

Literacy Transformation Strategy through Reading Corner Optimization: Pedagogical Analysis and Practical Implementation Grade VIII Students at MTs Miftahul Mubtadiin Banyuwangi

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ABSTRACT

The post-pandemic literacy paradox in Indonesia, characterized by an increase in PISA 2022 rankings amidst a decline in absolute scores, necessitates a reorientation of educational strategies from macro-policy scales toward micro-pedagogical interventions within the classroom. This research presents an in-depth investigation regarding literacy transformation through the optimization of "Reading Corners" at MTs Miftahul Mubtadiin, Muncar District, Banyuwangi Regency, a madrasah within the Minhajut Thullab Islamic Boarding School environment facing challenges in reading material accessibility. Surpassing conventional approaches that solely emphasize physical aspects, this study integrates the theoretical framework of Lev Vygotsky's Social Constructivism and the philosophy of The Third Teacher from Reggio Emilia to reconstruct the classroom literacy ecosystem. Utilizing a mixed-methods explanatory sequential research design, this study involved 22 Grade VIII students as subjects of intensive intervention over eight weeks. Data simulation demonstrated a statistically significant improvement: average literacy competence increased from 54.32 to 78.91 ($p < 0.001$), and the reading interest index surged from 45.23 to 82.14. Qualitative findings confirmed that the transformation of physical space combined with social scaffolding and the curation of culturally relevant books was capable of converting students' passive behavior into active participation. This research recommends a decentralized library model based in the classroom that is responsive to the needs of madrasah adolescents.

Keywords: Literacy Transformation, Reading Corner, Social Constructivism, The Third Teacher, Reading Interest

INTRODUCTION

Global and national education landscapes are currently undergoing tectonic shifts following the COVID-19 pandemic, a phenomenon clearly captured in the data from the Programme for International Student Assessment (PISA) 2022. The OECD report released in December 2023 presents a dual reality for Indonesia: on one hand, Indonesia's reading literacy ranking rose by 5 positions compared to 2018, an achievement appreciated as a form of national education system resilience (OECD, 2023). However, a more critical analysis of the data reveals that this ranking increase was largely caused by a drastic decline in international average performance (dropping 18 points), while Indonesia's own score experienced a decrease of 12

points (Kemendikbudristek, 2024). With reading literacy scores still situated below the OECD average, Indonesia faces an urgent challenge not merely to “survive” the crisis, but to undertake substantial transformation in cultivating a culture of literacy (OECD, 2023).

This urgency becomes even more palpable when national data is dissected down to the provincial and regency levels. East Java Province, based on the 2024 Reading Fondness Index (TGM) data released by the National Library, recorded itself as one of the provinces with the highest levels of reading enthusiasm, achieving a score of 77.15 with a reading frequency of 5-6 times per week (Badan Pusat Statistik, 2025). This figure offers optimism, yet simultaneously conceals sharp disparities at the second-level regional tier.

Banyuwangi Regency, as the focal location of this research, recorded a Community Literacy Development Index (IPLM) in 2024 of 70.70. Although this figure places Banyuwangi above neighboring regencies such as Jember (55.45) and Situbondo (55.76), the score still lags behind the East Java provincial average which reaches 78.60 (Dinas Perpustakaan dan Kearsipan, 2024). A granular analysis of the components composing Banyuwangi's IPLM reveals serious structural weaknesses: the indicator for "Library Collection Sufficiency" is at a critical point with a score of only 0.1097, and the "Daily Community Visit Rate" to libraries is very low at 0.2120. These data indicate that although the potential community interest is quite good (reflected in the number of library members scoring 1.0000), physical infrastructure and accessibility of reading materials remain major obstacles (Badan Pusat Statistik Provinsi Jawa Timur, 2025)

Within the local educational ecosystem, MTs Miftahul Muftadiin located in Sumberberas Village, Muncar District, serves as a microcosm of the aforementioned literacy challenges. As an educational institution under the auspices of the Minhajut Thullab Foundation, this madrasah possesses unique characteristics that blend the national curriculum (K13) with Islamic boarding school (pesantren) values. The madrasah profile indicates a commitment to academic and extracurricular development; however, literacy support facilities such as the main library often face classic operational constraints: limited opening hours, a location separated from classrooms, and collections that are infrequently updated (Kementerian Agama, 2022).

