels of learning motivation and responsibility, especially in the network configuration subject. This highlights an urgent need to explore how the inductive thinking model combined with H5P media can be optimized to improve students' motivation and learning responsibility, which are essential for their academic success and readiness for the workforce. The purpose of this study was to test the effectiveness of the inductive thinking learning model combined with HTML 5 Package (H5P)-based media in increasing students' learning motivation and to analyze the impact of H5P-based interactive media on students' sense of learning responsibility.

Research Method

The research approach used is quantitative research. The research variables including independent variables are the application of inductive thinking learning models using HTML 5 package (H5P) based learning media and the dependent variables consist of learning motivation and learning responsibility.
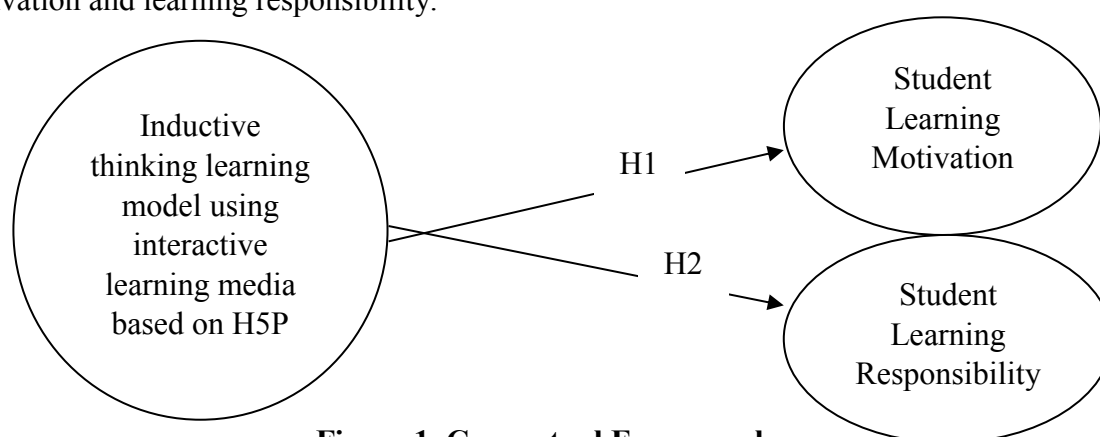
Figure 1. Conceptual Framework

Based on the conceptual framework above, the following hypothesis is obtained:

H1: There is an influence of the application of the inductive thinking learning model using learning media based on the HTML 5 package (H5P) on students' learning motivation.

H2: There is an influence of the application of the inductive thinking learning model using learning media based on the HTML 5 package (H5P) on students' learning responsibility.

The population of this study consists of all students at SMK PGRI 13 Surabaya. The sample is focused on the 11th-grade TKJ class, totaling 90 students. This group was selected because, at the time of the research, they had already experienced inductive learning using H5P-based media. In contrast, the 10th-grade students had not yet been introduced to this learning model, while the 12th-grade students were participating in off-campus internships. Data collection used a questionnaire distributed to respondents. Data analysis with simple linear regression and has 2 regression models that test X against Y1 and X against Y2.

Data collection technique;
1) Questionnaires: Quantitative surveys typically use closed-ended questions (e.g., multiple-choice, rating scales) to collect numerical data.
2) Observations: Involve systematically watching and recording behaviors, events, or phenomena.
3) Interviews: Involve direct interaction between the researcher and the participant.

This study uses multiple linear regression analysis. The basic equation for a multiple linear regression with two independent variables is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$$

Where:

Y is the dependent variable (the variable you are trying to predict or explain).

X_1 and X_2 are the independent variables (the variables you believe influence Y).

β_0 is the intercept (the value of Y when both X_1 and X_2 are zero).

β_1 is the coefficient for X_1 (it represents the change in Y for a one-unit increase in X_1, holding X_2 constant).

β_2 is the coefficient for X_2 (it represents the change in Y for a one-unit increase in X_2, holding X_1 constant).

ϵ is the error term (representing the unexplained variation in Y).

