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Developing Learning Communication Media in Science Education: Improving Critical Thinking and Honesty in Seventh Grade

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Abstract

Communication is the most important means of conveying goals; poor communication can lead to the failure of expected goals. This can also occur during the learning process at school. This study aims to enhance students' critical thinking skills and develop their honest character by utilising digital communication media. This research approach utilises R&D combined with the ADDIE model to produce a means of communication between teachers and students in the form of Google Sites learning media integrated with Canva. Experts then validated the resulting learning media to ensure strong results for use in learning. Experts also validated the critical thinking test instrument and the honest character observation sheet to ensure that strong, reliable instruments would be used. The sample of this study consisted of class VII D students of MTsN 2 Jember in the 2024/2025 academic year, who were selected using a purposive sampling technique. The data analysis technique employed N-

Gain and was followed by an independent sample t-test, which was subsequently evaluated using Cohen's d test. The results showed that students' critical thinking skills increased to a high category (Cohen's d = -4.501). There was also an increase in students' character scores, which were in the high category (Cohen's d = -5.386). These results suggest that effective communication media can enhance students' critical thinking skills and character. Teacher communication with students using digital media can overcome students' learning difficulties, increase their interest and motivation to learn, and improve their critical thinking skills. Rules regarding assignments and how to monitor them in learning through the Google Sites application train students' character of honesty. Students also responded enthusiastically to the presence of this media. The fatigue they previously experienced in conventional learning was alleviated by delivering more engaging lessons with fresh themes and animations on the Canva display, integrated with Google Sites.

***Keywords**: Google Sites, Canva, Critical Thinking, Character, Classification of Living Organisms*

1. Introduction

Education should be able to prepare students to face the challenges of life in the 21st century, which requires students to be able to compete to survive with several skills that they must have, namely critical thinking skills, problem-solving skills, and metacognitive skills (Hariyadi et al., 2017; National Education Association, 2014; Pacific Policy Research Center, 2010; Robinson & Kay, 2010; Saavedra & Opfer, 2012). However, in reality, the education model that is still being implemented today is a traditional education model that focuses on content, with the aim of students being able to answer exam questions only (Pacific Policy Research Center, 2010)Many students do not master critical thinking skills, which makes it difficult for them to solve complex problems in learning. (Mundilarto & Ismoyo, 2017).

Students have not yet fully understood and learned to use their critical thinking skills (Setiawati & Corebima, 2017). Students simply stop at memorizing content without understanding the usefulness and benefits of the content they're learning, so they gain nothing from the learning process except a pile of memorization prepared to answer tests as a prerequisite for graduation. Teachers only care about achieving the material without training students in critical

thinking skills. (Fahim & Pezeshki, 2012; Snyder & Snyder, 2008), So that the results obtained are that students are unable to utilize the learning outcomes they have achieved in class in real life, because they think that what they have learned in the school environment is different from what they have to face in real life.

Another important aspect to consider, besides critical thinking skills, is student character. Bad character behavior has been observed recently, with many students committing theft, fraud, shoplifting, and lying to teachers and parents (Hudd, 2004). The decline in student character can also be seen from several events that are described as not being in accordance with applicable rules and norms, both in terms of state law, customary law, and the customs of the surrounding community, such as the phenomenon of students not wearing helmets when riding motorbikes on the highway (Budiningsih et al., 2015). Another behavior that can be seen from the decline in student character is a liking to scribble on and damage public facilities. (Koesuma, 2007), inter-school brawl (PPK, 2018), and the behavior of throwing rubbish in the wrong place (Jannah et al., 2012).

The examples of events mentioned above are proof to us that schools have not been able to produce students who are in accordance with the hopes and main goals of education in Indonesia, as stated in the National Education System Law number 20 of 2003. The law states that character development is the main goal in developing other potentials, meaning that the goal of making the nation's life intelligent, which is the cognitive domain, must first develop character, which is the affective domain, because someone who is intelligent without being accompanied by good character will actually bring destruction to their nation.

This study aims to develop Google Sites-based learning media designed using Canva, with the primary goal of enhancing students' critical thinking skills and fostering character development in the context of classifying living things. This study focuses on the development and utilization of innovative and digital learning media that are not yet optimal, the limited availability of interactive visual aids, and the lack of critical thinking skills and character development of students during learning. The process of developing this learning media is based on three assumptions by Mayer (2012), namely dual coding theory, limited capacity and active processing, so that in its development, researchers pay attention to the involvement of five cognitive processes according to the theory put forward by Meyer

which states that multimedia instructional messages designed based on how the human mind works are more likely to produce meaningful learning than those that are not (Mayer, 2012).

