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Development of AIR (Auditory, Intellectually, Repetition)- Based Ethnomathematics E-Modules to Improve Numeracy Literacy

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ABSTRACT

The numeracy literacy skills of Indonesian students remain relatively low, particularly in the geometry topics of two-dimensional shapes. One contributing factor is the limited availability of teaching materials that are relevant to local culture, as well as the lack of learning models that actively engage students. This study aims to develop an ethnomathematics-based mathematics e-module using the Auditory, Intellectually, Repetition (AIR) model to enhance students' numeracy literacy. The research employed a Research and Development (R&D) design with the ADDIE model, which consists of the stages of analysis, design, development, implementation, and evaluation. The research subjects were seventh-grade students of SMP Negeri 3 Belitang Mulya and MTs Al Ihsan Kalirejo. The instruments used included expert validation questionnaires, student response questionnaires, and pretest–posttest assessments. The material expert validation produced an average score of 3.64 (very valid), and the media expert validation produced an average score of 3.84 (very valid). Student responses in both small- and large-group trials indicated a very attractive category, with average scores above 3.45. The effectiveness test showed an effect size of 0.81 (high category). These findings indicate that the ethnomathematics-based e-module using the AIR model is feasible, appealing, and effective for improving students' numeracy literacy. This research provides an innovative teaching material alternative that is culturally relevant and can serve as a reference for developing more contextual mathematics learning.

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Introduction

Mathematics education plays an important role in developing students' logical, critical, creative, and analytical thinking skills. Numeracy literacy is one of the key competencies students must possess, encompassing not only the ability to perform calculations but also the

ability to use numbers, data, and mathematical symbols to solve real-world problems (Reflina & Rahma P, 2023). However, the numeracy literacy skills of Indonesian students remain relatively low. International assessments such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) emphasize the need to improve students' numeracy literacy (Patriana et al., 2021).

The low level of numeracy literacy is partly caused by mathematics learning that remains abstract, formula-oriented, and insufficiently connected to everyday life. As a result, students struggle to understand mathematical concepts and often perceive mathematics as a difficult subject (Rahmawati et al., 2023). This issue is also evident in many schools, particularly in geometry topics such as two-dimensional shapes, which require visualization and real-life contexts to be better understood. Preliminary findings at SMP Negeri 3 Belitang Mulya and MTs Al Ihsan Kalirejo showed that 75.61% of students scored below the Minimum Mastery Criteria in the topic of two-dimensional geometry linked to the Limas traditional house of Palembang. Interviews with mathematics teachers confirmed that, although schools have attempted to relate learning to local culture, ethnomathematics has not yet been implemented in depth. This condition highlights the need for innovative teaching materials that offer contextual and meaningful learning experiences.

The issue of low numeracy literacy caused by abstract learning suggests that students need a more contextual approach that relates closely to their daily lives. Such an approach is expected to help students understand mathematical concepts more concretely and increase their learning motivation. One approach that meets this need is ethnomathematics. D'Ambrosio describes ethnomathematics as an approach that connects mathematical concepts with local culture, making learning more meaningful and relevant to students' lives. Previous studies support this, as shown by the issue of low numeracy literacy caused by abstract learning suggests that students need a more contextual approach that relates closely to their daily lives. Such an approach is expected to help students understand mathematical concepts more concretely and increase their learning motivation. One approach that meets this need is ethnomathematics. D'Ambrosio describes ethnomathematics as an approach that connects mathematical concepts with local culture, making learning more meaningful and relevant to students' lives. Previous studies support this, as shown by (Nurdyansyah, 2018) who found that the application of ethnomathematics can improve students' understanding of geometric concepts, and by Lisnani et al. (2022). This study demonstrates that ethnomathematics based on local culture can increase motivation to learn mathematics. The Limas traditional house in Palembang, rich in geometric elements such as triangles, squares, and trapezoids, serves as an effective contextual medium for integrating mathematics with students' local culture.

However, although ethnomathematics holds significant potential to improve student understanding, its effectiveness greatly depends on the use of instructional models that can optimally facilitate the learning process. One such model is the Auditory, Intellectually, Repetition (AIR) learning model. The AIR model emphasizes learning activities through listening (auditory), critical thinking (intellectually), and repetition (repetition) (Hidayati & Darmuki, 2021). Research by Manurung (2016) Research findings also indicate that the AIR model can significantly improve students' mathematics learning outcomes. Similarly Luthfiana & Wahyuni (2019) demonstrated that this model can increase student motivation and engagement. However, previous studies remain isolated: some focus on ethnomathematics without integrating innovative learning models, or conversely, emphasize the AIR model without cultural relevance.

