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The Impact of the "Digital Cultural Heritage" Model on Reducing Psychological Barriers and Developing Self-Directed Learning Competence in Literature among Ethnic Minority Boarding School Students

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KEYWORDS: digital cultural heritage, psychological barriers, self-directed learning, Literature, ethnic minority boarding school students, quasi-experiment.

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ABSTRACT: This study evaluates the impact of the "Digital Cultural Heritage–Literature" model on psychological barriers and self-directed learning competence in Literature among students at Quang Ninh Provincial Boarding School for Ethnic Minority Students. A quasi-experimental pretest–posttest design was employed with 300 upper-secondary students in Grades 10–12, including 150 students in the intervention group and 150 in the comparison group. Psychological barriers were measured using 16 observed variables across four dimensions, while self-directed learning competence was measured using 20 observed variables across five dimensions. A common Literature task score was used as an additional indicator of learning performance. At pretest, the two groups did not differ significantly in psychological barriers, self-directed learning, or Literature task scores (all $p > 0.49$). Psychological-barrier scores subsequently decreased from $M = 3.296$ to $M = 2.761$ in the intervention group, compared with a decrease from $M = 3.284$ to $M = 3.142$ in the comparison group; the between-group difference in change was significant ($p < 0.001$; $d = -1.77$). Self-directed learning increased from $M = 2.959$ to $M = 3.476$ in the intervention group, compared with $M = 2.965$ to $M = 3.169$ in the comparison group ($p < 0.001$; $d = 1.66$). Literature task scores also improved more strongly in the intervention group, with a between-group difference in change of 0.814 points ($p < 0.001$; $d = 2.60$). ANCOVA controlling for baseline scores confirmed significant group effects for all three outcomes. The findings indicate that the model was associated with substantial improvements in the study sample, while interpretation remains bounded by the non-randomized design and the modest internal consistency of several short subscales.

I. INTRODUCTION

The 2018 General Education Curriculum identifies autonomy and self-directed learning as core competencies to be developed among students. In Literature, the curriculum requires the development of language and literary competencies through reading, writing, speaking, listening, and the application of knowledge to learning and real-life situations (Ministry of Education and Training, 2018). From this perspective, innovation in Literature teaching concerns not only content but also the organization of learning so that students actively identify tasks, select information, construct interpretations, examine their reasoning, and evaluate their own learning processes.

Alongside educational reform, the digitalization of cultural heritage has created a source of learning materials capable of connecting literary texts with historical, cultural, and lived contexts. Decision No. 2026/QD-TTg dated 2 December 2021 approving the

Programme for the Digitalization of Vietnamese Cultural Heritage for 2021–2030 establishes objectives for developing, connecting, and expanding access to digital heritage data. The 2024 Law on Cultural Heritage (Law No. 45/2024/QH15), effective from 1 July 2025, further provides a legal basis for the management, protection, and promotion of cultural heritage values (Prime Minister of Vietnam, 2021; National Assembly of Vietnam, 2024).

In heritage education, technology has pedagogical value only when it is connected to learning tasks. Tan et al. (2024) propose a classroom digital-heritage education framework based on staged coordination between learners and digital tools, while Rizvic et al. (2019) show that interactive digital storytelling can bring heritage content into educational settings in a visual and participatory manner. In the Vietnamese context, Phuong (2026) reviews digital preservation approaches such as 3D modelling, metadata-based documentation, digital storage, and immersive technologies, demonstrating their potential to expand access to heritage resources. These studies suggest that the educational value of digital heritage lies in how learners explore, interpret, and use resources rather than in technological display alone.

For ethnic minority boarding schools, the educational use of heritage is also consistent with the requirement to organize learning activities suited to students' characteristics and to foster awareness of cultural identity and traditions under the Regulation on the organization and operation of boarding schools for ethnic minority students promulgated with Circular No. 04/2023/TT-BGDDT (Ministry of Education and Training, 2023). Heritage materials, however, become meaningful Literature learning resources only when students are required to observe, select evidence, connect it with texts, formulate interpretations, create products, and evaluate their own work.

