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THE SINGOSARI TEMPLE VIRTUAL TOUR AND JUNIOR HIGH SCHOOL STUDENTS' SOCIAL STUDIES LEARNING MOTIVATION: A QUASI-EXPERIMENTAL STUDY ON HINDU-BUDDHIST HERITAGE MATERIAL

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Abstract

When students only hear dry accounts of Hindu and Buddhist history and culture in class and do not see or connect with any media, they may lose interest and desire to learn. This study aimed to examine how a video walk of Singosari Temple affected the desire to learn in junior high school students. A quantitative quasi-experimental design with a control group that was not the same was used as the research method. The sample consisted of 64 seventh-grade students from SMPN 18 Malang. Thirty-two students from grade VII I were in the experimental group and 32 students from grade VII D were in the control group. A four-point Likert scale questionnaire that measures the desire to learn social sciences was used. It was checked for accuracy and reliability. To look at the data, we used descriptive statistics, Levene's homogeneity test, Shapiro-Wilk's normality test, and an independent-samples t-test on change scores. The motivation of the experimental group went up from M = 52.47 to M = 68.22, which is an increase of 15.75, while the motivation of the control group went up from M = 51.84 to M = 56.65, which is an increase of 4.81. The difference in scores for improvement was statistically significant ($t(61) = 8.61$, $p < .001$, $d = 2.17$), as shown by the t-test. The results of this study show that the video walk of Singosari Temple made students much more interested and excited about learning social sciences.

Keywords: Virtual Tour; Singosari Temple; Learning Motivation; Social Studies; Quasi-Experiment

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A. Introduction

Social Studies (IPS) at the junior high school level combines economics, history, geography, sociology, and civics. It aims not only to transmit factual knowledge but also to develop critical thinking, historical awareness, and an understanding of cultural interconnections (Aulia & Wandini, 2023). However, IPS is often perceived as a difficult subject because of its extensive content, which can lead to boredom and decreased motivation (Alfiah et al., 2021). Learning motivation is a key determinant of academic success (Adan, 2023; Uno, 2024). When students lack motivation, they underperform and disengage (Rohman et al., 2023).

Teaching practice at SMPN 18 Malang revealed that Hindu-Buddhist heritage is still taught in a highly structured, teacher-centred manner with few visual aids. Teachers rely on textbooks, leaving little room for student participation. More than half of the students appeared tired, put their heads on desks, or played with phones silently. They did not meet learning goals because they were not fully engaged. Field trips to historical sites are rarely organized because of cost, distance, and time constraints. Virtual tour technology offers a feasible alternative, allowing students to explore historical places interactively without leaving the classroom. This aligns with the Independent Curriculum's emphasis on digital tools.

This study's theoretical framework integrates the ARCS Motivation Model (Azizah, 2014) and Self-Determination Theory (SDT) (Ryan & Deci, 2020). ARCS emphasizes Attention, Relevance, Confidence, and Satisfaction. SDT highlights three basic psychological needs: autonomy, competence, and relatedness. The Singosari Temple virtual tour is theoretically capable of fulfilling all these components. Immersive 360° visualization captures attention and supports autonomy through self-directed navigation. Local cultural heritage (Singosari Temple is located in Malang, the same region as the students) enhances relevance and relatedness. Structured Student Worksheets (LKPD) guide exploration, fostering competence and confidence. A new, enjoyable learning experience provides intrinsic satisfaction. The complementarity of ARCS and SDT provides a robust theoretical basis for predicting the motivational effects of virtual tour media in IPS learning.

Several previous studies have confirmed the effectiveness of virtual tours in IPS contexts. Putri (2024) found that virtual museum tours had a significant positive effect on the motivation and learning outcomes of ninth-grade students. Tasbihah (2021) proved that a contextual teaching and Learning model assisted by virtual museum media positively affected learning interest. Ariesta et al. (2024) also showed that virtual tour media significantly enhanced students' learning motivation. These findings affirm the potential of virtual tours.