The novelty of this research lies in the integration of ethnomathematics and the AIR learning model into an e-module. The e-module allows students to access learning materials independently, interactively, and visually, making the content easier to understand (Laili et al.,

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2019). Research by Pratama & Yelken (2024) further affirmed that ethnomathematics-based e-modules are effective in improving students' conceptual understanding while supporting technology-based learning. Therefore, this research focuses on developing a mathematics e-module based on ethnomathematics and the AIR learning model to improve numeracy literacy among junior high school students on the topic of two-dimensional geometry. This study also evaluates the feasibility of the e-module through expert validation, student responses to the product, and its effectiveness in enhancing numeracy literacy.

Method

Research Type

This research is a research and development (R&D) using the ADDIE model consisting of five stages, namely, analysis, design, development, implementation, and evaluation. The analysis stage is carried out to identify the needs of students, teachers, and schools. The design stage is carried out by preparing an ethnomathematics-based e-module design using the context of the Limas Palembang traditional house combined with the steps of the AIR model. The development stage includes content preparation, presentation of materials in digital form, and validation by material experts and media experts. The implementation stage is carried out with limited trials at SMP Negeri 3 Belitang Mulya and MTs Al Ihsan Kalirejo, both on a small and large scale. The evaluation stage is carried out by analyzing the validation results, student responses, and effectiveness through pretests and posttests.

Subjects

The research subjects were seventh-grade students from SMP Negeri 3 Belitang Mulya and MTs Al Ihsan Kalirejo, with a total of 40 students. SMP Negeri 3 Belitang Mulya contributed 24 students, while MTs Al Ihsan Kalirejo contributed 16 students. The sample selection was carried out using purposive sampling because these schools possessed characteristics aligned with the needs of the study, namely the absence of ethnomathematics-based teaching materials integrated with the AIR model.

Instruments

Data collection instruments are tools used by researchers to collect data during the research process. The research instruments used in this study consisted of three types. First, validation questionnaires were administered to material experts and media experts. The assessment employed a four-point Likert scale, consisting of the categories: very good, good, fair, and poor. The validation process involved two material experts with a background in mathematics education and two media experts with expertise in educational technology. Second, a student response questionnaire was used to determine the level of attractiveness and ease of use of the e-module. This questionnaire consisted of statements related to the visual appearance, language, presentation of the material, and the usefulness of the e-module in supporting students' understanding. The student response questionnaire also used a four-point Likert scale.

Third, a numeracy literacy test consisting of pretest and posttest items was administered. This test included short constructed-response questions developed based on the numeracy literacy indicators issued by the Ministry of Education and Culture, covering the ability to understand information, apply concepts of two-dimensional geometry within the context of

local culture, and reason to solve problems. The test blueprint was designed to align with the Core Competencies of the junior high school curriculum for two-dimensional geometry.

Data Collection

To evaluate the feasibility and effectiveness of the ethnomathematics-based mathematics e-module using the Auditory, Intellectually, Repetition (AIR) model, this study was conducted through three main stages: the validation stage, the practicality testing stage, and the effectiveness testing stage. The first stage, validation, was carried out by material experts and media experts using questionnaire instruments. This validation process aimed to assess the feasibility of the product in terms of content, language, presentation, and design, as well as to identify its level of practicality, effectiveness, and any potential difficulties that may arise during its use. The second stage, the practicality test, was conducted through student response questionnaires administered during small-group and large-group trials in two schools, namely SMP Negeri 3 Belitang Mulya and MTs Al Ikhsan Kelirejo. At SMP Negeri 3 Belitang Mulya, the small-group trial involved 12 students, while the large-group trial involved 24 students. Meanwhile, at MTs Al Ikhsan Kelirejo, the small-group trial involved 8 students and the large-group trial involved 16 students. The third stage involved students completing a numeracy test in the form of a post-test. This test aimed to measure the extent to which the use of the e-module improved students' numeracy literacy skills after the learning process had taken place.