The novelty of this study lies in the systematic integration of Google Sites and Canva as interactive learning media in the context of science education, specifically for the topic of classifying living organisms. Previous research has highlighted the potential of these platforms. Hidayati et al. (2024) demonstrated that Google Sites can improve students' critical and creative thinking skills, while Aziza & Baroroh (2024) demonstrated that Canva and Google Sites are effective in presenting visually engaging and pedagogically insightful digital content.

The proposed hypothesis states that Google Sites-based learning media designed with Canva has a significant impact on improving students' critical thinking skills and character. The findings of this study are expected to make a meaningful contribution to improving the quality of science learning and provide a model for developing effective, relevant, and future-oriented digital learning media.

2. Method

This study adopts a Research and Development (R&D) approach using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) as its developmental framework (Branch, 2009). This model has been widely applied in the development of technology-integrated instructional tools that respond to the demands of 21st-century learning (Lee & Hannafin, 2016; Rahman & Duran, 2022). R&D aims to create or improve educational products that are relevant, practical, and evidence-based (Sukmadinata, 2005). In addition to this design, a quasi-experimental method with a one-group pretest-posttest design is employed to examine the effectiveness of the developed media. The study also incorporates reflective and formative elements typical of classroom action research (CAR), particularly in cycles of intervention and improvement (Kemmis & McTaggart, 1988).

This research was conducted at MTsN 2 Jember during the 2024/2025 academic year, involving 30 participants from class VII D. The research topic focused on the classification of living organisms, a complex subject in science that requires an understanding of concepts and critical thinking. Class VII D was selected purposively based on teacher access, technological

infrastructure, and student characteristics that aligned with the research objectives. The students had previously been trained using student-centered learning models and independent learning, ensuring they were not confused when applying the media in this study. This study did not use a control class for comparison, this is a limitation of this study caused by the difficulty of finding an equivalent class after several homogeneity tests, another reason is because this study was designed to To evaluate the impact of a particular program or training on one group, where the focus is on measuring changes in that group, a pretest-posttest design may be appropriate.

The intervention began with an analysis of the curriculum, student characteristics, and technological readiness. Subsequently, learning materials were designed using Canva and structured via Google Sites, integrating interactive videos, quizzes, infographics, and tasks promoting values such as honesty, discipline, and responsibility. The developed media was then validated by experts and implemented over three weeks, covering two main topics: (1) interactions between living things and their environment, and (2) classification of living things.

Each session involves students in digital activities and face-to-face discussions over the course of one month. Details include two meetings a week, each lasting 40 minutes, for a total of eight sessions, allowing them to explore, collaborate, and reflect. The intervention includes strengthening embedded characters and high-level thinking tasks, such as giving independent assignments to analyze learning outcomes, collecting independent assignments from teachers, and having teachers analyze the assignments, which includes plagiarism checks to instill honesty values in students and prevent cheating. Learning is structured using a problem-based learning plan (PBL), which utilizes media developed by researchers in the learning stages. These stages include problem exploration, formulating problems, and collecting and analyzing data (Lee & Hannafin, 2016;Tan, 2009).

Data in this study were obtained through several instruments. To assess students' cognitive improvement, a critical thinking test was administered in the form of a pretest and a posttest. To evaluate the development of students' character during the learning process, Researchers employed character observation sheets specifically focused on the aspect of honesty. Furthermore, students' perceptions and experiences related to the media were gathered through a student response questionnaire, which provided insight into the practicality

and appeal of the learning media. Finally, the quality and feasibility of the developed product were examined using expert validation rubrics, completed by subject matter experts and media design experts.

Quantitative data were analyzed using N-Gain scores to determine improvement levels, and Paired Sample t-tests were applied to examine significance (Sugiyono, 2017). Wilcoxon Signed-Rank Tests were used for non-parametric alternatives. The effect size was measured using Cohen's d, with interpretation based on standard benchmarks (Cohen, 1988). Character values were analyzed descriptively, supported by gain score categorization, and triangulated using qualitative observations from teachers.

This multi-method approach provides both statistical rigor and classroom-based reflection, ensuring that the developed media is not only effective in enhancing learning outcomes but also in shaping student behavior in line with 21st-century competencies (Rodrigues et al., 2024 ; Ranggana et al., 2024).

