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Innovation in learning resource services and promotion strategy in elementary schools: A case study

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ABSTRACT

This study was motivated by the low utilisation of student learning resources in elementary schools despite the adequate availability of Organisation of Learning Resources (OLR) facilities, indicating weaknesses in service and promotion strategies rather than infrastructure provision. The study aimed to examine the influence of OLR services, compare manual and digital promotion strategies, and analyse the interaction between both variables on the utilisation of student learning resources in elementary schools in Mojokerto City. The research employed a quantitative approach with a 2×2 factorial quasi-experimental design analysed using two-way ANOVA. Data were collected through a Likert-scale questionnaire that had met validity and reliability requirements. The findings revealed that OLR services significantly influenced resource utilisation, while digital promotion strategies proved more effective than manual approaches. A significant interaction between service quality and promotion strategy was also identified (Sig. < 0.001), with the model explaining 75% of the variance in utilisation scores. These findings strengthen the concept of integrated learning resource management in elementary schools.

INTRODUCTION

Transforming learning resource management in elementary schools requires shifting service and promotion methods from administrative to more strategic and communicative. In this study, Organisation of Learning Resources (OLR) refers to the school unit responsible for managing learning resources, including the school library, reading corners, digital learning resources, and other educational materials that support teaching and learning activities. The elementary school students are the primary users of these services, while teachers and learning resource managers plan, deliver, and promote access to these resources. Learning resource organisations are no longer sufficient in providing collections; they must also ensure that students are aware of, interested in, and able to use available learning resources effectively. Despite the adequate availability of learning resource facilities in many elementary schools, students often do not utilise them optimally. This condition indicates that the challenge lies not

only in the availability of resources but also in the quality-of-service delivery and promotional strategies employed by learning resource managers. As communication patterns among the digital generation continue to evolve, promotional approaches must also move beyond conventional methods toward more interactive and student-centered communication. These circumstances raise essential questions regarding the comparative effectiveness of conventional and innovative learning resource service and promotion models in supporting students' utilisation of learning resources in elementary schools. Empirical evidence is therefore needed to better understand how these approaches influence students' engagement with learning resources (Akakpo et al., 2025; Rüth et al., 2022; Zhao, 2024).

Building on these definitions, the study draws upon two complementary theoretical perspectives. The concept of learning resource services is informed by *Instructional Media and Technologies for Learning*, which emphasises accessible services, clear communication, and user-centred support to improve students' engagement with learning resources. Meanwhile, the promotion of learning resources is explained through the *Diffusion of Innovations* theory, which argues that the adoption of innovations depends on how effectively information is communicated to potential users. Promotional strategies that do not match learners' characteristics are less likely to encourage the effective use of learning resources. Therefore, the alignment between service quality and promotional strategies is expected to play a significant role in increasing students' utilisation of learning resources (Devisakti & Muftahu, 2023; Marek et al., 2014; Wang et al., 2025). These theoretical perspectives provide the conceptual foundation for examining the main and interaction effects of learning resource service and promotion strategies using a two-way ANOVA.

The phenomenon observed in elementary schools in Mojokerto City indicates that learning resource facilities, including reading corners, thematic book collections, instructional media, and digital teaching materials, are not utilised equally by students. Daily usage records reveal unstable participation rates and consistently lower utilisation on certain days. Some students reported that they were not fully aware of the available services and learning resources. Information about these resources has primarily been communicated through verbal announcements or bulletin boards, while the use of digital media for promotion remains limited (Casucci et al., 2025; Riady et al., 2025; Sprenger & Schwaninger, 2023). School principals, learning resource managers, and teachers share responsibility for improving this situation and are expected to ensure that learning resources are effectively managed, communicated, and integrated into classroom learning. The limited coordination among these stakeholders in promoting available resources may contribute to the gap between the availability of learning resources and their actual utilisation by students. Therefore, examining alternative service and promotion approaches, particularly by comparing conventional and digital models, is vital to identify more effective strategies for increasing students' engagement with learning resources.

The theoretical foundation of this study is primarily derived from the concept of Learning Resource Services within the field of Instructional Media and Technologies for Learning proposed by Heinich et al. (1996), which emphasises that the effectiveness of learning resources depends not only on their availability but also on accessibility, guidance, communication support, and user-centred services. This perspective suggests that learning resources become meaningful when students can easily access, understand, and utilise them as part of their learning activities. Therefore, the quality of OLR services is expected to influence students' utilisation of available learning resources.