The novelty of this study is threefold and explicitly distinguishes itself from prior studies. Unlike Putri (2024), who used a virtual museum tour for ninth-grade students, this study focuses on a *temple* virtual tour for seventh-grade students. Unlike Tasbihah (2021), who combined virtual tours with the CTL model, this study tests the virtual tour as a standalone intervention. Unlike Ariesta et al. (2024), who used Millealab-assisted tours, this study utilizes a freely accessible web-based tour (Theasys) that requires no VR headset. Furthermore, no previous study has specifically examined the *Singosari Temple* virtual tour as the instructional stimulus, nor has any integrated both ARCS and SDT as a combined theoretical framework to explain motivational effects. Finally, seventh-grade students at SMPN 18 Malang have never been the subjects of such research. Thus, the novelty lies in the unique combination of stimulus (Singosari Temple), theoretical framework (ARCS + SDT), and participant characteristics (seventh grade, Malang context).

The urgency of this study is twofold. First, if low learning motivation due to monotonous teaching methods is not addressed, students may permanently lose interest in the IPS and local historical heritage. Second, this study provides an empirical contribution to educational technology and IPS learning, as well as a practical reference for teachers facing similar problems.

Nevertheless, several limitations must be acknowledged from the outset. First, the novelty of this study is primarily contextual and empirical rather than theoretical; it does not propose a new instructional model but rather applies existing theories in a new setting. Second, the study was conducted in only one school with a limited sample (n=64), which restricts the generalizability of the findings to other regions, grade levels, or educational contexts. Third, this study measures only learning motivation and does not examine other important educational outcomes such as academic achievement, historical literacy, or critical thinking skills. These limitations are addressed further in the discussion and conclusion. Stemming from these gaps, urgency, and acknowledged limitations, this research aims to measure and analyze the effect of using the Singosari Temple virtual tour on the IPS learning motivation of seventh-grade students at SMPN 18 Malang.

B. Method

A quantitative quasi-experimental method was used in this study. A non-equivalent control group design was used because both the experimental and control groups comprised people from the same school. Random selection did not change the way the school ran its classes or the way people learned in general. However, this approach allowed the researcher to see how the treatment and control groups improved their desire to learn (Sugiyono, 2021).

In April and May 2026, this study took place at SMPN 18 Malang in Malang City, East Java. The kids in the study were all seventh-graders during the 2025–2026 school year. Purposive sampling was used to choose the group, which was done after talking to the social studies teacher and taking into account the subjects' academic level. The test group was made up of 32 students from Class VII I, and the control group was made up of 32 students from Class VII D. In this way, 64 kids were used as study subjects.

We used the web-based tool Theasys to make a video tour of Singosari Temple. The entry, the northwest corner, the main temple, the relief panels, the garden, and the Dwarapala figures are some of the places around the temple complex where six 360-degree photos were taken. After putting the pictures together and sending them to Theasys, a live tour with hotspot marks was made. When you tap on any point, you can see an explanation of the object's historical and cultural importance. You can move around on a computer screen by dragging it, but on a smartphone, all you have to do is tap and turn the screen. You don't need virtual reality glasses. Students were given a short URL link by the teacher that they could use to access the virtual tour on their own or with a partner. During the whole study, the tour link worked.

For this study, a four-point Likert scale form was used to determine how much people wanted to study social studies. Participants could choose from strongly disagree, disagree, agree, or strongly agree on the scale. The evaluation was based on four factors: attention, relevance, confidence, and satisfaction. To obtain a more accurate picture of the range of student answers, multiple positive and negative statement items were used for each part. Before using Pearson's product-moment correlation to check the instrument's empirical validity, experts in educational testing and social studies teaching were asked to ensure that it was correct in terms of its content. Finally, Cronbach's alpha was used to check the instrument's reliability. Observation sheets for how students behaved during class were also used to keep track of how often they were on task and off task. On-task tasks include watching TV or movies, reading, having talks, asking and answering questions, and doing homework. Talking about things other than the subject at hand, not following directions, playing with electronics when not studying, shaking your head at the table, and not finishing chores are all examples of behaviors that are not on task. Observational data were used to help with the analysis of the poll results.