In Literature learning, psychological barriers may appear as anxiety about being evaluated when expressing opinions, low confidence in communication, a perceived distance between literary texts and personal experience, or dependence on ready-made interpretations. These conditions may reduce students' willingness to test interpretations and participate actively. Bandura's (1997) self-efficacy theory indicates that beliefs about one's own capability are related to task choice, effort, and persistence; therefore, a learning environment that enables gradual successful experiences and gives students opportunities to work independently with evidence may contribute to reducing such barriers.

Self-directed learning in this study is understood as the learner's active engagement in setting goals, planning, selecting resources and strategies, monitoring and adjusting progress, and evaluating outcomes. This approach is related to Knowles' (1975) concept of self-directed learning, Garrison's (1997) model, and Zimmerman's (2002) self-regulated learning framework. In Literature, this competence is reflected not only in task completion but also in students' ability to identify what they need to understand, select evidence, evaluate interpretations, revise products, and reflect on how they learn.

On this basis, the study develops the "Digital Cultural Heritage–Literature" model through the sequence Connect–Explore–Interpret–Create–Reflect and examines its impact on two central outcomes: psychological barriers and self-directed learning competence in Literature. Literature task scores are used as an additional indicator to determine whether changes in students' psychological accessibility and learning autonomy are accompanied by improved task performance.

II. THEORETICAL BACKGROUND AND RESEARCH METHODS

2.1. Theoretical background and analytical framework

In this study, "digital cultural heritage" is operationally defined as heritage materials, data, and representations that have been digitized or organized in digital environments, have identifiable provenance, and can be used for learning tasks. In Literature teaching, such resources may include digital images, digital maps, 3D models, virtual-visit environments, audio, documentary films, digitized artefacts, or heritage narratives. The model does not assume that the mere presence of digital resources automatically produces learning outcomes; effects are expected only when the resources are integrated into a learning process with explicit tasks, criteria, and an appropriate transfer of responsibility to students.

Psychological barriers are operationalized through four dimensions: (1) evaluative anxiety; (2) low confidence in expression; (3) perceived distance between literary texts and experience; and (4) dependence on ready-made interpretations. Self-directed learning competence is operationalized through five dimensions: (1) goal setting; (2) planning and resource selection; (3) use of learning strategies; (4) self-monitoring and persistence; and (5) self-evaluation and reflection. The proposed impact pathway is: digital heritage resources organized into learning tasks → opportunities for contextual connection, bounded choice, evidence-based interpretation, creation, and reflection → lower psychological barriers and stronger self-directed learning in Literature.

2.2. The "Digital Cultural Heritage–Literature" model

The model consists of five consecutive stages. In the Connect stage, students encounter a relevant heritage resource and formulate initial questions. In Explore, students select, compare, and take notes from verified sources. In Interpret, heritage materials are brought back into relation with details, imagery, themes, or contexts in the literary text. In Create, students produce reading, writing, speaking, listening, or multimodal products according to specified criteria. In Reflect, students evaluate their source choices, reasoning, difficulties, and adjustments. The five-stage structure is intended to shift students gradually from receiving prepared interpretations toward greater responsibility for evidence selection, interpretation, production, and self-evaluation.

Table 1. Structure of the "Digital Cultural Heritage–Literature" model

Stage	Main student activity	Teacher role	Link to study outcomes
Connect	Observe heritage materials; state prior knowledge; formulate questions	Select appropriate resources and create an entry situation	Reduce unfamiliarity; support goal setting
Explore	Search, select, compare, and take notes	Guide students in identifying provenance and relevance of sources	Increase task control; develop resource selection
Interpret	Compare heritage materials with textual evidence and formulate interpretations	Use probing questions; require evidence-based reasoning	Increase interpretive confidence; reduce dependence on ready-made interpretations
Create	Produce Literature products according to criteria	Provide a rubric and feedback	Expand opportunities for expression; develop task management
Reflect	Self-evaluate and explain choices and adjustments	Organize self-assessment and feedback	Develop self-monitoring, self-evaluation, and reflection

Source: Developed by the author based on the study's theoretical framework.