In addition, this study adopts Diffusion of Innovations Theory as the theoretical basis for understanding the role of promotional strategies. It explains that the adoption of innovations is strongly affected by communication channels, the characteristics of the innovation, and the effectiveness of information dissemination among potential users. In educational settings,

learning resources can be viewed as educational innovations whose utilisation depends on how effectively information about those resources is communicated to students. Consequently, digital promotional strategies are assumed to be more effective than conventional manual approaches because they provide broader reach, faster dissemination, and greater engagement opportunities.

The integration of these two theoretical perspectives provides the conceptual framework for this study. Learning Resource Service Theory explains the service dimension that supports students' access to learning resources. Meanwhile, Diffusion of Innovations Theory explains how promotional strategies influence students' awareness and adoption of those resources. Accordingly, this study hypothesises that the quality of OLR services, promotional strategies, and the interaction between these variables significantly affect students' utilisation of learning resources in elementary schools (see Figure 1).

Previous research (Kurniawan, 2022; Merga & Mat Roni, 2025; Nitzah & Heriyanto, 2025) showed that the successful utilisation of school libraries is significantly influenced by the communication strategy of services to students. Other studies by Waghmare (2025), Wang, (2025), & Wibowo, (2022) confirmed that the digital environment can increase information access if supported by effective promotion. These findings demonstrate that services and promotion play a strategic role in increasing the use of learning resources. However, most research focuses on school library context rather than the overall organisation of learning resources. Research also tends to examine one variable in isolation rather than interactively. These limitations open research opportunities that investigate both variables simultaneously. This need is increasingly vital in elementary schools adapting to the digital ecosystem (Kulavijit et al., 2026; Zhou et al., 2025) .

National data indicate that Indonesia's elementary school students' literacy level belongs to the moderate category, based on the Programme for International Student Assessment report (OECD, 2022). These results indicate that the utilisation of learning resources in schools is suboptimal. The utilisation of available learning facilities often does not match the investment made. Schools have learning resources, but students are not encouraged to actively use them. This situation suggests that the problem lies not only in availability but also in service and promotion strategies. The manual approach currently used may no longer be relevant for the digital generation. This fact reinforces the urgency of research into the effectiveness of manual and digital promotion in OLR environments.

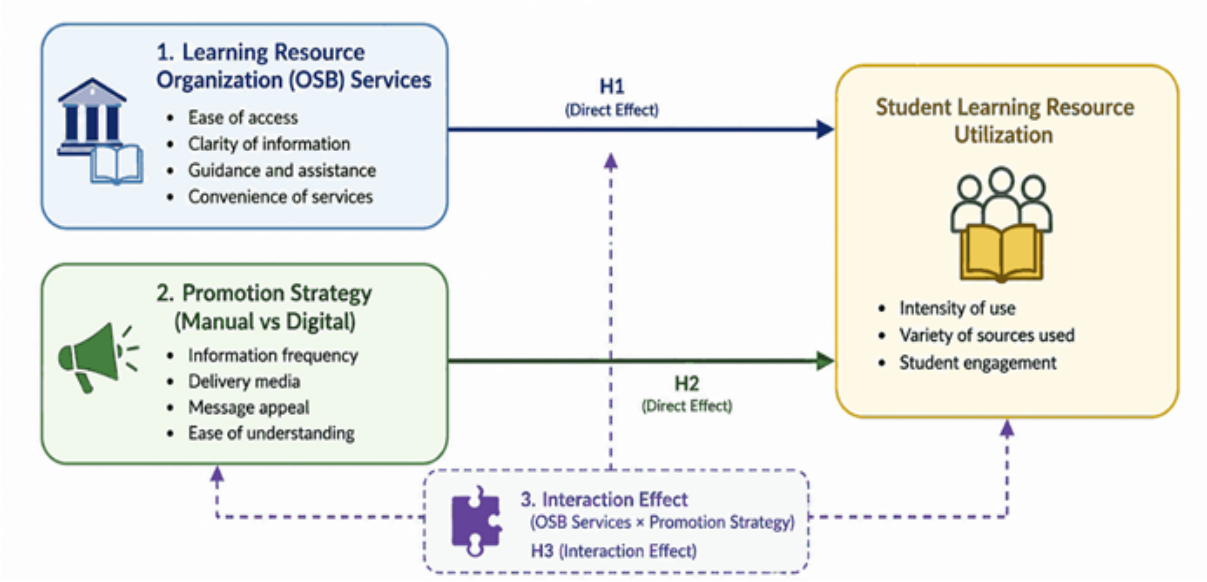


Figure 1. Conceptual framework

The research gap lies in the absence of quantitative studies that simultaneously examine differences in manual and digital OLR services and promotion using two-way ANOVA. Previous studies tend to use descriptive or correlational designs. A comparative experimental approach with two factors is very rare in the context of OLR in elementary schools. This situation creates an opportunity to generate stronger empirical findings. The two-way ANOVA allows the identification of the influence of each variable and their interactions. The results can provide data-based recommendations for OLR management in schools. The need for precise quantitative evidence is the primary reason for this research.