The study process was made up of three main steps. We made student papers (LKPD), a motivation poll, observation sheets, and a link to the video tour of Singosari Temple during the planning process. Giving the experimental and control groups a learning motivation pretest was the first step to carry out the plan. Following that, one group learned Social Studies through a virtual walk of Singosari Temple, while the other group learned through more standard means, such as talks and still pictures. After the therapy, both groups took a test to determine their motivation to learn. As the last step,

we made a data table, tested our theories and ideas, and figured out what the results meant.

The results were analyzed using both descriptive and inferential statistics. Using descriptive statistics (Adnan et al., 2024), the mean, standard deviation, minimum, maximum, and learning incentive increase scores were determined. As there were less than 50 people in each group, the Shapiro-Wilk test was used to determine whether the data were normal. The Levene test was used to determine whether the groups were the same. The independent samples t-test was used to determine whether the data on the growth scores were uniform and spread out in a normal way. If it was not clear that the data were normal, the Mann-Whitney U test was used to complete the analysis. An important amount of 0.05 was picked as the cutoff. Reporting both statistical significance and effect sizes, such as Cohen's d, will help provide a more accurate picture of the strength of the treatment effect.

C. Finding and Discussion

1. Finding

The instrument quality test was conducted before the learning motivation questionnaire was administered to the experimental and control groups. The validity test results showed that all 20 questionnaire items had item-total correlation coefficients above the r-table value of 0.361, with r-values ranging from 0.412 to 0.781. The reliability test results indicated a Cronbach's Alpha value of 0.903. Thus, the Social Studies learning motivation questionnaire was declared valid and reliable for measuring student motivation on Hindu-Buddhist heritage materials.

Table 1 Summary of validity and reliability of the learning motivation questionnaire

Aspect	Result	Decision
Initial number of items	20 items	All items tested
r-value range	0,412-0,781	All items valid
r-table	0,361 (N=30; α=0,05)	Criteria met
Cronbach’s Alpha	0,903	Very good reliability

Descriptive statistics showed that the initial learning motivation of both groups was relatively balanced. The mean pretest score for the experimental group was 52.47, while the control group was 51.84. After the treatment, the mean posttest score for the experimental group increased to 68.22, whereas the control group increased to 56.65. The gain score difference indicated that the increase in learning motivation in the experimental group was higher than that in the control group.

Table 2 Descriptive statistics of Social Studies learning motivation

Group	N	Pretest M±SD	Posttest M±SD	Gain M±SD	N-gain Category
Experimental	32	52,47 ± 6,11	68,22 ± 5,74	15,75 ± 5,31	0,57 (moderate)
Control	32	51,84 ± 5,98	56,65 ± 6,12	4,81 ± 4,76	0,17 (low)

The prerequisite tests were performed on the gain scores of learning motivation. The Shapiro–Wilk normality test showed that the gain scores of both the experimental and control groups were normally distributed, as the significance values for each were greater than 0.05. Levene's test for homogeneity also showed a significance value greater than 0.05, indicating that the variances of the two groups were homogeneous. Based on these results, hypothesis testing proceeded with an independent sample t-test.

Table 3 Results of prerequisite tests for analysis

Test	Group/Variable	Statistic	Sig.	Decision
Shapiro-Wilk	Experimental gain	0,963	0,318	Normal
Shapiro-Wilk	Control gain	0,957	0,240	Normal
Levene's Test	Gain of both groups	0,271	0,605	Homogeneous

An independent sample t-test showed a significant difference in the increase in learning motivation between the experimental and control groups. The t-value was 8.61, with 61 degrees of freedom and a significance of $p < .001$. The mean gain difference of 10.94 indicated that students who learned using the Singosari Temple virtual tour experienced a greater increase in motivation compared to students who learned through lectures and static images. Cohen's d value of 2.17 falls into the very large effect category.