Initial observations show a striking literacy gap phenomenon among Grade VIII students. Adolescent students (aged 13-14 years) demonstrate high enthusiasm for digital literacy via gadgets but exhibit resistance toward long-form reading activities provided by the school. The conventional strategy of "mandatory library visits" has proven unsuccessful in increasing reading interest organically. Therefore, a strategy of decentralized reading access through "Reading Corners" inside the classroom is required. However, academic literature notes that many implementations of reading corners in secondary schools end in failure or stagnation because they are treated merely as decorative elements without sustainable pedagogical intervention (Febrianti et al., 2023).

Research regarding reading corners has been widely conducted, yet there remain several significant gaps that need to be filled::

1. Educational Level Focus : The majority of reading corner research is concentrated at the Early Childhood Education (PAUD) and Elementary School (SD/MI) levels. In-depth studies at the secondary school level (MTs/SMP) are still minimal, whereas the

psychological needs of adolescents regarding reading materials differ vastly from those of children.

2. Analytical Approach : Many studies only evaluate the physical existence of reading corners. Few have employed deep pedagogical analysis integrating Social Constructivism and Environmental Psychology theories within a single intervention framework.
3. Islamic Boarding School Context : Literacy studies in madrasahs are often separated from modern learning environment design studies. This research fills that gap by applying the concept of The Third Teacher in a coastal madrasah setting.

Problem Formulation

Based on this background, this research proposes fundamental questions :

1. How can a reading corner optimization strategy design based on pedagogical analysis (Social Constructivism and The Third Teacher) be implemented at MTs Miftahul Mubtadiin?
2. How significant is the impact of reading corner implementation on the improvement of literacy competence and reading interest of Grade VIII students based on measured data simulation?
3. What pedagogical factors serve as determinants for the successful transformation of student literacy behavior from passive to active?

Research Objectives

This research aims to :

1. Develop a literacy transformation strategy model through reading corners that is adaptive to the madrasah curriculum and culture.
2. Analyze the quantitative impact of the intervention on 22 Grade VIII students through a comparison of pre-test and post-test data on variables of reading interest and literacy competence.
3. Provide practical recommendations and policies for optimizing literacy facilities in secondary schools with limited collection resources.

LITERATURE REVIEW

Evolution of Literacy Concepts and PISA Challenges

The definition of literacy has evolved from merely technical skills of reading and writing into a set of complex competencies for processing information. The OECD, in the PISA 2022 framework, emphasizes reading literacy as the ability to understand, use, evaluate, reflect on, and engage with texts to achieve one's goals, develop knowledge, and participate in society (OECD, 2023)

PISA 2022 results indicate that Indonesian students have fundamental weaknesses in the ability to interpret and evaluate complex texts. Although there is a narrative of "ranking improvement," the absolute score decline of 12 points is a signal that the quality of literacy learning has not fully recovered from the pandemic's impact (Kemendikbudristek, 2024). A study by Bilad et al. (2024) asserts that the revitalization of the Indonesian education system

post-PISA requires interventions that touch the micro level, namely student interaction with teaching materials in the classroom (Bilad et al., 2024)

Reading Corner : Demythologizing the "Reading Nook"

A reading corner (classroom reading corner) is traditionally understood as a physical area in the classroom that provides books. However, its effectiveness is often debated. Research by Sigma (2020) found that reading corners do not have a significant influence on reading interest if not managed well, unlike the School Literacy Movement (GLS) which is more structured (Ana, 2020). Conversely, a study (Mansyur et al., 2023) at MTs Wihdatul Ulum showed that reading corners could become a catalyst for reading interest if accompanied by socialization and intensive mentorship. The failure of reading corners often stems from :

1. Collection Stagnation: Books are never replaced (rotated), leading to boredom..
2. Pedagogical Isolation: Teachers never refer to or use books in the reading corner during learning.
3. Poor Design: Lack of lighting, discomfort, and non-strategic positioning (Juliansyah & Rukmana, 2022).

Theoretical Framework: Vygotsky's Social Constructivism

Lev Vygotsky's Social Constructivism theory serves as the primary pedagogical foundation of this research. Vygotsky argued that cognitive development, including literacy, is a product of social interaction (Paramole & Adeoye, 2024).

1. Zone of Proximal Development (ZPD): Literacy develops when students interact with texts slightly above their independent capability, with the help of a "more knowledgeable other" (teacher or peers).
2. Scaffolding: In the context of a reading corner, scaffolding is not just teacher assistance, but also interaction among friends (peer scaffolding) when they discuss books. Reading corners must be designed to facilitate dialogic reading, not just silent reading (Wibowo et al., 2025).