The novelty of this research lies in examining the interaction of OLR services and promotional strategies in two forms: manual and digital, in the elementary school context. This approach has not been widely used in elementary education research in Indonesia. This research also positions OLR as a learning information service center, not simply a supporting facility. The two-way ANOVA analysis provides methodological strength in examining the effects of variable interactions. The research results are expected to enrich empirical data-based studies of learning resource management. This contribution is relevant for developing school policies to optimise the use of learning resources. This novelty gives the research significant academic added value.

The purpose of this study was to examine the effect of OLR services on student learning resource utilisation, the influence of manual and digital promotional strategies on learning resource utilisation, and the interaction between the two variables. These objectives arose from the problem of low OLR utilisation in schools despite the availability of facilities. This study seeks to provide data-based answers to the effectiveness of the two promotional approaches. The results are expected to provide a scientific basis for decision-making in schools. The empirical findings can also serve as a reference for other schools with similar characteristics. The quantitative focus provides clarity on the causal relationships between variables. This clarity is essential for improving the quality of learning resource management in elementary schools.

METHOD

Types of research

This study employed a quantitative approach with a 2x2 factorial quasi-experimental design and was analysed with two-way ANOVA. This design was selected for its simultaneous test of the influence of two independent variables and their interaction on one dependent variable, objectively and measurably. The OLR service variable was the first factor with two treatments, while manual and digital promotion strategies were the second factor with two treatments. The factorial design allows for a simultaneous identification of the main and interaction effects. This approach is relevant to the research objective, which is not only to determine the differences, but also the relationship between the effects of the treatments. The resulting data are numerical, so they can be analysed statistically to obtain empirical conclusions. This design provides a strong methodological basis for answering the research hypothesis precisely.

Location and time of research

The research was conducted at an elementary school in Mojokerto city, facilitated by an OLR, which has begun utilising digital school media to deliver information. The selection was based on the phenomenon of low utilisation of learning resources despite adequate facilities. The school's semi-urban location provides a representative context for a simultaneous implementation of manual and digital promotion. The research was planned for one academic semester to ensure adequate observation of the treatment. The research stages began with instrument preparation, instrument trials, treatment implementation, data collection, and data analysis. Each stage was designed sequentially to ensure the research process was systematic and controlled. A detailed activity schedule was used to ensure each stage followed the research plan.

Population and sample

The population of this study was all upper-grade students who actively used the OLR facilities at school. Population characteristics included those who had developed independent

reading skills and were accustomed to using school learning media. Inclusion criteria were for students who regularly participated in OLR activities, while exclusion criteria applied to those who did not participate in the entire treatment series. The sampling technique employed cluster random sampling as the sample units were class-based. This technique was selected to maintain the integrity of the learning groups so the treatment was applied naturally. The sample size met the minimum requirements for factorial analysis to fulfil the conditions of the ANOVA test. Representativeness was the primary basis for determining the sample size.

Research instruments and operational definitions

The research instrument used a closed-ended questionnaire with a Likert scale to measure the level of student learning resource utilisation. OLR service variable indicators include ease of access, clarity of information, mentoring, and service convenience. Promotion variable indicators include information frequency, delivery media, message appeal, and ease of understanding. The learning resource utilisation variable was measured through the intensity of use, variety of sources used, and student engagement. The operational definition of each variable was compiled based on the concept of learning resource services from Instructional Media and Technologies for Learning and the innovation diffusion theory from Diffusion of Innovations. Validity testing was conducted through expert judgment and item correlation tests, while reliability was tested using the Cronbach's Alpha coefficient. The instrument development stages were carried out systematically, so the measuring instrument truly represents the research variables.

Data collection and analysis techniques

The data were collected using a questionnaire, administered after the service and promotion treatment for each group. The collected data, consisting of student learning resource utilisation scores, were the dependent variable. The procedure was carried out under direct supervision to minimise response bias. Data validity was maintained through clear filling instructions and controlled filling time. Data analysis used descriptive statistics to obtain a data overview, followed by prerequisite tests of normality and homogeneity. Hypothesis testing used two-way ANOVA to determine the influence of each variable and their interactions. Data processing was carried out in SPSS to ensure accurate and scientifically accountable analysis results.

RESULT

The following between-subjects factors table, descriptive statistics, and two-way ANOVA test provide an empirical overview of the influence of Learning Resource Organisation (LSO) services and promotional strategies (manual vs. digital) on student resource utilisation. These data depict variations in utilisation scores across treatment groups, which were analysed quantitatively and in depth (see Table 1).