2.3. Research design and participants

The study employs a quasi-experimental pretest–posttest design with two nonequivalent groups. The analytical sample comprises 300 upper-secondary students in Grades 10, 11, and 12 at Quang Ninh Provincial Boarding School for Ethnic Minority Students, including 150 students in the intervention group and 150 in the comparison group. The sample is balanced by gender and grade level: each group contains 75 male and 75 female students and 50 students from each of the three grade levels. Complete paired data were available for all 300 students at both measurement points, with no missing values in the variables used in the main analyses.

The intervention group participated in Literature learning activities organized according to the "Digital Cultural Heritage–Literature" model, whereas the comparison group followed the same general curriculum orientation without tasks structured through the model's five-stage sequence. Because students were not randomly assigned, baseline equivalence between the two groups was examined statistically before intervention effects were estimated. The balanced group composition reduces observable demographic imbalance but does not eliminate the possibility of unmeasured group differences inherent in a non-randomized design.

2.4. Measurement instruments

Psychological barriers were measured using 16 observed variables on a five-point Likert scale, equally distributed across four dimensions: evaluative anxiety (DG), low confidence in expression (TC), perceived text–experience distance (KC), and dependence on ready-made interpretations (LG). Higher scores indicate stronger barriers. Self-directed learning competence was measured using 20 observed variables on a five-point Likert scale across five dimensions: goal setting (MT), planning and resource selection (KH), use of learning strategies (CL), self-monitoring and persistence (GS), and self-evaluation and reflection (PT). Higher scores indicate stronger self-directed learning competence. Each dimension contains four observed variables.

In addition to these two scales, Literature task scores were recorded at pretest and posttest on a 0–10 scale. This indicator is used as supplementary evidence of change in learning-task performance and does not replace the two central psychological and learning constructs of the study.

Table 2. Structure of measured variables

Outcome group	Dimension	Number of observed variables	Score direction
Psychological barriers	Evaluative anxiety; low confidence in expression; text–experience distance; dependence on ready-made interpretations	16 (4 × 4)	Higher = stronger barriers
Self-directed learning	Goal setting; planning/resource selection; learning strategies; monitoring/persistence; evaluation/reflection	20 (5 × 4)	Higher = stronger self-direction
Task performance	Literature task scores before and after the intervention	2 score variables	0–10; higher = better performance

Source: Structure of the research variables.

2.5. Data processing and analysis

The analysis was conducted in four steps. First, descriptive statistics were used to present sample characteristics, means, and standard deviations. Second, baseline equivalence between the two groups was examined using Welch's t-test for continuous variables and chi-square tests for categorical variables. Third, internal consistency of the scales was assessed using Cronbach's alpha at both

measurement points. Fourth, intervention effects were examined through change scores (posttest minus pretest) using Welch's t-test between groups, with Cohen's d reported as an effect-size measure. ANCOVA was additionally conducted with the posttest score as the dependent variable, group as the explanatory variable, and the corresponding pretest score as a covariate. Sensitivity models further controlled for gender and grade level.

Shapiro–Wilk tests indicated departures from normality for some change-score distributions, particularly in the comparison group and for Literature task scores. Because each group contained 150 observations and Welch tests are reasonably robust to moderate non-normality, the parametric analyses were retained; Mann–Whitney U tests were also conducted as sensitivity analyses for the three primary outcomes and produced the same substantive conclusions (all $p < 0.001$). The homogeneity-of-regression-slopes assumption for ANCOVA was examined using group × baseline-score interactions. Statistical significance was set at $p < 0.05$, and effect sizes are interpreted within the quasi-experimental study context.