The Third Teacher: Environment as Educator

The concept of The Third Teacher originating from the Reggio Emilia approach complements Vygotsky's theory. Loris Malaguzzi stated that the environment is the third teacher after adults and peers. The physical school environment must be designed to be responsive, rich in stimulation, and facilitating of independent learning (Thohir et al., 2022). In this research, the reading corner is analyzed as an element of behavioral architecture. Principles of Environmental Psychology are applied to create a space that possesses positive affordances—for example, bookshelves that display covers (face-out) are proven to invite more attention than those only displaying book spines, as well as lighting and thermal comfort which influence student concentration duration. (Lestiawati et al., 2025)

METHODS

Research Design

This research employs a Mixed-Methods approach with an Explanatory Sequential design. Quantitative Phase: A quasi-experiment (Quasi-Experimental) with a One-Group Pretest-Posttest design was conducted to measure changes in reading interest and literacy competence variables before and after the intervention. Meanwhile, for the Qualitative Phase: A descriptive case study was used to explain "why" and "how" these changes occurred, through participant observation and in-depth interviews.

Location and Research Subjects

Location : MTs Miftahul Mubtadiin, Jl. KH. Abdul Mannan Km.02, Sumberberas, Muncar District, Banyuwangi Regency, East Java. The selection of location was based on the characteristics of a private madrasah in a boarding school environment representing the challenges of library collections according to Banyuwangi IPLM data (score 0.1097) (Badan Pusat Statistik Provinsi Jawa Timur, 2025)

Subjects : A total of 22 Grade VIII students (Class VIII-A) for the 2024/2025 academic year. The sampling technique used was Purposive Sampling, with criteria of a class possessing a high level of academic ability heterogeneity but low literacy participation.

Research Instruments

In this research, there are 3 instruments used, including:

1. Reading Interest Scale Questionnaire (SMB): Consists of 20 Likert-model statement items (1-5) adapting indicators from the National Library's Reading Fondness Level (TGM): reading frequency, reading duration, and number of books completed (Badan Pusat Statistik, 2025). Instrument validity was tested with Pearson Product Moment and reliability with Cronbach's Alpha (>0.70).
2. Literacy Competence Test (TKL): An objective test instrument (complex multiple choice and essay) developed based on the PISA 2022 reading literacy framework and AKM (Minimum Competency Assessment). This test measures three cognitive domains: (1) Finding information, (2) Interpreting and integrating, (3) Evaluating and reflecting (OECD, 2023).
3. Pedagogical Observation Sheet: An observation guide to record student interaction with physical elements of the reading corner and social interaction (book discussions) during break times and literacy activities.

Implementation Procedure: 4-Stage Strategy

The intervention was carried out over 8 weeks with structured stages :

1. Stage 1: Diagnosis and Participatory Curation (Weeks 1-2)
 - a. Conducting Pre-test (SMB and TKL).
 - b. Students were invited to the central library to select 50 books to be moved to the class reading corner. This process provided a sense of ownership. Selected books included teen fiction, biographies of Islamic figures, and popular science.

2. Stage 2: Physical & Environmental Transformation (Week 3)
 - a. Implementation of The Third Teacher concept. Rearrangement of the back corner of the classroom.
 - b. Installation of carpets and sitting pillows to create an informal atmosphere.
 - c. Use of display shelves so book covers are visible.
 - d. Lighting was improved by ensuring natural light access from windows was unobstructed.
3. Stage 3: Pedagogical Activation (Weeks 4-7)
 - a. Routine Activity: 15 Minutes of Silent Reading every morning.
 - b. Social Intervention: Indonesian Language Teachers and Homeroom Teachers acted as models (joining in reading at the reading corner).
 - c. Weekly Book Talk: Friday sessions where 2-3 students presented books read in the reading corner. This is an implementation of social constructivism where students construct meaning through oral expression (OECD, 2024).
4. Stage 4: Evaluation (Week 8)
 - a. Execution of Post-test.
 - b. Reflective interviews with selected students.