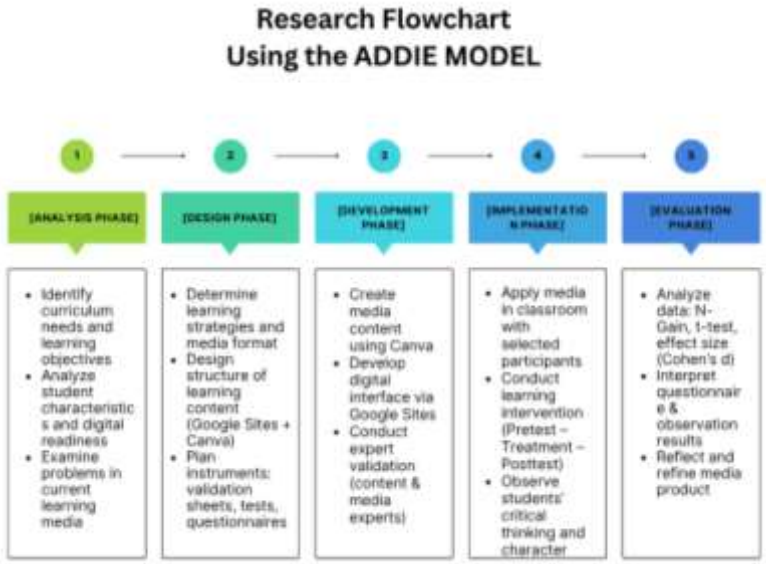

Figure 1. Research Flowchart

3. Results and Discussion

3.1 Media Development

The development of the instructional media in this study involved two main stages: designing visual content using Canva and integrating it into a digital platform via Google Sites. Canva was used

to create visually appealing learning materials by selecting and customizing magazine-style templates. Content was adapted to the subject matter (e.g., classification of living organisms) by modifying texts, images, page layouts, and visual themes. The media was then exported in PNG or JPG format for integration.

In the second stage, the Canva designs were embedded into a custom-built Google Sites page. Elements such as interactive quizzes, video links, and evaluation tools were added as subpages, allowing for a more dynamic and engaging learning experience. The combination of Canva's visual strength with Google Sites' platform flexibility enabled the development of a technologically integrated learning tool that supports both content delivery and student engagement.

Figure 2. Google Sites Interface View

This approach aligns with recent studies emphasizing the value of multimedia-rich and interactive learning environments in promoting student motivation, critical thinking, and digital literacy (Mouza et al., 2023 ; Ukenova & Bekmanova, 2023). Furthermore, tools like Canva and Google Sites support learner-centered design, which is central to 21st-century education frameworks (Lee & Hannafin, 2016 ; Mayer, 2021). Subsequently, the media was validated by a team of content experts and a team of media experts.

The validation results indicate that the learning media developed using Google Sites and Canva is highly feasible and appropriate for classroom implementation. The content expert validation on instructional and content aspects showed very high scores, with average feasibility ratings of 93.33% and 95.56% for instructional

components and 94.00% and 92.00% for content components. These findings confirm that the media is aligned with learning objectives, systematically presented, clear in explanation, and pedagogically sound.

Similarly, the media expert validation results demonstrate that both visual design (display) and programming functionality are of excellent quality. The display aspect received average feasibility scores of 93.33% and 95.56%, indicating that the text, layout, color composition, and animations were clearly presented and user-friendly. Meanwhile, the programming aspect—covering navigation, button consistency, animation, speed, and menu accessibility—achieved even higher ratings of 96.36% and 94.55%, categorizing the media as "very feasible" to support effective and engaging learning experiences.

These results are consistent with research indicating that well-validated digital learning media can significantly improve students' engagement, understanding, and motivation (Li et al., 2023 ; E. Lee & Hannafin, 2016). Moreover, user-friendly and visually appealing educational platforms are critical in supporting 21st-century learning, especially when integrated with interactive elements that foster critical thinking and character development ((Rodrigues et al., 2024 ;Ukenova & Bekmanova, 2023).

These findings underscore the importance of well-designed digital interfaces in enhancing usability and student engagement. According to Mayer (2021)Multimedia learning is most effective when visual and navigational elements are intuitively designed, as poor interface quality can distract learners and increase cognitive load. In line with this, the results of the current validation affirm that the Canva-integrated Google Sites platform adheres to principles of coherent design, user-friendliness, and visual clarity—all of which are critical in promoting sustained attention and comprehension (Clark & Mayer, 2016).