Results and Discussion
Instrument Test

Instrument validity test to determine whether or not the statements in the instrument used are valid. The results of the research instrument validity test show that all instrument statements have a significance of 0.000, this result indicates that the instrument used by the researcher is valid. While the reliability test shows Cronbach's Alpha results > 0.600, this result indicates that the research instrument used by the researcher is reliable.

Normality Test

To measure data quality, researchers use normality tests. There are 2 normality tests as follows:

Table 4. Normality Test

Model	Asymp. Sig. (2-tailed)	Condition	Information
X -> Y1	0.082	> 0.05	Normal
X -> Y2	0.149	> 0.05	Normal

Table 4 shows Asymp. Sig. > 0.05, so it is concluded that the research data is normally distributed.

Multiple Linear Regression Analysis

Furthermore, to test the hypothesis, the researcher used simple linear regression analysis with the following 2 models:

Table 5. Linear Regression Test Model 1
Coefficients ª

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	22,564	3.093		7.295	.000
	X	.655	.072	.696	9,081	.000

a. Dependent Variable: Y1

The regression equation formed based on table 6, includes:

Y1 = a + b1X + e

Y1 = 22.564 + 0.655X + e

The model can be interpreted as follows:

1) Constant (a) 22.564 means that when the independent variable has a constant value, the magnitude of the dependent variable has a value of 22.564.
2) The variable of the inductive thinking learning model using interactive learning media based on H5P has a coefficient value of 0.655. This shows that every one unit increase in the inductive thinking learning model using interactive learning media based on H5P will result in an increase of 0.655 units in the student learning motivation variable.
3) The determinant coefficient test to measure the magnitude of the contribution of variable X to Y is as follows:

Table 6. Determinant Coefficient Test for Model 1
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.696ª	.484	.478	5.68016

a. Predictors: (Constant), X

b. Dependent Variable: Y1

The R Square value shows 0.484. This result means that 48.4% of students' learning motivation is influenced by the inductive thinking learning model using interactive learning media based on H5P.

Table 7. Linear Regression Test Model 2
Coefficients ª

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	11,785	1,892		6.229	.000
	X	.164	.044	.368	3,707	.000

a. Dependent Variable: Y2

The regression equations formed based on table 8 include:

Y1 = a + b1X + e

Y1 = 11.785 + 0.164X + e

The model can be interpreted as follows:

a) Constant (a) 11.785 means that when the independent variable has a constant value, the magnitude of the dependent variable has a value of 11.785.
b) The variable of the inductive thinking learning model using interactive learning media based on H5P has a coefficient value of 0.164. This shows that every one unit increase in

the inductive thinking learning model using interactive learning media based on H5P will result in an increase of 0.164 units in the student's learning responsibility variable.

The determinant coefficient test to measure the magnitude of the contribution of variable X to Y is as follows:

Table 8. Determinant Coefficient Test for Model 2

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.368[a]	.135	.125	3.47412

a. Predictors: (Constant), X

b. Dependent Variable: Y2

The R Square value shows 0.135. This result means that 13.5% of students' learning responsibilities are influenced by the inductive thinking learning model using interactive learning media based on H5P.

Discussion

The Effect of Implementing the Inductive Thinking Learning Model Using HTML 5 Package (H5P) Based Learning Media on Learning Motivation in Students of SMK PGRI 13 Surabaya

Table 6 shows a t value of 9.081 > t table (1.986) with a significance level of 0.000 < α (0.05), indicating that the inductive thinking learning model using H5P-based interactive media has a positive and significant effect on student learning motivation. This is because inductive learning encourages students to discover patterns through direct experience. H5P media further enhances engagement by allowing students to interact with content through features like quizzes and interactive videos.

The positive influence of the inductive thinking learning model using interactive learning media based on H5P on learning motivation includes:
1) H5P-based learning media can make learning interactive and interesting, so it can increase students' learning motivation.
2) The inductive thinking learning model allows students to learn independently and be responsible for their own learning methods.
3) Use of Technology: The use of technology in learning can increase learning motivation, especially for students who are interested in technology.
4) The inductive thinking learning model and the use of H5P-based learning media can make learning more interesting and less boring.