III. RESEARCH FINDINGS

3.1. Sample characteristics and baseline equivalence

Table 3. Characteristics of the study sample

Characteristic	Intervention group (n=150)	Comparison group (n=150)	Total (N=300)
Male	75 (50.0%)	75 (50.0%)	150 (50.0%)
Female	75 (50.0%)	75 (50.0%)	150 (50.0%)
Grade 10	50 (33.3%)	50 (33.3%)	100 (33.3%)
Grade 11	50 (33.3%)	50 (33.3%)	100 (33.3%)
Grade 12	50 (33.3%)	50 (33.3%)	100 (33.3%)
Total	150 (100.0%)	150 (100.0%)	300 (100.0%)

Source: Results of research data analysis.

Gender and grade-level composition were exactly balanced between the intervention and comparison groups. Chi-square tests therefore showed no between-group difference for gender ($\chi^2 = 0.000$; $p = 1.000$) or grade level ($\chi^2 = 0.000$; $p = 1.000$). This balance strengthens comparability on the observed demographic characteristics, while the non-randomized design still requires direct examination of baseline outcome equivalence.

Table 4. Baseline equivalence of the primary outcomes

Indicator	Intervention M (SD)	Comparison M (SD)	Welch t	p
Psychological barriers	3.296 (0.284)	3.284 (0.348)	0.318	0.751
Self-directed learning	2.959 (0.287)	2.965 (0.268)	−0.208	0.835
Literature task score	5.547 (0.612)	5.495 (0.698)	0.686	0.493

Source: Results of research data analysis.

None of the three primary outcomes differed significantly between the groups at pretest. Psychological barriers were nearly identical ($p = 0.751$), as were self-directed learning ($p = 0.835$) and Literature task scores ($p = 0.493$). The corresponding standardized differences were very small ($|d| \leq 0.08$). These results provide a favorable baseline for evaluating differential pretest–posttest change, although they do not substitute for random assignment.

3.2. Reliability of the measurement scales

Table 5. Cronbach's alpha for the scales and subscales

Scale/subscale	Items	Pretest	Posttest
Psychological barriers – total	16	0.789	0.847
Evaluative anxiety	4	0.582	0.683
Low confidence in expression	4	0.584	0.662
Text–experience distance	4	0.533	0.691
Dependence on ready-made interpretations	4	0.608	0.725
Self-directed learning – total	20	0.780	0.838
Goal setting	4	0.544	0.676
Planning and resource selection	4	0.404	0.673
Use of learning strategies	4	0.485	0.632
Self-monitoring and persistence	4	0.565	0.656
Self-evaluation and reflection	4	0.584	0.640

Source: Results of research data analysis.

The composite scales showed acceptable-to-good internal consistency at both measurement points. Cronbach's alpha for the 16-item psychological-barrier scale increased from 0.789 at pretest to 0.847 at posttest, while alpha for the 20-item self-directed-learning scale increased from 0.780 to 0.838. The four-item subscales were more modest, particularly at pretest, with coefficients ranging from 0.404 to 0.608; posttest coefficients ranged from 0.632 to 0.725. Accordingly, the composite outcomes provide the strongest reliability basis, while component-level effects are interpreted with attention to the brevity and lower internal consistency of several subscales.

3.3. Effects on psychological barriers in Literature learning

Table 6. Changes in psychological barriers by group

Indicator	Group	Pretest M (SD)	Posttest M (SD)	Mean change	p for between-group difference in change	d
Evaluative anxiety	Intervention	3.303 (0.411)	2.868 (0.430)	−0.435	<0.001	−0.87
	Comparison	3.322 (0.442)	3.265 (0.462)	−0.057		
Low confidence in expression	Intervention	3.233 (0.407)	2.730 (0.423)	−0.503	<0.001	−0.85
	Comparison	3.218 (0.439)	3.053 (0.435)	−0.165		
Text–experience distance	Intervention	3.195 (0.397)	2.712 (0.434)	−0.483	<0.001	−0.90
	Comparison	3.178 (0.457)	3.063 (0.438)	−0.115		
Dependence on ready-made interpretations	Intervention	3.452 (0.409)	2.735 (0.484)	−0.717	<0.001	−1.10
	Comparison	3.418 (0.475)	3.185 (0.429)	−0.233		
Psychological barriers – total	Intervention	3.296 (0.284)	2.761 (0.317)	−0.535	<0.001	−1.77
	Comparison	3.284 (0.348)	3.142 (0.314)	−0.143		

Source: Results of research data analysis.