Moreover, smooth navigation and responsive programming features align with the findings of Pérez-Sanagustín et al. (2022), who argue that the technical performance of a learning platform—such as load speed, menu responsiveness, and animation control—plays a decisive role in the perceived usefulness and ease of use, which are central to learner acceptance in technology-enhanced environments.

The high validation scores obtained in both the display and programming domains indicate not only the aesthetic strength of the

media but also its pedagogical usability. This balance is essential for ensuring that students can access, interact with, and internalize instructional content efficiently and enjoyably, as supported by empirical findings from recent instructional technology research (Ghai, 2022). Thus, the media developed in this study fulfills not just functional requirements, but also aligns with contemporary pedagogical standards for 21st-century learning environments.

In conclusion, the expert validation confirms that the developed learning media meets high standards of content quality, instructional design, visual display, and usability. Therefore, the media is considered ready to be implemented in science learning, particularly to support the development of students' critical thinking and character skills.

3.2 Critical Thinking Skills

The results of students' critical thinking scores, assessed through pretest and posttest on the topic of classification of living organisms, are presented in the following diagram. This visual comparison illustrates the improvement in students' higher-order thinking abilities after the implementation of the Google Sites-based learning media.

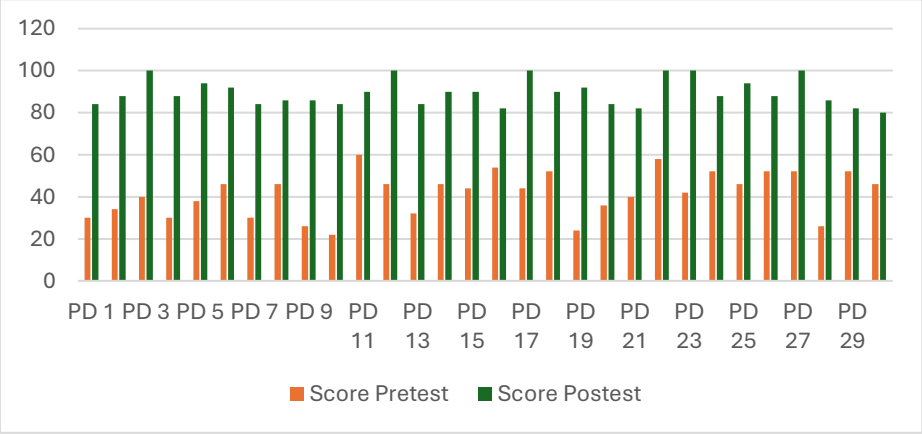

Figure 3. Critical thinking pretest and posttest scores

In order to assess the impact of the developed instructional media on students' critical thinking skills, a descriptive analysis of the normalized gain (N-Gain) scores was performed. This analysis aimed

to determine the degree of improvement between the pre-test and post-test results.

Table 1. Critical Thinking N-Gain Score

	N	Minimum	Maximum	Mean	Std. Deviation
NGain_Score	30	0,87	1,00	0,9097	0,04236
NGain_Presen	30	86,79	100,00	90,9703	4,23593
Valid N (listwise)	30				

The pretest and posttest data were analyzed using the Normalized Gain (N-Gain) formula to measure the improvement in students' critical thinking skills following the implementation of the Google Sites-based learning media designed with Canva. Based on the descriptive analysis of the N-Gain scores, the minimum value obtained was 0.87 and the maximum was 1.00, with a mean score of 0.9097 and a standard deviation of 0.04236.

When converted into percentage form, the N-Gain ranged from 86.79% to 100.00%, with an average of 90.97% and a standard deviation of 4.23593. These results indicate that students' critical thinking skills improved significantly, categorized as high gain, according to Hake (1999) Classification ($g > 0.7$). This finding confirms the effectiveness of interactive digital learning media in promoting higher-order thinking skills (HOTS), which aligns with recent studies emphasizing the role of technology-enhanced learning environments in improving cognitive performance and learner engagement (Mouza et al., 2023 ; Lee & Hannafin, 2016).

The high N-Gain score suggests that the integration of visually engaging and interactive media into science learning, particularly using platforms such as Google Sites and Canva, can substantially enhance students' critical thinking. These tools allow for personalized, flexible, and inquiry-based learning experiences, which are essential in fostering analytical and evaluative abilities. As emphasized by recent research, active learning environments that incorporate multimedia, interactivity, and learner autonomy are associated with greater cognitive development (Ukenova & Bekmanova, 2023 ;Rodrigues et al., 2024).