Based on the data distribution, the Method variable shows a relatively balanced number of respondents between the Organisation of Learning Resources (OLR) Services (43 respondents) and the OLR Promotion Strategy (42 respondents). Meanwhile, in the Promotion Strategy variable (Manual vs Digital), the Low category is more dominant (55 respondents) than the High category (30 respondents), indicating a lower level of respondents' promotion strategies. To facilitate understanding of the distribution of research data, the results of respondent grouping are presented not only in tabular form but also visualised through bar graphs (see Figure 2). Graphic presentation is regarded as vital for its clearer, more concise, and informative picture of the comparison of the number of respondents in each research variable category. Through this visualisation, readers can easily identify the distribution differences between **the Method** and **Promotion Strategy variables (Manual vs Digital),** so data interpretation becomes more effective and easier to understand.

The Figure 3 presents the results of a descriptive analysis comparing promotional strategies (manual vs. digital) for Organisation of Learning Resources (OLR) services, including the mean, standard deviation, and sample size (N) for each category. This data presentation aims to provide a general overview of the distribution trends and differences in values across each group studied.

Table 1. Respondent characteristics based on research variables

Variables	Code	Value Label	Number (N)
Method	1	Organisation of Learning Resources (OLR) Services	43
	2	OLR Promotion Strategy	42
Promotion Strategy (Manual vs Digital)	1	High	30
	2	Low	55

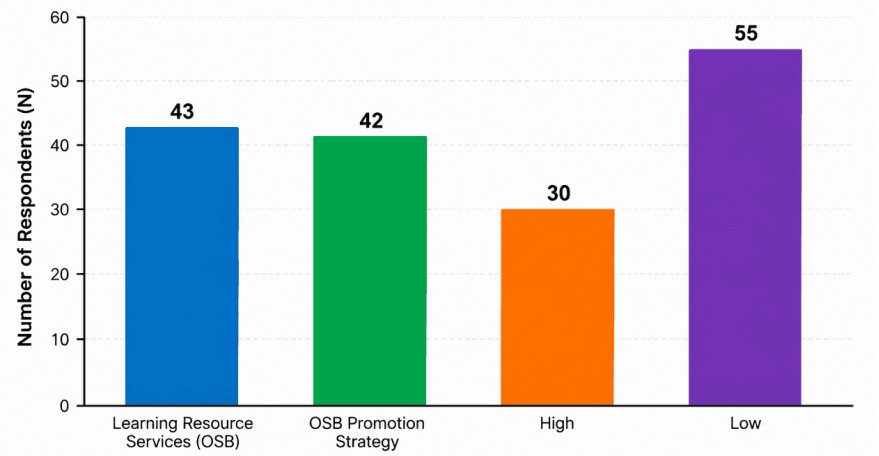


Figure 2. Distribution of respondents based on promotion methods and strategies

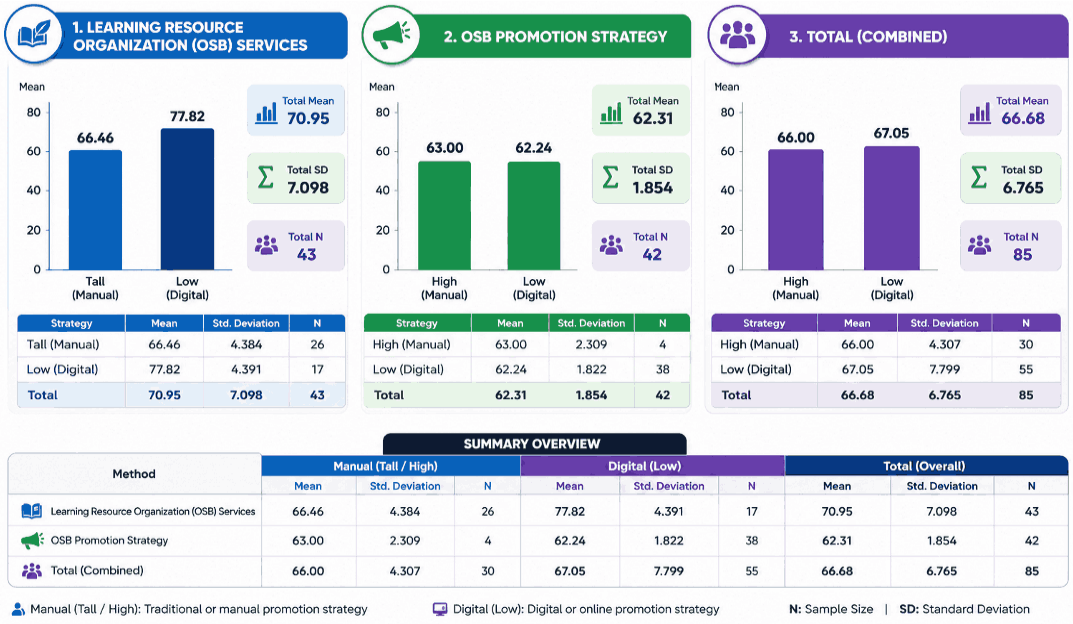


Figure 3. Descriptive analysis of the influence of manual and digital promotion strategies on OLR services