Data Analysis

Data analysis in this study was conducted using a descriptive quantitative approach in accordance with the research objectives (Widodo et al., 2023). The data obtained from expert validation were analyzed by calculating the average score of each assessment aspect using a four-point Likert scale, namely very good, good, poor, and very poor. These average scores were then interpreted into feasibility criteria to determine the validity level of the developed e-module (Luthfiana & Wahyuni, 2019).

Table 1. Expert Validation Assessment Scores

Score	Feasibility Assessment Category
4	Very good
3	Good
2	Poor
1	Very Poor

The validators who assessed the validity and feasibility aspects of the product consisted of subject-matter experts and media or design experts. The scores provided by the validators were averaged and then converted according to the feasibility criteria. The detailed feasibility criteria based on the results of the average score calculation are presented in the following Table 2

Table 2. Validation Criteria

Quality Score	Feasibilty Criteria	Description
$3{,}26 < \bar{x} \leq 4{,}00$	Very Valid	No Revision Required
$2{,}52 < \bar{x} \leq 3{,}26$	Valid	Partial Revision
$1{,}76 < \bar{x} \leq 2{,}52$	Less Valid	Content Review Required

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$1{,}00 \leq \bar{x} \leq 1{,}76$	Not Valid	Total Revision

Data obtained from the student response questionnaire was analyzed using the same procedure, namely by calculating the average score for each statement (Supriadi et al., 2020). The results were then categorized into very interesting, interesting, quite interesting, and less interesting. These categories were used to determine the extent to which the developed e-module was accepted and liked by students. The procedure for converting scores into assessment categories is presented in the following Table 3

Table 3. Student Response Criteria

Quality Score	Quality Statement
$3{,}26 < \bar{x} \leq 4{,}00$	Very Interesting
$2{,}52 < \bar{x} \leq 3{,}26$	Interesting
$1{,}76 < \bar{x} \leq 2{,}52$	Quite Interesting
$1{,}00 \leq \bar{x} \leq 1{,}76$	Less Interesting

The pretest and posttest data were analyzed to determine the effectiveness of the e-module. The improvement in students' numeracy literacy was calculated using effect size. Furthermore, to determine the level of effectiveness of the e-module, the effect size value was calculated using Cohen's (1988) formula. The criteria for interpreting the effect size are classified as low ($0 \leq d < 0.2$), medium ($0.2 \leq d < 0.8$), and high ($d \geq 0.8$) (Info, 2020). This analysis aimed to measure the extent to which the use of an ethnomathematics-based e-module employing the AIR model had a significant impact on improving students' numeracy literacy. The criteria for categorizing the magnitude of the effect size are as follows

Table 4. Effect Size categories

R value	Interpretation
$0{,}2 < E_S \leq 0{,}5$	low
$0{,}5 < E_S \leq 0{,}8$	medium
$0{,}8 < E_S \leq 2$	high

Research Findings

The development research conducted aimed to improve students' numeracy literacy skills in the topic of plane figures. This resulted in an ethnomathematics-based mathematics e-module, which focuses on plane figures and is linked to the Limas house using the AIR approach. The development process for this e-module utilized the ADDIE development model (Sulistiyowati, 2017). Each stage of the model plays an important role in producing effective learning products that are aligned with students' needs. A further explanation of the stages in the ADDIE model is presented as follows:

Analysis

The analysis stage is the initial step aimed at identifying students' needs, problems, and characteristics prior to the development of the learning product. In the analysis stage, researchers collected data as the basis for designing ethnomathematics- based mathematics e-module teaching materials on the geometry of flat shapes related to the Limas House context using the AIR approach. This analysis encompasses three main aspects: needs analysis,

curriculum analysis, and student characteristics analysis. In addition, at this stage, researchers also began to determine the appropriate learning model, namely Auditory Intellectually Repetition (AIR), to support a more enjoyable, meaningful, and student-centered learning process.

Design

The planning stage of an ethnomathematics-based e-module integrated with the Palembang Limas Traditional House in plane geometry involves preparing a learning material framework consisting of an opening section (cover, foreword, and table of contents), a core module section containing learning materials and content standard information (core competencies, basic competencies, and indicators), and a closing section consisting of references and author biography. In addition, the planning of material presentation is aligned with learning objectives and relevant sources. Research instrument planning includes the development of a product feasibility questionnaire for subject matter experts and media experts, a student response questionnaire to assess the appeal of the e-module, and essay-type pretest and posttest instruments to determine product effectiveness.