Moreover, the consistently high scores with low variability suggest the effectiveness and equity of the digital media across diverse learners. This supports the view that well-designed digital instruction

can bridge cognitive skill gaps. Tomlinson (2014) notes that differentiated digital platforms accommodate diverse abilities and learning profiles, helping reduce disparities. VanLEHN (2011) highlights that intelligent and interactive technologies enable real-time adaptation, fostering equitable outcomes. Schmid et al. (2014) further demonstrate that multimedia tools enhance engagement and narrow performance gaps, especially when content is accessible and visually structured.

These results also align with the Universal Design for Learning (UDL) framework, which promotes flexible instructional strategies to meet learner variability (CAST, 2018). The integration of Canva with Google Sites in this study exemplifies UDL principles, supporting improved and equitable development of students' critical thinking skills.

Table 2. One-Sample Kolmogorov–Smirnov Test for Critical Thinking

			Unstandardized Residual
N			30
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		6.10537868
Most Extreme Differences	Absolute		.145
	Positive		.145
	Negative		-.095
Test Statistic			.145
Asymp. Sig. (2-tailed)[c]			.108
Monte Carlo Sig. (2-tailed)[d]	Sig.		.105
	99% Confidence Interval	Lower Bound	.097
		Upper Bound	.113

The normality test using the One-Sample Kolmogorov–Smirnov Test yielded Asymp. Sig. = 0.108 and Monte Carlo Sig. = 0.105, both exceeding the 0.05 threshold. Therefore, the residual data were normally distributed, fulfilling the assumptions required for parametric statistical analysis, including the paired sample t-test used to assess the effectiveness of the learning media on students' learning outcomes.

This supports the use of t-test procedures in educational research when normality is assumed (Field, 2018; McDonald, 2014),

particularly in quasi-experimental designs for measuring learning gains through pretest-posttest comparisons (Fraenkel et al., 2012;Creswell & Guetterman, 2020).

Table 3. Paired Sample t-Test Results

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Postest	-48,067	10,680	1,950	-52,055	-44,079	-24,651	29	0,000

The paired sample t-test revealed a significant mean difference of -48.067 between the pretest and posttest scores, with a standard deviation of 10.680 and a standard error of 1.950. The 95% confidence interval ranged from -52.055 to -44.079, excluding zero, indicating a statistically significant difference. The t-value was -24.651 (df = 29) with a p-value of 0.000 ($p < 0.05$), confirming the effectiveness of the developed instructional media in improving student learning outcomes.

These findings support recent research on the impact of technology-integrated media in enhancing academic performance and promoting deeper cognitive engagement (Rodríguez-García et al., 2024).

In addition to testing the significance of differences between pretest and posttest scores, the analysis was complemented by calculating the effect size using Cohen's d formula, as shown in the following table.

Table 4. Paired Samples Effect Sizes

			Standardizer[a]	Point Estimate	95% Confidence Interval	
					Lower	Upper
Pair 1	pre-test - post-test	Cohen's d	10.680	-4.501	-5.702	-3.290
		Hedges' correction	10.821	-4.442	-5.628	-3.247

This analysis is further supported by calculating the effect size using Cohen's d, which yielded a value of -4.501, with a Hedges correction of -4.442, and a 95% confidence interval that did not cross

zero. The negative value of Cohen's d (-4.501) indicates that the post-test results had a higher average than the pretest results, indicating a huge intervention effect. Learning media has a very significant impact on improving student learning outcomes. The enormous effect size, as indicated by Cohen's d value (-4.501), was due to the careful planning that went into developing Google Sites and Canva media, as well as the effective integration of these tools with the learning model. Expert intervention in validating the media played a significant role in the success of the results of this study.

This finding aligns with Cohen (1988) Interpretation, where d > 0.8 is considered a large effect, and supports contemporary research showing that technology-enhanced and interactive instructional media can substantially improve learning effectiveness (Al-Barrak & Al-Razgan, 2023).

3.3 Character

Students' honesty and character were assessed through observational data collected before and after the intervention. The following graph compares the observed changes across both phases.