In general, the Figure 3 data show a difference in the average between promotional strategies (manual vs. digital) in OLR services, but the pattern is inconsistent. In OLR services, the low promotion strategy group has a higher mean (77.82) than the high group (66.46). Meanwhile, in the OLR promotion strategy variable, the difference is very small between the high (63.00) and low (62.24) groups. Overall, the low group is also slightly higher (67.05) than the high group (66.00), although the difference is relatively small. Overall, these results indicate no strong tendency that high promotion strategies consistently produce better values. Therefore, the relationship between promotion strategies and OLR service quality is generally weak or influenced by other factors.

To clarify the data presentation and facilitate understanding of the comparison between promotional strategies (manual vs. digital) and Organisation of Learning Resources (OLR) services, the following descriptive statistics are presented in graphs. This graphical presentation is expected to provide a more visual and understandable picture of the differences in mean values, standard deviations, and data distribution for each analysed group (see Figure 4).

The Figure 5 presents a summary of the results of a two-way ANOVA test used to analyse the influence of learning methods and promotional strategies, as well as their interaction, on students' utilisation of learning resources. This analysis aims to determine whether each independent variable or their combination has a statistically significant influence on the dependent variable. The F value and significance level (Sig.) for each source of variation serve as the basis for decision-making. The criteria used are that if the significance value is less than 0.05 ($p < 0.05$), then it can be concluded that there is a significant influence. Thus, this table helps readers briefly understand the contribution of each factor in explaining variations in students' utilisation of learning resources.

Descriptive analysis showed that the group of students who experienced OLR services and low promotion strategies had higher mean utilisation scores than the other groups on this variable. This conclusion is consistent with educational research results showing that interactive approaches to learning resources usually increase utilisation among students (e.g., the use of educational media that adapts to student needs) (Halomoan et al., 2025; Kaba et al., 2025; Singh, 2020). The clear mean differences between baseline treatments indicate significant variation in student responses to the service format and promotional delivery methods.

The two-way ANOVA test yielded significant F values for the method ($F = 84.787$, $p < .001$), the promotion strategy ($F = 26.251$, $p < .001$), and the interaction between the method and the promotion strategy ($F = 34.356$, $p < .001$). These findings indicate that both factors have a statistically significant main and joint influence on students' utilisation of learning resources. The significant influence of both independent variables and the interaction effect is consistent with other factorial quantitative studies showing that the combination of supporting factors (such as learning methods) and moderating conditions (such as the level of support or acceptance of technology) varies in student learning outcomes or engagement (Lin & Wu, 2025).

The coefficient of determination (R-squared) of .759 indicates that this model explains approximately 75.0% of the variation in students' learning resource utilisation scores, meaning that most score changes can be explained by the promotional method and strategy variables and their interactions.