The total psychological-barrier score decreased by 0.535 points in the intervention group, compared with a decrease of 0.143 points in the comparison group. The between-group difference in change was −0.392 points (95% CI: −0.443 to −0.342) and was highly statistically significant (Welch $t = -15.300$; $p < 0.001$; $d = -1.77$). Reductions were significantly greater in the intervention group across all four component dimensions. The strongest component-level effect was observed for dependence on ready-made interpretations, where the intervention group decreased by 0.717 points compared with 0.233 points in the comparison group ($p < 0.001$; $d = -1.10$).

Within-group paired analyses also showed significant reductions in total psychological barriers in both groups (both $p < 0.001$). The comparison group therefore experienced some improvement over time, but the magnitude of reduction was substantially larger in the intervention group. The direct between-group comparison of change scores, together with the baseline-adjusted analysis reported below, provides the more relevant evidence for estimating the model-associated effect.

3.4. Effects on self-directed learning competence in Literature

Table 7. Changes in self-directed learning competence by group

Indicator	Group	Pretest M (SD)	Posttest M (SD)	Mean change	p for between-group difference in change	d
Goal setting	Intervention	3.088 (0.412)	3.582 (0.434)	+0.493	<0.001	0.80
	Comparison	3.072 (0.423)	3.227 (0.418)	+0.155		
Planning and resource selection	Intervention	2.982 (0.400)	3.547 (0.446)	+0.565	<0.001	0.85
	Comparison	3.003 (0.343)	3.193 (0.427)	+0.190		

Use of learning strategies	Intervention	2.997 (0.421)	3.402 (0.428)	+0.405	<0.001	0.39
	Comparison	2.963 (0.358)	3.203 (0.424)	+0.240		
Self-monitoring and persistence	Intervention	2.860 (0.422)	3.467 (0.386)	+0.607	<0.001	0.88
	Comparison	2.905 (0.408)	3.142 (0.432)	+0.237		
Self-evaluation and reflection	Intervention	2.867 (0.440)	3.383 (0.402)	+0.517	<0.001	0.73
	Comparison	2.883 (0.412)	3.082 (0.441)	+0.198		
Self-directed learning – total	Intervention	2.959 (0.287)	3.476 (0.280)	+0.517	<0.001	1.66
	Comparison	2.965 (0.268)	3.169 (0.279)	+0.204		

Source: Results of research data analysis.

The total self-directed-learning score increased by 0.517 points in the intervention group compared with 0.204 points in the comparison group. The between-group difference in improvement was 0.313 points (95% CI: 0.270 to 0.356; Welch t = 14.393; $p < 0.001$; d = 1.66). All five self-directed-learning dimensions showed significantly greater gains in the intervention group. The largest component-level gains were observed for self-monitoring and persistence (difference in change = 0.370; d = 0.88) and planning and resource selection (difference in change = 0.375; d = 0.85).

The use-of-learning-strategies dimension also favored the intervention group, although its effect was smaller than those of the other dimensions. The intervention group increased by 0.405 points compared with 0.240 points in the comparison group ($p < 0.001$; d = 0.39). This pattern suggests that the model was associated with broad self-directed-learning improvement, but strategy use may be a comparatively less responsive component than planning, monitoring, persistence, and reflective evaluation.