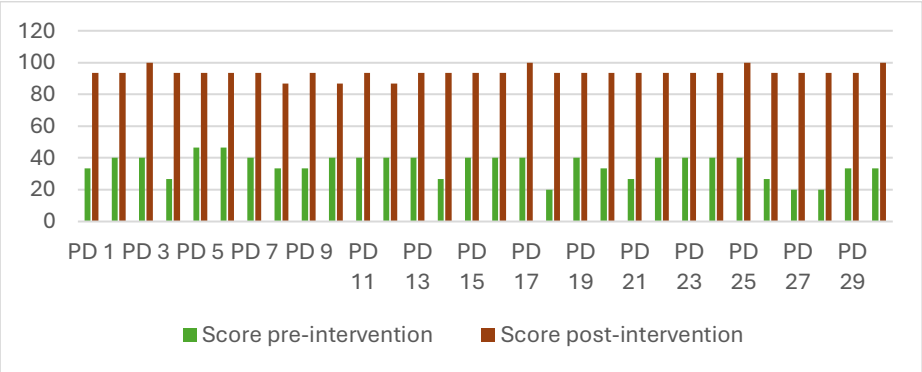

Figure 4. Pre- and Post-Intervention Honesty Scores

The graphical data demonstrates a uniform upward trend in students' honesty character development. This improvement highlights the effectiveness of the digital learning media in integrating moral values into the learning experience. The average post-intervention score is significantly higher than the pre-intervention average, and the low standard deviation suggests that the improvement was consistently distributed across all students.

These findings reinforce prior research asserting the importance of values-based instructional design in digital learning. According to Berkowitz & Bier (2021), effective character education requires structured, intentional efforts embedded within meaningful learning contexts. The consistency of high post-intervention scores supports the idea that digital tools—when designed with moral development in mind—can effectively foster character formation among students.

Table 5. N-Gain Score for the Character of Honesty

	N	Minimum	Maximum	Mean	Std. Deviation
NGain_Score	30	0,78	1,00	0,8959	0,05286
NGain_Presen	30	78,33	100,00	89,5928	5,28558
Valid N (listwise)	30				

The impact of the intervention on students' honesty character was assessed using descriptive statistics, nonparametric, and parametric tests. Based on N-Gain analysis, 30 students showed a minimum score of 0.78 and a maximum of 1.00, with a mean of 0.8959 (SD = 0.05286). In percentage terms, scores ranged from 78.33% to 100%, with a mean of 89.59%. This indicates a high and consistent improvement, suggesting that students' character formation progressed substantially following the intervention.

Such consistent and substantial gains reflect the effectiveness of targeted instructional interventions in shaping student character traits, particularly when using digital media that integrates values education into the learning process. According to Lapsley & Narvaez (2006)Character development is most effective when embedded within regular academic content and supported by structured pedagogical strategies. The near-perfect N-Gain scores suggest that the learning media used in this study successfully merged cognitive and affective learning outcomes.

These findings are consistent with recent studies affirming that digital media integrated with values-based instruction can promote both cognitive and affective learning outcomes, including student character (Santoso et al., 2023). This aligns with recent findings by Berkowitz & Bier (2021), who argue that meaningful character growth requires both intentional design and repetitive reinforcement

in authentic contexts. Digital learning platforms—especially those offering visual interactivity and ease of access—can support this kind of holistic learning when properly designed (Chai et al., 2023).

Table 6 Wilcoxon Signed-Rank Test Results for the Character of Honesty

	Implementation - Before
Z	-4.812[b]
Asymp. Sig. (2-tailed)	0,000

As the data failed the normality assumption, a Wilcoxon Signed-Rank Test was first applied. The results showed that all 30 participants had improved scores, with no negative ranks or ties. The test yielded $Z = -4.812$, $p < 0.001$, indicating a statistically significant difference in students' honesty character scores pre-intervention and post-intervention using the Google Sites-based media. The large and significant difference indicates that the instructional treatment had a substantial impact and did not occur by chance (Fraenkel et al., 2012)**.**

These findings reinforce the growing literature on the effectiveness of digital media in fostering character development. Structured, tech-enhanced learning environments—especially those with clear visuals and repeated exposure to value-based content—have been shown to consistently support moral growth (Yoon & Baek, 2022). The absence of negative ranks and consistent improvement among all participants indicates that the Google Sites-based media was effective not only in content delivery but also in promoting socio-emotional traits such as honesty. This aligns with Kim et al. (2023), Who found that digital tools integrating character education significantly enhanced ethical awareness and behavior. The significant Wilcoxon result further confirms that when character instruction is intentionally embedded in digital curricula, it can yield both statistically and educationally meaningful impacts.

Table 7 Paired Samples t-Test Results for Honesty Character

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre-intervention	35,33	30	7,462	1,362
	post-intervention	93,33	30	3,220	0,588

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre-intervention - post-intervention	-58,000	7,957	1,453	-60,971	-55,029	-39,926	29	0,000

A paired sample t-test was also conducted to validate the result. The pre-intervention mean was 35.33 (SD = 7.46), and the post-intervention mean rose to 93.33 (SD = 3.22), with a mean difference of -58.00. The t-value was -39.926 (df = 29, $p < 0.001$), indicating a significant statistical difference.