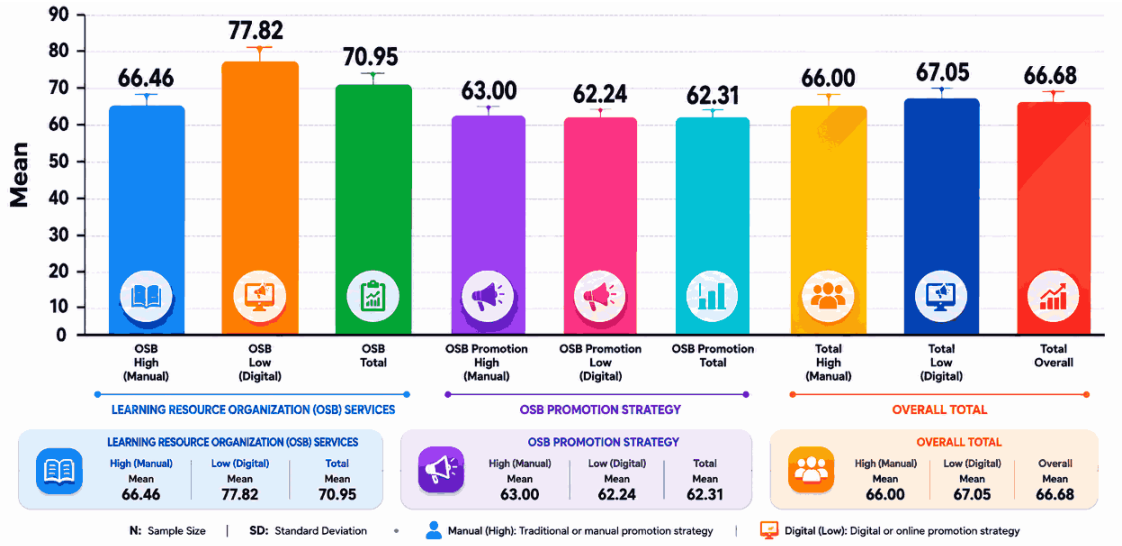


Figure 4. Comparison of OLR services by promotion strategy and overall total

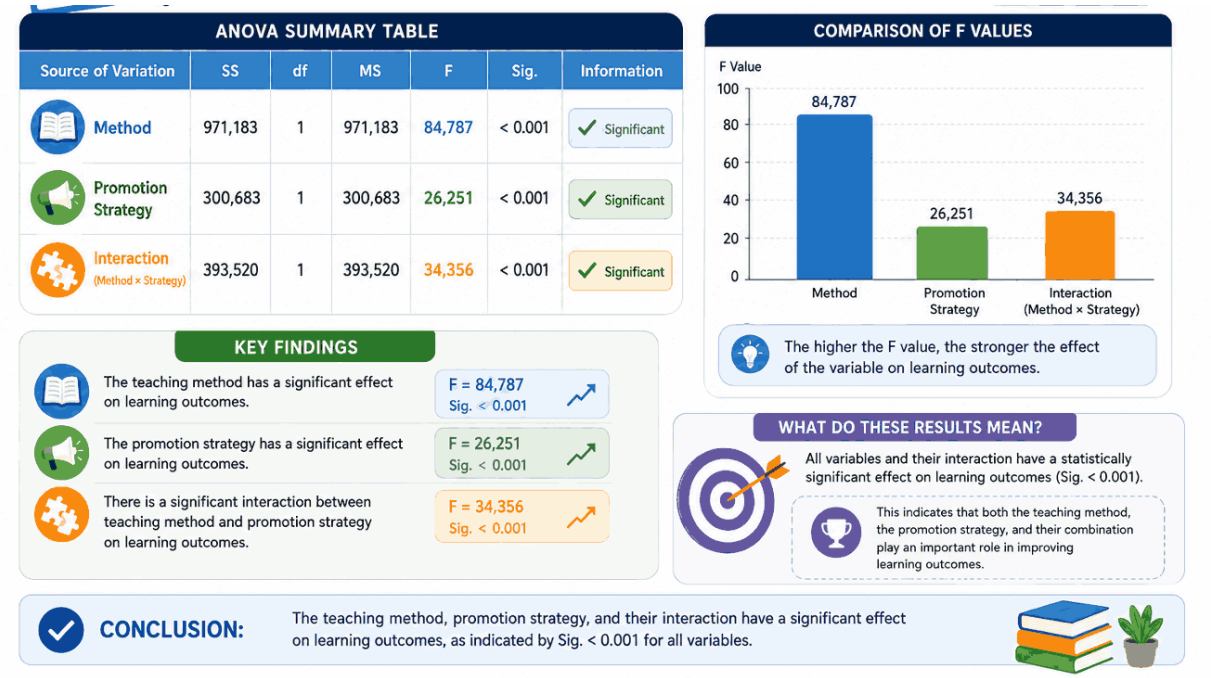


Figure 5. Summary of anova test results (between-subjects effects)

This also supports the literature that emphasises the importance of considering both contextual and technical factors simultaneously when evaluating the effectiveness of learning programs or learning resources (Cordova-Buiza et al., 2025; Yemelianenkova & Bielova, 2022; Zhang & Hu, 2023).

Substantially, these results provide evidence that not only does each factor have an independent effect on the utilisation of learning resources, but also that strong interactions indicate that the effectiveness of a service approach depends on the chosen promotional method. These findings enrich the quantitative understanding of basic education service program design, where both factors must be considered simultaneously to optimise empirical results (Gavrilova et al., 2026; Zarubina et al., 2024).