Development

In the development stage, the researcher began compiling and producing the e-module based on the design established in the previous stage. At this development stage, the process was adjusted to the design results, which included creating a module consisting of an introduction, module content, and a conclusion. The introduction included a cover, foreword, and table of contents, all developed using the Canva application. The module content was also developed using Canva and included a concept map, introduction, and learning activities containing material descriptions and links to learning videos. Meanwhile, the conclusion included a bibliography and author profiles to complement the e- module.

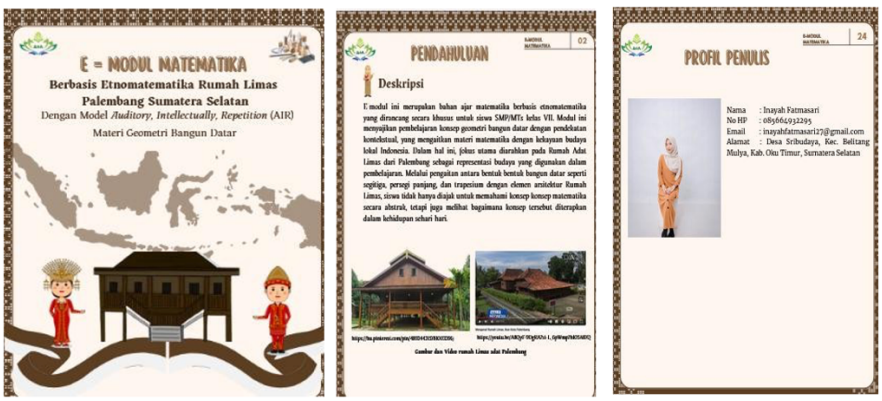

Figure 1. E-Modul Design

After the product was fully developed, the next stage was product validation conducted by media experts and subject matter experts. The validation process generates assessments, critiques, suggestions, and input that are used to improve the e-module, improving the resulting product and declaring it suitable for use in learning. The following are the validation results obtained by the experts

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Table 5. Expert Validation Results

Validator	Aspects Assessed	Average Score	Criteria
material experts	Content suitability, conceptual accuracy, ethnomathematics integration	**3,64**	**Very Valid**
media experts	Display, navigation, interactivity, and design appeal	**3,84**	**Very Valid**

Based on the validation results, the e-module obtained an average score of 3.64 from subject- material experts and 3.84 from media experts, both categorized as Very Valid. These results indicate that the content is aligned with the basic competencies, conceptually accurate, and able to effectively integrate ethnomathematical contexts. In terms of media aspects, the e-module was considered to have an attractive appearance, be user-friendly, and interactive, making it feasible for implementation in the learning process. The teaching materials can be accessed via the following link: https://drive.google.com/file/d/1_VPY1PnUCZ5SSAmBXjhC2LFI2_alJM4w/view?usp=drivesdk or can be accessed by scanning the available QR code:

Figure 2. QR of Design Materials

Implementation

After undergoing the validation and revision processes, the developed e-module was declared ready for implementation (Riset & Pendidikan, 2025a). The implementation stage is the process of implementing learning using the developed teaching materials, namely an ethnomathematics-based mathematics e-module on the geometry of plane figures linked to the context of the Limas house in Palembang using the Auditory Intellectually Repetition (AIR) approach. At this stage, the e-module was directly used in classroom learning activities to evaluate its effectiveness, readability, and functionality in supporting students' understanding of the material. The implementation was carried out after the e-module had passed the validation process by subject matter experts and media experts and had been revised according to the validators' feedback.

The e-module trial was conducted in two schools, namely SMP Negeri 3 Bandar Lampung and MTs Al-Ikhsan Kelirejo. These schools were selected as the implementation sites to determine the extent to which the developed e-module could be effectively applied in the teaching and learning process. Teachers used the e-module as the primary learning resource during instruction, allowing all stages of the AIR learning model to be directly observed. The use of the e-module also aimed to examine students' initial responses to instructional materials that integrate elements of local culture.

The implementation of the AIR learning model in the e-module is carried out through three stages. In the auditory stage, students listen to the teacher's explanation and read the

material contained in the e-module to gain an initial understanding of the concept of plane figures. Next, the intellectual stage encourages students to think critically through activities such as analyzing geometric shapes in the traditional Limas Palembang house, discussing, and solving contextual problems. In the repetition stage, students are given repeated practice through various types of problems to strengthen conceptual understanding and improve problem-solving skills. These three stages are implemented in a structured manner to make learning more meaningful and in accordance with student characteristics.