This significant increase aligns with prior research that emphasizes the effectiveness of multimedia-based digital learning tools in enhancing both engagement and achievement (Mayer, 2021). Mayer's Cognitive Theory of Multimedia Learning posits that well-designed digital environments improve retention and comprehension by simultaneously stimulating auditory and visual channels, leading to deeper learning. In the present study, the post-intervention scores, which rose by more than 58 points, provide empirical support for this theory.

Moreover, the findings corroborate previous studies showing that digital platforms that integrate interactive, visual, and context-relevant content contribute to significant learning gains (Clark & Mayer, 2016; Yildirim & Sensoy, 2021). Particularly in science education, where abstract concepts can be difficult for students to

grasp through traditional lectures alone, digital media has been shown to bridge the gap between theoretical knowledge and practical understanding. (Lin et al., 2022).

The sharp reduction in standard deviation from 7.462 pre-intervention to 3.220 post-intervention also indicates a greater uniformity in learning outcomes among students. This may suggest that the intervention not only raised achievement levels but also helped close performance gaps, ensuring that students with initially lower performance also benefited. This is consistent with findings by Schmidt & Strasser (2018), who reported that the integration of visual and interactive media could minimize disparities in student achievement.

Table 8 Paired Samples Effect Sizes for Honesty Character

			Standardizer[a]	Point Estimate	95% Confidence Interval
					Lower
Pair 1	pre-intervention - post-intervention	Cohen's d	7.957	-7.289	-9.185
		Hedges' correction	8.062	-7.195	-9.065

			95% Confidence Interval
			Upper
Pair 1	pre-intervention - post-intervention	Cohen's d	-5.386
		Hedges' correction	-5.316

Effect size analysis further revealed a Cohen's d of -7.289 and a Hedges' g of -7.195, both well above the conventional threshold of 0.8, signifying an extremely large effect. The 95% confidence intervals ranged from -9.185 to -5.386 (Cohen's d) and -9.065 to -5.316 (Hedges' g), showing consistent and practically meaningful improvement. Although the effect size values are negative, this only reflects the direction of change (i.e., score improvement), not a negative outcome. According to Plonsky & Oswald (2014)A large effect size is a key indicator of educational program effectiveness and demonstrates that the observed improvement is truly attributable to the intervention.

The improvement in the students' honesty character is due to the media developed including the desired character values, such as including motivational sentences to always behave honestly in everything we provide in each media slide, including animations that refer to wise words about honest behavior and setting the tasks given to students with a slight possibility of cheating, such as telling them that their results will be tested in turnitin.

Overall, these results confirm that the digital learning intervention using Google Sites and Canva had a powerful and practical impact on enhancing students' honesty, aligning with current literature advocating for technology-supported character education (Arwen & Puspita, 2020;Sari & Rochbani, 2024). Administering quizzes on Google Sites and Canva using personal accounts fosters honesty in students, as they are taught that teachers will easily detect plagiarism. Our inclusion of honesty messages in Google Sites and Canva also encourages students to behave honestly consistently, which has a significant impact on their honesty.

The unique integration of Google Sites, which facilitates the tracking of similarities or plagiarism, and Canva, which offers animations and visually appealing displays, can stimulate the development of students' honesty and critical thinking skills. With Google Sites' integrated plagiarism testing feature, students are always cautious about committing dishonest acts, such as copying others' work. This feature can help them become critical, creative, and imaginative with Canva. The combination of these two advantages makes researchers confident that the media developed will be able to improve critical thinking skills while honing students' character values of honesty.

These findings support prior research indicating that interactive, character-integrated digital media can substantially enhance both academic and affective learning outcomes (Santoso et al., 2023; Rodríguez-García et al., 2024 ; Mayer, 2021).

3.4 Student Response Analysis Results

Students' responses toward the Google Sites-based instructional media designed with Canva indicate a highly positive perception across all measured indicators. Most students reported that the appearance of the Google Sites homepage significantly enhanced their motivation to learn, with 63.3% agreeing and 36.7% strongly agreeing. This aligns with Mayer's (2021) theory of multimedia

learning, which emphasizes that visual appeal plays a critical role in maintaining learners' attention and motivation.