DISCUSSION

The Two-Way ANOVA test in this study showed that both OLR service methods and promotional strategies, both manual and digital, as well as their interaction, had a significant influence on the utilisation of learning resources by students at SDN Mojokerto City. The very high F value ($F = 84.787$; $p < 0.001$) for the different methods indicates that the way learning resource services are organised and delivered to students quantitatively can explain variations in learning resource utilisation behavior very strongly, which is consistent with previous literature findings that the quality and structure of learning resource services are the main predictors in the use of learning resources by students (Jose, 2018; Othman et al., 2025; Wang et al., 2025). This finding confirms that effective OLR services go beyond simply providing a collection of resources and also require an active approach in providing access, guidance, and context of use relevant to students' daily needs to increase their engagement in learning.

The significant differences between manual and digital promotional strategies also indicate that digital promotion has a greater driving force in increasing student utilisation of learning resources than manual promotional mechanisms. This reflects findings in educational promotion research that show that promotional strategies through digital media can attract a wider audience and strengthen engagement in educational contexts (Azzaakiyyah et al., 2025; Susanti & Amelia, 2021). Digital promotion allows students to access information from learning resources anytime and anywhere. Meanwhile, traditional manual promotions such as brochures or face-to-face announcements have limitations in scope and communication reach.

The significant interaction between OLR service methods and promotional strategies ($F = 34.356$; $p < 0.001$) indicates that the combined effect of structured OLR use with a strong promotional strategy creates more conducive conditions for student learning resource utilisation than either factor alone. This is in line with the diffusion of innovations theory, which states that innovations in education, including digital promotion and the organisation of new learning resources, will be more effectively adopted when supported by strong and contextually relevant communication channels (Galanti & Fantinelli, 2025; Iman et al., 2025; Usman et al., 2025), the implications of which are also evident in contemporary research on digital media integration in learning (OECD, 2025). Thus, a methodologically sound promotional strategy not only introduces resource services but also increases their perceived value in students' eyes, which, in turn, increases student engagement in using learning resources.

The theoretical explanation for this main finding can be traced to the theory of educational services, which emphasises that the utilisation of learning resources is not only influenced by the availability of learning materials but also by how these materials are managed, communicated, and promoted to the target audience. Research in the context of school libraries shows that good management of facilities and services is positively related to the level of library utilisation as a learning resource by students (Gulo & Pranoto, 2025; Krisnahadi & Octavia, 2025), which supports the finding that effective OLR services are a vital foundation for active learning activities in schools.

Findings regarding the differences in influence between manual and digital promotion indicate that current digital-based communication tends to be more responsive to the learning styles and information habits of millennial and post-pandemic students. In the current educational context, the digitisation of learning resources has been shown to increase student accessibility and motivation, as digital content can be tailored to individual learning preferences (Gulo & Pranoto, 2025; Uday Kiran & Arumugam, 2021). The interactivity and unlimited access offered by digital media strengthen the role of digital promotion strategies in encouraging the continued use of learning resources. In contrast, manual promotion is often less responsive to the needs of students accustomed to instant and interactive information through digital devices (Lee & Park, 2026; Shen et al., 2026; Slatvinskyi, 2025).

Comparisons with previous research show that digital support in education generally strengthens the relationship between digital learning resources and student learning outcomes or interests when implemented effectively. For example, studies focusing on the use of digital libraries found a positive and significant relationship between digital library use and student learning outcomes (Nahan et al., 2025; Suprihartini et al., 2025). Although the context differs, focusing on learning outcomes, these findings reinforce the understanding that digital contexts can enhance engagement and achieve desired outcomes in the learning process.

However, research also suggests that digital technology does not automatically yield maximum benefits without the support of an appropriate pedagogical context. Several studies have shown that students' digital literacy, infrastructure readiness, and teacher support play a crucial role in determining the effectiveness of digital learning resources (Cordova-Buiza et al., 2025; Uday Kiran & Arumugam, 2021; Yemelianenkova & Bielova, 2022). This explains the potential discrepancies that may arise if schools fail to fully optimize digital integration with contextual learning practices.

The differences between previous studies and this research primarily lie in the focus of the analysis: this study emphasises the influence of promotional strategies on the utilisation of learning resources, while many other studies emphasize the relationship between digital platforms and learning outcomes or interest directly. This difference in context suggests that while the digitalisation of learning resources has great potential, its successful utilisation depends heavily on how communication strategies, including digital promotion, are systematically designed and implemented within the school context (Ahmad et al., 2023; Bates, 2022; Nilsson & Lund, 2023).

Theoretically, these findings broaden the understanding of service delivery and communication theory in education by demonstrating that promotion should not be viewed as an additional activity, but as an integral part of an effective learning resource delivery strategy.

Implementing a structured digital promotion strategy helps bridge the gap between the availability of learning resources and students' access to them, ultimately influencing the frequency and quality of their use (Fu et al., 2025; Gabay, 2025; Istenič et al., 2023).