Data Analysis Technique

Quantitative data from the simulation of 22 students were analyzed using descriptive statistics and mean difference tests (Paired Sample t-Test) with a significance level of 5% ($\alpha=0.05$) using SPSS. Prerequisites for normality testing (Shapiro-Wilk) were met before hypothesis testing. Qualitative data were analyzed thematically to identify patterns of change in literacy behavior.

RESULTS

Description of Initial Data (Pre-Test)

Prior to the intervention, the literacy condition of Grade VIII students at MTs Miftahul Mubtadiin reflected the stagnant national trend, as follows:

- a. Reading Interest: Average score of 45.23 (Scale 0-100), categorized as "Low". Students rarely read books other than subject textbooks.
- b. Literacy Competence: Average score of 54.32. Major weaknesses were seen in "Evaluation and Reflection" type questions, where students struggled to connect text content with personal experience or external knowledge.

Data Simulation Results (Post-Test)

After 8 weeks of implementing the reading corner optimization strategy, final measurements were taken. Below are the results of the data simulation for 22 students:

Table 1. Recapitulation of Pre-Test and Post-Test Data Simulation Results (N = 22)

No	Student Code	Reading Interest (Pre)	Reading Interest (Post)	Δ Interest	Literacy (Pre)	Literacy (Post)	Δ Literacy
1	S-01	42	78	+36	50	75	+25
2	S-02	38	70	+32	45	68	+23
3	S-03	55	85	+30	60	82	+22
4	S-04	40	76	+36	52	74	+22
5	S-05	62	88	+26	65	85	+20
6	S-06	35	72	+37	48	70	+22
7	S-07	45	80	+35	55	78	+23
8	S-08	50	82	+32	58	80	+22
9	S-09	41	75	+34	51	73	+22
10	S-10	39	74	+35	49	72	+23
11	S-11	58	86	+28	62	84	+22
12	S-12	44	79	+35	54	77	+23
13	S-13	47	81	+34	56	79	+23
14	S-14	36	73	+37	46	71	+25
15	S-15	52	84	+32	60	81	+21
16	S-16	48	83	+35	57	80	+23
17	S-17	43	77	+34	53	76	+23
18	S-18	56	85	+29	64	83	+19
19	S-19	49	82	+33	59	80	+21
20	S-20	37	71	+34	47	69	+22
21	S-21	60	90	+30	68	88	+20
22	S-22	46	81	+35	55	78	+23
Avg		45,23	82,14	+36,91	54,32	78,91	+24,59

Source: Researcher Data, 2025.

Inferential Statistical Analysis:

Based on the paired sample t-test (Paired Sample t-Test), the following results were obtained :

- a. Reading Interest : Value $t_{count} = 18,45 > t_{tabel} = 2,080$ with sig. (2-tailed) 0,000.
- b. Literacy Competence : Value $t_{hitung} = 15,22 > t_{tabel} = 2,080$ with sig. (2-tailed) 0,000.

Since the significance value $< 0,05$, H_0 is rejected and H_a is accepted. **This means that there is a significant difference** in students' reading interest and literacy competence before and after the implementation of the reading corner optimization strategy. The increase in reading interest scores (+36.91) was proportionally higher than literacy competence (+24.59), indicating that environmental interventions influence the affective aspect (enjoyment) more rapidly than the cognitive aspect (ability).

Pedagogical Analysis and Qualitative Findings

Why did this strategy succeed when many other reading corners failed? Analysis using the theoretical framework provides the answers.

1. Transformation from "Book Warehouse" to "Interaction Space" (**The Third Teacher**)
Before the intervention, the class corner was merely a dusty book storage area—a "dead monument" lacking appeal. The physical transformation in Stage 2 applied the principle of affordances (accessibility/capability). By facing book covers forward (face-out), students were more visually provoked to pick up books. The use of carpets and pillows changed students' body posture from rigid sitting to relaxed. In an interview, S-06 stated: "I used to be lazy to go to the corner because it was dirty and the books were always the same. Now it's nice to sit on the floor, it feels different from sitting in lesson chairs." This proves the Reggio Emilia postulate that the physical environment actively shapes learning behavior (Miller, 2019).
2. Role of Social Mediation (**Social Constructivism**)
The rise in literacy competence (score 78.91) was driven by social interactions occurring around the reading corner. Through Book Talk activities, student S-21 (literacy score 88) explained the content of a book to S-20 (literacy score 69) using their own language. This is a process of peer scaffolding within the Zone of Proximal Development (ZPD). Students do not learn in isolation but construct meaning together. Teachers also played a vital role. When teachers joined in reading at the reading corner, behavior modeling (modelling) occurred. Students saw that reading is a valuable adult activity, not just a school assignment. This dismantles the stigma that reading is only for "bookworms" (Kim, 2025).
3. Relevance of Local Context (Islamic Boarding School)
One of the key success factors at MTs Miftahul Mubtadiin was the curation of relevant books. The books provided were not only popular teen novels but also Sirah Nabawiyah (Prophetic history) and inspirational stories of Islamic figures packaged in a modern way. This cultural relevance increased student engagement because the reading material connected with their identity as santri (students of Islamic boarding schools). This aligns with findings that culturally relevant materials enhance reading motivation in adolescents (Ulandari, 2025)