The variation in Google Sites content was also perceived positively, contributing to a joyful and dynamic learning environment. Sixty percent of students agreed, and 40% strongly agreed that the diverse content enhanced their learning experience. Research by Rodríguez-García et al. (2024) Supports this, stating that varied digital content fosters active engagement and reduces passive consumption of information.

Regarding the completeness of instructional materials, 66.7% of students agreed and 33.3% strongly agreed that the media and learning resources were sufficient. This suggests that the integration of Canva allowed teachers to present well-structured and comprehensive content, resonating with Santoso et al. (2023), who highlight the importance of integrating character and cognitive materials in digital resources.

Clarity in text and media was another highly rated feature. A remarkable 83.3% of students strongly agreed, and 16.7% agreed that the quality of the media was clear and accessible. This aligns with Mayer (2021), who emphasizes the importance of coherence and clarity in digital instructional design to prevent cognitive overload.

In terms of accessibility, 66.7% of students strongly agreed and 33.3% agreed that the media was simple and easy to use. These results are in line with usability studies Pérez-Sanagustín et al. (2022) This indicates that simplicity in digital navigation contributes to higher levels of student satisfaction and usage frequency.

Students also perceived the content as clearly presented and easy to understand. A total of 56.7% strongly agreed and 43.3% agreed with this statement. This confirms that Canva-enhanced Google Sites helps teachers break down complex concepts into digestible formats, as noted by Yusuf et al. (2023) In their study on interactive e-learning design.

Color contrast in the media was well-received, with 70% strongly agreeing and 26.7% agreeing that the text colors used were appropriate and readable against the background. According to Buljat et al. (2024), color contrast significantly impacts visual ergonomics and learning comfort in digital interfaces.

Furthermore, 56.7% of students agreed and 43.3% strongly agreed that they liked the overall appearance of the media, indicating an emotional connection and user satisfaction. Lickona (2021) notes

that enjoyment in learning environments can contribute to deeper value internalization, including discipline and responsibility.

Half of the students agreed and half strongly agreed that learning activities became more varied through the use of Google Sites. This supports the findings of Plass & Pawar (2020), who suggest that platform-based learning introduces pedagogical variety and promotes student-centered instruction.

Another noteworthy aspect is that all students (100 %) agreed or strongly agreed on the usefulness of the content, demonstrating the perceived relevance of the material. This finding aligns with the conclusions by Anderson & Rainie (2023) This is further supported by research indicating that perceived relevance and usefulness are fundamental factors in sustaining motivation and acceptance in digital learning environments (Venkatesh & Bala, 2008; Wighting et al., 2013).

Student enjoyment was also evident, with 56.7% agreeing and 43.3% strongly agreeing that they enjoyed learning with the media. This emotional engagement is key to fostering long-term academic interest and participation (Fredricks et al., 2004).

The limitations in this study relate to the limited implementation time, which is only 1 month (8 meetings), this is considering the time duration contained in the curriculum, another thing that is a limitation of this study is that no control class has homogeneity, so we do not have a comparison to test the effectiveness of using this media.

Finally, 63.3% of students agreed and 36.7% strongly agreed that they did not feel bored using the media, highlighting the platform's effectiveness in maintaining attention. This confirms the motivational potential of interactive, multimedia-enriched environments.

4 Conclusion

This study highlights the potential of Google Sites integrated with Canva as an effective digital medium for character education, particularly in enhancing student honesty. This intervention not only improved cognitive outcomes but also demonstrated significant improvements in student honesty, demonstrating that well-designed digital tools can support affective learning objectives. The integration of Canva-based Google Sites with the learning model was carried out by embedding the media at the student orientation stage on the

problem. At this stage, researchers utilized Canva animations to lead students to authentic problems by showing animated videos accompanied by wise words about honesty. At the Guiding Individual and Group Inquiry stage, teachers presented moral messages related to the meaning of honesty once again. Furthermore, at the presentation stage, teachers utilized the capabilities of Google Sites, integrated with Canva, to present the nuances of student interest in learning and stimulate their analytical thinking.

However, the study has limitations, including a small sample size from a single school and a short observation period, which may limit broader generalization and long-term impact assessment. The reliance on teacher observations and self-reported data also warrants further methodological strengthening.

Despite these constraints, this research contributes a practical framework for integrating honesty-based character instruction into digital learning.

Future studies should investigate the long-term effects in various educational settings by increasing the study duration, using a larger sample, employing a control sample for comparison to assess the effectiveness of the media, and utilizing more accurate statistical analysis.

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