Practically, these findings suggest that schools need to design and evaluate promotional strategies that not only introduce learning resource services to students but also consider their communication preferences. This is crucial for increasing the visibility and relevance of learning resources in students' daily learning lives. Promotional strategies that combine manual and digital approaches can provide more comprehensive and inclusive coverage for all students, especially those with limited digital access.

Methodologically, this study demonstrates that a 2×2 factorial experimental design is highly effective for testing the simultaneous influence of two independent variables on a dependent variable in an educational context. This approach helps identify interactions between service methods and promotional strategies, which are rarely analysed simultaneously in traditional educational research. These findings provide guidance for future educational researchers in applying factorial designs when exploring the interplay between variables (Patel et al., 2024; Sallaah et al., 2025; Teresa Ribeiro et al., 2023).

The primary contribution of this research lies in strengthening the perspective that student utilisation of learning resources is determined not only by service quality but also by systematic accompanying promotional strategies. The findings indicate that the combination of OLR service methods and promotional strategies, particularly digital ones, forms an integrated mechanism that significantly increases student engagement in utilising learning resources. These results enrich previous studies that tend to separate aspects of service provision and promotional communication by confirming that both work synergistically in the context of basic education. This contribution also expands the study of service delivery and communication by positioning promotion as an integral part of learning services, not merely a supporting activity (Aldhafeeri & Alotaibi, 2023; Akar et al., 2025; Van Schoors et al., 2023).

The practical contribution of this research is evident in the implementation recommendations for elementary schools in managing Organisation of Learning Resources (OLR) more adaptively and contextually. The integration of structured services and planned digital promotion strategies has been proven to optimise the utilisation of student learning resources. Methodological contributions are also evident through the use of two-way ANOVA, which allows for more comprehensive simultaneous analysis and interactions between variables. This research's contextual contribution enriches the literature on elementary education in Indonesia, particularly in the public elementary school environment in Mojokerto City, and provides an empirical basis for the development of evidence -based education policies to improve the quality of services and utilisation of learning resources (Bough & Martinez Sainz, 2023; Özer & Demirbatır, 2023).

Overall, student utilisation of learning resources at elementary schools in Mojokerto City is influenced by educational services, which include the quality of OLR services and the effectiveness of promotional strategies. These findings are relevant for elementary school education policy and learning service planning in the current digital era. Digital promotional strategies combined with robust learning resource services can significantly increase student utilisation of learning resources, strengthen their engagement in the learning process, and ultimately have the potential to improve learning outcomes in the long term. These findings align with global trends in the use of digital technology in education, while emphasising that technology use needs to be accompanied by well-planned communication strategies and educational services.

CONCLUSION

This study concludes that the OLR services significantly influence student learning resource utilisation, then digital-based promotional strategies are more effective than manual promotions, and moreover the interaction provides the strongest combined effect in increasing student engagement with learning resources in elementary schools.

These findings suggest that the utilisation of learning resources is determined not only by the availability of facilities but also by the quality of communicative services and promotional strategies that align with the students' communication characteristics in the digital era. The theoretical implications highlight the significance of viewing learning resource management as an integrated service and communication system. The practical implications encourage schools to integrate digital promotion into Organisation of Learning Resources services systematically. Meanwhile, the methodological implications demonstrate the usefulness of a two-way ANOVA factorial design for examining the primary and interaction effects of service and promotion strategies. However, these findings must be interpreted in light of several limitations. First, the research was conducted only in elementary schools in Mojokerto City, which may limit the generalisability of the findings to other educational contexts. Second, the study focused on two independent variables, learning resource services and promotion strategies, without considering other factors, such as digital literacy, teacher competence, school leadership, or students' learning motivation, that may also influence learning resource utilisation. Third, the cross-sectional design captures participants' responses at a single point in time and therefore does not reflect changes in utilisation behaviour over longer periods. Future research is recommended to include schools from different regions and educational levels, incorporate additional explanatory variables, and employ longitudinal or mixed-methods designs to obtain a more comprehensive understanding of the factors influencing students' utilisation of learning resources.

Author contributions

The authors made significant contributions to the study's conception and design. The authors was in charge of data analysis, interpretation, and discussion of results. The final manuscript was read and approved by the authors.

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Conflict of interest

The authors declare that there is no potential conflict of interest.

Data availability statement

All data are available from the authors.

AI Declaration Statement

The authors used OpenAI's ChatGPT to assist with language editing and improve the clarity and wording of the Introduction. All AI-generated suggestions were carefully reviewed, verified, and critically revised by the authors. AI was not used to conduct data analysis, generate research findings, or draw conclusions. The authors take full responsibility for the accuracy, interpretation, and content of the manuscript.

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