Increased learning motivation positively affects student achievement, as motivated students are more engaged and confident in learning. Research by (Padang & Mulyati, 2022) shows that the inductive thinking model effectively encourages student activity, with 85.15% of students becoming more active and 86.96% meeting learning standards. (Puspananda et al., 2023) also found that H5P-based interactive videos on Moodle increase learning motivation, with 90% of students showing greater enthusiasm and motivation. Additionally, H5P supports students' learning independence.

This result aligns with Mertasih (2020) , who found improved learning achievement among 11th-grade computer network engineering students and positive student responses to the use of the inductive learning model with an analogy approach. Similarly, (Putri, 2023) demonstrated that interactive videos using HTML5 Package (H5P) within the Moodle LMS are effective, engaging, and easy for students to use.

The R Square value of 0.484 indicates that 48.4% of students' learning motivation is influenced by the inductive thinking learning model using H5P-based interactive media. H5P's accessibility across devices allows students to learn anytime and anywhere, increasing comfort and encouraging active learning. This combination creates a more engaging and supportive learning environment, positively impacting students' motivation.

The Effect of Implementing the Inductive Thinking Learning Model Using HTML 5 Package-Based Learning Media (H5 P) on Learning Responsibility in Students of SMK PGRI 13 Surabaya

Table 8 proves that the t value is 3.707 > t table (1.986), with a significance of 0.000 < α (0.05), meaning that the inductive thinking learning model using interactive learning media based on H5P has a positive and significant influence on students' learning responsibilities. Inductive learning encourages students to actively explore, analyze, and draw their own conclusions, which strengthens their awareness and responsibility in the learning process. Interactive media supports this by allowing students to choose how and when they engage with the material. This sense of control helps foster a stronger sense of responsibility for their own learning.

The positive influence of the inductive thinking learning model using interactive learning media based on H5P on learning responsibility includes:

1) The inductive thinking learning model allows students to learn independently and take responsibility for their own learning.
2) The use of technology in learning activities can increase students' responsibility for learning, because they can access learning materials independently and flexibly.
3) H5P-based learning media makes learning interactive and more interesting, so that it can increase student involvement in the learning process and their learning responsibilities.
4) The inductive thinking learning model can help students develop critical and analytical thinking skills, thereby increasing their responsibility for learning.

When there is an increase in student learning responsibility, it will provide benefits in improving student learning outcomes (grades), making students more independent in learning and making decisions and increasing student self-confidence. Research (Susanto et al., 2020) proved that the inductive thinking learning model has a significant effect on student learning outcomes.

This result is in line with research (Ristika & Lestari, 2024) where motivation and responsibility for learning are greatly influenced by the learning model and learning media applied by the teacher. (Muttaqini et al., 2024) stated that students' responsible attitudes increase when an interactive learning model is implemented.

The inductive thinking learning model is a learning model by processing information, this model allows students to actively learn independently, are able to find concepts and ideas, and also develop critical thinking skills (Malik & Fazrin, 2023) . Inductive thinking itself according to Markman & Gentner in (Santrock, 2010) is drawing conclusions about all categories based on observations from several members. Inductive thinking forms a thinking process. Starting from identifying data, grouping, to forming concepts, interpreting and concluding data and also applying certain principles to problem situations.

The inductive thinking learning model follows the same principles as inductive reasoning—starting with identifying relevant data, grouping it, and drawing conclusions. In practice, students are provided with various data or examples to help them form concepts. This model encourages students to observe, analyze, and discuss, which fosters curiosity,

collaboration, and active learning. By constructing their own understanding, students experience more meaningful and engaging learning (Sari & Suryanti, 2013) .