Table 4 Hypothesis test results on the effect of the Singosari Temple virtual tour

Analysis	Statistical Value	df	Sig.	Mean difference	Effect size	Decision
Independent sample t-test	t=8,61	62	<0,001	10,94	Cohen's d=2,17	H0 rejected; Ha accepted

Observational data on student behavior reinforced these quantitative findings. In the experimental group, on-task behaviors were more dominant, particularly in the form of paying attention to the virtual tour display, discussing temple objects, and completing worksheets. Conversely, the control group exhibited higher off-task behaviors, such as lack of attention to the explanation, talking outside the learning context, and several students appearing passive during the learning process.

Table 5 Summary of observation of student learning behavior

Indicator	Experimental	Control	Interpretation
On-task behavior	84,4%	58,1%	Higher engagement in experimental group
Question/discussion participation	75,0%	45,2%	Experimental group more active in material exploration
Off-task behavior	12,5%	35,5%	Control group showed higher distraction

2. Discussion

The results of this study demonstrate that the Singosari Temple virtual tour has a significant positive effect on the learning motivation of seventh-grade students in Social Studies. The experimental group showed a substantially higher increase in motivation (gain = 15.75) compared to the control group (gain = 4.81), with a very large effect size (Cohen's d = 2.17). These findings confirm that the virtual tour is not merely a variation in learning media but functions as a powerful motivational stimulus that enhances students' attention, engagement, and drive to learn.

Why was the virtual tour highly effective in this specific context? Three interconnected factors explain its success. First, the immersive 360° visualization captured students' attention (ARCS model) while simultaneously supporting autonomy (Self-Determination Theory), as students could navigate the temple at their own pace and choose which hotspots to explore. Second, the local cultural relevance of Singosari Temple, located in the same region as the students, enhanced relevance (ARCS) and relatedness (SDT). Students perceived the heritage not as distant history but as part of their own lived environment, making the material more meaningful. Third, the structured Student Worksheet (LKPD) transformed free exploration into goal-directed inquiry, thereby fostering competence (SDT) and confidence (ARCS). Observational data strongly support this interpretation: the experimental group exhibited 84.4% on-task behavior and 75.0% active participation, compared to only 58.1% and 45.2% in the control group.

The success of the virtual tour is not automatic or universally guaranteed. Several factors could limit or moderate its effectiveness in other contexts. First, the quality of the worksheet (LKPD) is crucial; a poorly designed worksheet would not foster competence and might even confuse students. Second, teacher facilitation skills matter greatly; without active guidance, students might engage in off-task browsing rather than focused exploration. Third, students' prior digital literacy can be a barrier; some students may struggle with navigation on touchscreens or computers. Fourth, the novelty effect cannot be ignored—students might be initially motivated simply because the medium is new, and motivation could decline over repeated use. This study did not measure long-term sustainability, as the treatment lasted only approximately two weeks.

Fifth, technical infrastructure (internet speed and device compatibility) could disrupt the experience in under-resourced schools.

These findings align with Putri (2024), Tasbihah (2021), and Ariesta et al. (2024), confirming the general effectiveness of virtual tours in IPS learning. However, this study extends prior work in two important ways. First, it demonstrates that a *locally produced*, low-cost virtual tour using free web-based tools (Theasys) can be as effective as more expensive or complex VR systems. This has significant practical implications for schools with limited budgets. Second, unlike previous studies that relied on a single theoretical framework (usually ARCS alone), this study integrates ARCS and self-determination theory to provide a richer explanatory account. The findings show that the virtual tour works not only because it captures attention and provides satisfaction (ARCS) but also because it fulfills basic psychological needs for autonomy, competence, and relatedness (SDT). This integrated framework offers a more nuanced understanding of *why* virtual tours enhance motivation.

Social studies teachers can use virtual tours as feasible alternatives to physical field trips when time, cost, or distance is prohibitive. However, effectiveness depends heavily on the accompanying instructional design. Teachers should: (1) provide clear learning objectives before the tour; (2) use structured worksheets (LKPD) that guide observation and inquiry; (3) facilitate post-tour discussions to deepen understanding; and (4) incorporate reflective writing or formative assessment. Teachers should also anticipate technical issues (slow internet, incompatible devices) and prepare offline backups such as printed screenshots or pre-recorded video tours. Without these scaffolds, the virtual tour risks becoming a mere visual spectacle with limited educational value.