3.5. Literature task performance and baseline-adjusted analyses

Table 8. Changes in Literature task scores

Group	Pretest M (SD)	Posttest M (SD)	Mean change	p for between-group difference in change	d
Intervention	5.547 (0.612)	6.846 (0.682)	+1.299	<0.001	2.60
Comparison	5.495 (0.698)	5.980 (0.739)	+0.485		

Source: Results of research data analysis.

Literature task scores increased in both groups, but the intervention group improved by an average of 1.299 points compared with 0.485 points in the comparison group. The between-group difference in improvement was 0.814 points (95% CI: 0.743 to 0.885; Welch t = 22.483; $p < 0.001$; d = 2.60). A Mann–Whitney U sensitivity analysis of change scores produced the same conclusion ($p < 0.001$). The very large standardized effect should be interpreted within the present quasi-experimental design rather than assumed to generalize unchanged to other settings.

Table 9. ANCOVA results for the three primary outcomes

Posttest dependent variable	Intervention-group coefficient	SE	t	p	ηp^2
Psychological barriers	−0.389	0.024	−16.235	<0.001	0.470
Self-directed learning	+0.312	0.021	15.155	<0.001	0.436
Literature task score	+0.815	0.036	22.501	<0.001	0.630

Source: ANCOVA results; the corresponding pretest score was used as the covariate.

After adjustment for the corresponding pretest score, the intervention-group effect remained significant for psychological barriers (B = −0.389; $p < 0.001$; $\eta p^2 = 0.470$), self-directed learning (B = +0.312; $p < 0.001$; $\eta p^2 = 0.436$), and Literature task score (B = +0.815; $p < 0.001$; $\eta p^2 = 0.630$). Group × baseline-score interactions were nonsignificant for psychological barriers ($p = 0.100$), self-directed learning ($p = 0.595$), and Literature task scores ($p = 0.488$), supporting the homogeneity-of-regression-slopes assumption. When gender and grade level were added to the models, the group coefficients remained essentially unchanged at −0.389, +0.312, and +0.815, respectively, and all remained significant at $p < 0.001$.

IV. DISCUSSION

The results provide consistent evidence that students who participated in the "Digital Cultural Heritage–Literature" model experienced greater reductions in psychological barriers than students in the comparison group. The groups began at nearly equivalent levels, and the intervention group subsequently showed a substantially larger decline in the composite barrier score. The strongest component-level change concerned dependence on ready-made interpretations. This pattern is consistent with the instructional logic of the model: students are required to explore heritage materials, select evidence, formulate interpretations, create products, and reflect rather than rely primarily on a predetermined explanatory answer.

Evaluative anxiety, low confidence in expression, and perceived text–experience distance also decreased more strongly in the intervention group. From a self-efficacy perspective, repeated opportunities to complete manageable tasks and express evidence-based interpretations may support students' confidence in their capabilities (Bandura, 1997). The present study did not directly measure self-efficacy as a mediating construct, however; the results therefore support an intervention–outcome association but do not establish a specific psychological mechanism.

For self-directed learning, the composite result was similarly clear. Students in the intervention group improved more strongly than those in the comparison group across all five measured dimensions. The strongest component-level effects were found for self-monitoring and persistence, planning and resource selection, goal setting, and self-evaluation and reflection. These components correspond closely to the self-directed-learning processes described by Knowles (1975) and Garrison (1997), and to Zimmerman's (2002) account of self-regulated learning, in which learners plan, monitor, select strategies, and evaluate their own progress.

The learning-strategies dimension produced the smallest component-level effect, despite a statistically significant between-group difference. This distinction is important. The five-stage model appears particularly aligned with planning, evidence selection, persistence, and reflection because these operations are explicitly embedded in the task sequence. More generalized learning strategies may be more heterogeneous and may require repeated practice across a wider range of texts and tasks before effects become as pronounced as those observed in the other dimensions.

Literature task scores increased substantially more in the intervention group, and the group effect remained strong after controlling for baseline performance, gender, and grade level. This result is important because it indicates that increased learner responsibility and reduced psychological barriers were accompanied by stronger task performance rather than by a trade-off in academic outcomes. At the same time, the available measure is a single pretest–posttest Literature score; without additional information on rubric structure, task-form equivalence, or inter-rater reliability, it should be treated as supplementary evidence rather than a comprehensive measure of subject competence.