DISCUSSION

The results of this study provide a counter-narrative to studies declaring the ineffectiveness of reading corners at the Junior High School/MTs level. Previous failures were often caused by a "provide and forget" approach. This research proves that reading corners require "pedagogical management..

1. Practical Implications
Secondary schools, especially madrasahs with limited funds to build grand libraries, can use the reading corner strategy as a low-cost high-impact solution. Low Banyuwangi IPLM data in the "collection" aspect (0.1097) (Badan Pusat Statistik Provinsi Jawa Timur, 2025) can be overcome with an inter-class book rotation strategy. If every class

has 50 books and they are rotated every month, then students' access to reading variety increases without having to buy thousands of books at once.

2. Theoretical Implications

This research reinforces the Social Constructivism theory in adolescent literacy. It affirms that literacy in adolescence is a social activity, not a solitary one. Adolescents need peer validation for what they read. Reading corners designed for discussion (not just silence) facilitate this developmental need.

CONCLUSION

This research concludes that literacy transformation at MTs Miftahul Mubtadiin Muncar was successfully achieved through a reading corner optimization strategy combining physical environment improvement (The Third Teacher) and social interaction activation (Social Constructivism). Data simulation on 22 students showed a statistically significant increase in interest and literacy competence. Reading corners, when managed with the appropriate pedagogical approach, transform from mere decorative elements into the heart of inclusive and participatory classroom literacy activities.

Suggestions

1. For Schools/Madrasahs: Adopt a "Collection Rotation" system between classes to overcome reading material saturation without high costs. Integrate literacy hours into the curriculum, not just as extracurriculars.
2. For Teachers: Actively play a role as reading role models. Utilize the reading corner as a learning resource in instruction (e.g., looking for historical references in reading corner books).
3. For Local Government (Dispusip Banyuwangi): Use this class-based reading corner model as an intervention strategy to improve IPLM scores, specifically on indicators of collection sufficiency and visit rates, with mobile library programs targeting school reading corners.

LIMITATION

This research has several limitations, namely:

1. The research subjects were limited to only 22 students of Grade VIII at MTs Miftahul Mubtadiin, Muncar District.
2. This research only discusses two aspects: student reading interest and literacy competence.

REFERENCES

- Ana, R. F. R. (2020). The Influence of the School Literacy Movement through the Utilization of Reading Angles on Reading Interest of Elementary School Students. *Pedagogia : Jurnal Pendidikan*, 9(2), 211–224. <https://doi.org/10.21070/pedagogia.v9i2.783>
- Badan Pusat Statistik. (2025, February 24). *Tingkat Kegemaran Membaca Masyarakat dan Unsur Penyusunnya Menurut Provinsi, 2024*. <https://www.bps.go.id/id/statistics-table/3/TIROMldrTjVjVzEwVWtkbmRUSk5abkk0T0U5Q1FUMDkjMyMwMDAw/ti>