This study supports the complementarity of ARCS and SDT as a composite framework for designing and evaluating digital learning media. ARCS addresses instructional design features (attention, relevance, confidence, and satisfaction), while SDT addresses psychological needs (autonomy, competence, and relatedness). Together, they provide a more complete explanation of motivational processes in technology-enhanced learning environments. Future research should test whether this integrated model predicts motivation more accurately than either theory alone.

This study has several limitations that must be acknowledged. (1) The sample was limited to 64 students from one school in Malang, which severely restricts generalizability to other regions, grade levels, or socio-cultural contexts. (2) The study measured only learning motivation; it did not examine whether increased motivation translated into higher academic achievement, historical literacy, or critical thinking skills. (3) The treatment duration was short (approximately two weeks); therefore, long-term motivational effects remain unknown. (4) The novelty effect may have inflated the

results. (5) Reliance on self-reported questionnaire data, despite triangulation with observations, introduces possible social desirability bias.

To address these limitations, future studies should (1) replicate this research across multiple schools in different regions with larger and more diverse samples; (2) include additional dependent variables such as academic achievement, historical understanding, historical literacy, and critical thinking skills; (3) employ longitudinal designs to assess whether motivational gains persist over weeks or months; (4) use mixed methods (interviews, focus groups, open-ended surveys) to capture students' subjective experiences and explain why certain tour features are more motivating; and (5) compare different virtual tour formats (360° photos, full VR headsets, and 3D reconstructions) to identify the most cost-effective and pedagogically optimal design. In conclusion, while the Singosari Temple virtual tour proved highly effective in this localized context, its success depends on thoughtful instructional design, and its broader applicability awaits further empirical testing.

D. Conclusion

This study confirms that the Singosari Temple virtual tour significantly enhances seventh-grade students' learning motivation in Social Studies, as evidenced by a very large effect size (Cohen's d = 2.17) and supported by observational data showing higher on-task engagement. Returning to the initial problem outlined in the introduction—low motivation due to monotonous, lecture-based instruction and the absence of field trips—the findings demonstrate that a locally produced, low-cost 360° virtual tour can effectively address this gap. The integrated theoretical framework of ARCS and Self-Determination Theory explains why: the tour simultaneously captures attention, fosters relevance through local heritage, builds confidence and competence via structured worksheets, provides satisfaction and autonomy through self-paced exploration, and enhances relatedness by connecting students to their own cultural environment. However, critical evaluation reveals that this success is not universal or automatic. The study's narrow scope (one school, 64 students) limits generalizability to other regions, grade levels, or contexts. Furthermore, the exclusive focus on motivation leaves unanswered whether increased motivation translates into academic achievement, historical literacy, or critical thinking skills. The short treatment duration also means that long-term sustainability remains unknown, and the novelty effect may have contributed to the observed gains.

The prospects for developing this research are both promising and necessary. Future studies should replicate the intervention across multiple schools and regions with larger, more diverse samples to test generalizability. Longitudinal designs are needed to examine whether motivational effects persist over time. Most importantly, subsequent

research must expand the dependent variables to include academic outcomes, historical literacy, and critical thinking skills, providing a more comprehensive assessment of the benefits of virtual tours. Mixed-method approaches (interviews, open-ended surveys) would capture students' subjective experiences and explain why certain tour features are more motivating than others. For practical application, Social Studies teachers facing similar constraints—limited field trip access, low engagement, and minimal resources–can confidently use the Singosari Temple virtual tour, but only when integrated with clear learning objectives, structured worksheets (LKPD), follow-up discussions, and formative assessment. Without these scaffolds, the tour risks becoming a mere visual spectacle. With careful instructional design, virtual tours can transform heritage education from passive listening into active, meaningful exploration. This study provides initial empirical evidence for that transformation while honestly acknowledging its boundaries and charting a clear agenda for future research.

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