The inductive thinking learning model in this study was implemented by creating interactive HTML 5 Package (H5P) content. Interactive HTML 5 Package (H5P) content provides many projects that can be used as learning media. Some examples are in Figure 1.
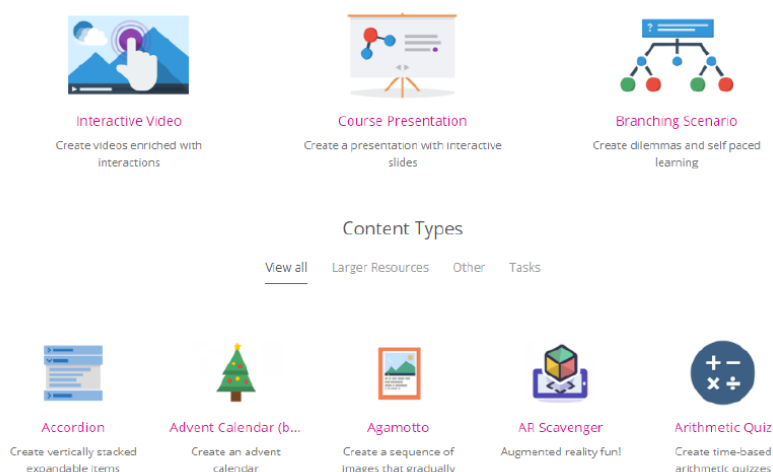
Figure 2. HTML 5 PACKAGE (H5P) platform homepage view

Teachers currently use the Interactive Video feature of HTML5 Package (H5P), which allows them to upload or link videos from YouTube and insert quizzes or summaries within the video. Another feature, Course Presentation, functions like PowerPoint but offers more interactive options, such as playing videos, adding multimedia, inserting text boxes, and testing student understanding directly within the slides.

The use of interactive H5P content encourages teachers to be more creative by transforming static materials like PDFs into engaging, student-centered content. This approach aligns with students' learning styles, making them more enthusiastic and active in class. With H5P on Moodle e-learning, students respond more positively to audio-visual materials like interactive books and videos. Additionally, many H5P features can be customized to suit different learning preferences (Yaas et al., 2022) .

H5P-based online learning involves the use of technology, including computers, the internet, websites, and learning management systems (LMS), to create and deliver interactive learning media. H5P (HTML5 Package) is a free, open-source JavaScript-based tool that allows users to easily create, share, and reuse interactive content such as videos, quizzes, presentations, and learning modules (Arsyad, 2011) . H5P is used as e-learning that can be accessed by anyone (Utari et al., 2022) .

Based on observations, several factors influence the effectiveness of the inductive thinking learning model using H5P-based interactive media: Teacher competence in applying the model and using H5P is crucial for enhancing student motivation, Availability of resources, such as technology and infrastructure, supports the successful use of H5P media and Student characteristics, including initial motivation and ability, affect how effective the model and media are. Implications of the study include: Increased student independence in learning and taking responsibility and Improved teaching strategies, as teachers can design more effective lessons using inductive thinking and H5P media.

Conclusion

The study prove the t value of 9.081 > t table (1.986), with a significance of 0.000 < α (0.05), meaning that the inductive thinking learning model using interactive learning media based on H5P. has a positive and significant influence on student learning motivation. The inductive thinking learning model with H5P-based interactive media positively influences learning motivation by: Making learning more interactive and engaging, Encouraging independent and responsible learning, Leveraging technology to boost motivation, and Creating a more enjoyable and less monotonous learning experience. that the t value is 3.707 > t table (1.986), with a significance of 0.000 < α (0.05), meaning that the inductive thinking learning model using interactive learning media based on H5P has a positive and significant influence on students' learning responsibilities. The inductive thinking learning model with H5P-based interactive media positively influences learning responsibility by: Promoting independent and self-directed learning, Enabling flexible access to materials through technology, Enhancing engagement and responsibility through interactive media, and Developing critical thinking skills that foster greater learning accountability.

Recommendation

Based on the research findings, teachers are encouraged to consistently apply the inductive thinking model supported by H5P-based interactive media. This approach helps increase student motivation and responsibility. Teachers should design engaging H5P activities, provide timely feedback, and involve students actively in the learning process. Additionally, training other teachers in using inductive methods and digital tools is recommended to enhance overall teaching quality.

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