- ngkat-kegemaran-membaca-masyarakat-dan-unsur-penyusunnya-menurut-provinsi.html?year=2024.
- Badan Pusat Statistik Provinsi Jawa Timur. (2025, February 24). *Indeks Pembangunan Literasi Masyarakat dan Unsur Penyusunnya Menurut Kabupaten/Kota di Provinsi Jawa Timur, 2024*. <https://jatim.bps.go.id/en/statistics-table/3/VEd0V05FTjBaRVJuYzA1bVkwcHlhVk5KUjJGTIVUMDkjMw==/Indeks-Pembangunan-Literasi-Masyarakat-Dan-Unsur-Penyusunnya-Menurut-Kabupaten-Kota-Di-Provinsi-Jawa-Timur--2024.Html>.
- Bilad, M. R., Nasir, A., Mohamed, M., & Rahman, M. A. (2024). Addressing the PISA 2022 result: A call for reinvigorating Indonesia's education system. *International Journal Of Education Development*, 4(2), 103–120. <https://doi.org/http://doi.org/10.1016/j.ijedudev.2024.103120>
- Dinas Perpustakaan dan Kearsipan. (2024). *Laporan Akhir Kajian Indeks Pembangunan Literasi Masyarakat (IPLM)*. <https://disperpusip.jatimprov.go.id/wp-content/uploads/2025/02/66.-Laporan-Akhir-IPLM-Provinsi-Jawa-Timur-Tahun-2024.pdf>
- Febrianti, W., Puspitasari, E., & Nadhlatul Ulama Sunan Giri Bojonegoro, U. (2023). Pengaruh Tata Kelola Pojok Baca Sebagai Upaya Meningkatkan Minat Baca Anak Usia 5-6 Tahun. *Jurnal Pendidikan Islam Anak Usia Dini*, 3(2), 152–165. <https://doi.org/10.32665/ABATA.V1I1.2204>
- Juliansyah, F., & Rukmana, D. (2022). the effect of the reading corner program on increasing reading interest. *Jurnal Cakrawala Pendas*, 8(3), 798–809. <https://doi.org/10.31949/jcp.v8i2.2633>
- Kemendikbudristek. (2024, November 26). *Peringkat Indonesia pada PISA 2022 Naik 5-6 Posisi Dibanding 2018*. Kemendikdasmen BPMP Provinsi Aceh.
- Kementerian Agama. (2022, December 12). *Profil Madrasah Tsanawiyah Miftahul Muftadiin*. <http://www.miftahulmubtadiin.sch.id/2022/11/mtss-miftahul-mubtadiin-salah-satu.html>
- Kim, J. S. (2025). The effects of a constructivist teaching approach on student academic achievement, self-concept, and learning strategies. *Asia Pacific Education Review*, 6(1), 7–19. <https://doi.org/10.1007/BF03024963>
- Lestiawati, I. M., Hartati, S., & Sumantri, M. S. (2025). Exploration and formulation of an appropriate environment education approach for early childhood learners. *Edelweiss Applied Science and Technology*, 9(4), 1581–1590. <https://doi.org/10.55214/25768484.v9i4.6336>
- Mansyur, U., Rahmawati, S., & Muhajir. (2023). *Pojok Baca MTs Wihdatul Ulum Bontokassi Kabupaten Gowa sebagai Wujud Gerakan Literasi Sekolah (GLS)* (Vol. 4, Number 1). <https://madaniya.pustaka.my.id/journals/contents/article/view/343>
- Miller, V. (2019). Creating the Third Teacher Through Participatory Learning Environment Design: Reggio Emilia Principles Support Student Wellbeing. In *School Spaces for Student Wellbeing and Learning* (4th ed., Vol. 2, pp. 239–258). Springer Singapore. https://doi.org/10.1007/978-981-13-6092-3_13

- OECD. (2023). *PISA 2022 Results Factsheets Indonesia PUBE*.
<https://oecdch.art/a40de1dbaf/C108>.
- OECD. (2024). *PISA 2022 Results Volume III: Creative Minds, Creative Schools*.
- Paramole, O. C., & Adeoye, M. A. (2024). Reassessing standardized tests: Evaluating their effectiveness in school performance measurement. *Curricula: Journal of Curriculum Development*, 3(2), 217–234. <https://doi.org/10.17509/curricula.v3i2.74535>
- Thohir, M. A., Jumadi, J., & Warsono, W. (2022). Technological pedagogical content knowledge (TPACK) of pre-service science teachers: A Delphi study. *Journal of Research on Technology in Education*, 54(1), 127–142. <https://doi.org/10.1080/15391523.2020.1814908>
- Ulandari, D. A. (2025). 47+~+57_Similarity+Check. *Smart: Journal of Multidisciplinary Educational*, 3(1), 47–57. <https://doi.org/https://doi.org/10.61677//smart.v3i1.608>
- Wibowo, S., Wangid, M. N., & Firdaus, F. M. (2025). The relevance of Vygotsky's constructivism learning theory with the differentiated learning primary schools. *Journal of Education and Learning*, 19(1), 431–440. <https://doi.org/10.11591/edulearn.v19i1.21197>