The findings are consistent with the view that digital heritage education should be designed as a structured participatory process rather than as the presentation of digital resources. Tan et al. (2024) emphasize staged coordination between learners and digital tools, while Rizvic et al. (2019) demonstrate the educational potential of interactive digital storytelling. In the present model, heritage resources are embedded in tasks requiring question formulation, source selection, interpretation, production, and reflection. This task architecture may be more educationally consequential than the technological format of the resources by itself.

The study has several limitations. First, the quasi-experimental design did not use random assignment, so selection effects and unmeasured class-level differences cannot be fully excluded even though baseline outcomes and observed demographic composition were equivalent. Second, the study was conducted in a single school, which limits direct generalization to other boarding-school contexts. Third, although the two composite scales showed acceptable-to-good internal consistency, several four-item subscales had modest alpha coefficients, particularly at pretest; component-level estimates should therefore be interpreted more cautiously than the composite outcomes. Fourth, intervention duration and implementation fidelity were not quantified in the statistical analysis, making it difficult to identify the relative contribution of individual model stages. Fifth, Literature performance was represented by one pretest and one posttest score, without additional evidence on inter-rater reliability or task equivalence.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The study evaluated the "Digital Cultural Heritage–Literature" model with 300 upper-secondary students in Grades 10–12, including 150 in the intervention group and 150 in the comparison group. The groups were balanced by gender and grade level and did not differ significantly on psychological barriers, self-directed learning, or Literature task scores at pretest. Across the pretest–posttest period, the intervention group showed a substantially greater reduction in psychological barriers, a greater increase in self-directed learning competence, and a greater improvement in Literature task scores than the comparison group. These findings remained statistically significant after baseline adjustment and after additional control for gender and grade level.

At the component level, all four dimensions of psychological barriers showed significantly greater reductions in the intervention group, with the strongest effect for dependence on ready-made interpretations. All five dimensions of self-directed learning also favored the intervention group; the smallest effect was observed for the use of learning strategies, whereas planning/resource selection and self-monitoring/persistence showed stronger effects. The pattern indicates that the model was associated with broad changes across both psychological accessibility and learning autonomy, while the magnitude of change varied across specific components.

Within the study context, the findings support the use of digital cultural heritage as a structured task environment that connects literary texts with cultural context, expands bounded learner choice, and requires students to take greater responsibility for evidence selection, interpretation, production, and reflection. The results should not be interpreted to mean that any use of digital resources will produce comparable effects; the model depends on deliberate instructional organization and on the integration of resources into disciplinary Literature learning.

5.2. Recommendations

First, digital heritage resources used in Literature should have clear provenance, align with lesson objectives, and be linked to a specific learning operation such as observation, comparison, contextualization, evidence identification, argumentation, or product creation. The number of resources should remain manageable so that digital abundance does not replace focused reading and interpretation.

Second, learner autonomy should be expanded gradually. At the initial stage, teachers can provide a verified set of sources and explicit selection criteria; in later tasks, students can independently locate and compare sources and explain their choices. This transfer of responsibility should be accompanied by clear assessment criteria so that autonomy remains academically structured.

Third, reflect activities should remain a required component of the model. Reflection tasks should require students to identify their goals, selected evidence, difficulties, strategy adjustments, and areas for improvement in subsequent Literature tasks. This is particularly relevant because the strongest self-directed-learning gains were observed in planning, monitoring, persistence, and reflective evaluation.

Fourth, future studies should extend implementation across multiple classes and schools, document intervention duration and fidelity, and further refine the short component scales. Where feasible, class-level randomization or cluster designs should be used to strengthen causal inference. Literature task performance should also be assessed with standardized rubrics, multiple tasks, and inter-rater reliability evidence.

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