After the learning activities were conducted, an attractiveness test of the e-module was carried out through small-group and large-group trials. The small-group trial was conducted to obtain an initial overview of students' interest, while the large-group trial was used to examine the attractiveness of the e-module on a broader scale. The results of the trials conducted in both schools are presented in the following Table 6

Table 6. Trial Results

School / Trial	Average Score	Category
SMP Negeri 3 Belitang Mulya (small group)	**3,45**	**very attractive**
MTs Al Ihsan Kalirejo (small group)	**3,55**	**very attractive**
SMP Negeri 3 Belitang Mulya (large group)	**3,49**	**very attractive**
MTs Al Ihsan Kalirejo (large group)	**3,51**	**very attractive**

The trial results indicate that students in both schools provided positive responses, with an average score above 3.45, which falls into the very attractive category. Students perceived the e-module as different from previous instructional materials because it integrates elements of local culture, namely the Limas traditional house of Palembang, with geometric concepts. The visualizations, interactive design, and systematic presentation of the material increased students' motivation to learn mathematics.

In addition, the effectiveness of the e-module was analyzed using effect size calculations based on pretest and posttest results. The analysis showed that the e-module had a high effect at SMP Negeri 3 Belitang Mulya and a moderate effect at MTs Al-Ikhsan Kelirejo. Therefore, this ethnomathematics-based e-module is considered effective in improving students' learning outcomes and numeracy literacy skills, as presented in the following results Table 7

Table 7. Effect Size Result

School	Effect Size Value	Effectiveness Category
SMP Negeri 3 Belitang Mulya	**0,81**	**High**
MTs Al Ihsan Kalirejo	**0,78**	**Medium**

Based on the pretest and posttest results, an effect size of 0.81 was obtained at SMP Negeri 3 Belitang Mulya (high category) and 0.78 at MTs Al Ihsan Kalirejo (medium category). These findings indicate that the ethnomathematics-based e-module with the AIR model is effective in improving students' numeracy literacy. The higher improvement at SMP Negeri 3 Belitang Mulya was influenced by student readiness and teacher support in using the e-module during learning.

Evaluation

In the evaluation stage, assessments are carried out continuously at each development step to ensure that the resulting product meets the criteria of validity, practicality, and

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effectiveness (Riset & Pendidikan, 2025b). The evaluation stage in the ADDIE development model is carried out at each stage with the aim of ensuring the quality of the product being developed. The evaluation is stopped if the assessment results indicate that the product has met the criteria of validity or feasibility, attractiveness, and effectiveness so that it can be used in

Discussion

The results of this study confirm that the improvement in students' numeracy literacy is primarily influenced by the successful implementation of the Auditory, Intellectually, Repetition (AIR) learning model within the ethnomathematics-based e-module. The AIR model functions effectively because it provides a learning sequence that facilitates gradual conceptual understanding: students initially receive information through verbal explanations (auditory), then process concepts through critical thinking activities and problem solving (intellectually), and finally reinforce their understanding through repeated practice (repetition).

These findings align with research by Syahid et al. (2021) which shows that the gradual structure of the AIR model can strengthen the internalization of mathematical concepts through long-term memory activation. Furthermore, Luthfiana & Wahyuni (2019) found that structured repetition in the AIR model increases students' cognitive persistence, thus directly impacting numeracy skills. The effectiveness of the AIR learning model in this study was further strengthened by its integration with an ethnomathematics approach, which makes geometric concepts easier to understand through the local cultural context of the Limas traditional house in Palembang. This supports the findings of Lisnani et al. (2022) which stated that integrating local culture can increase the relevance of the material and deepen understanding of abstract concepts.

The e-module's feasibility also strengthens learning effectiveness. Validation by material experts, who obtained a score of 3.64 (very valid criteria), and media experts, who obtained a score of 3.84 (very valid criteria), indicates that the e-module has met the standards for good content and display, thus optimally facilitating the learning flow of the AIR model. This assessment is in line with Herawati & Muhtadi (2020) which emphasizes that e-modules play a crucial role in providing interactive and flexible digital scaffolding. Therefore, the effectiveness of numeracy literacy improvement in this study is primarily driven by the synergy of three main components: the systematic structure of the AIR learning model, the use of an ethnomathematics context that facilitates conceptual understanding, and the feasibility of the e-module as a medium that supports interactive learning processes. This synergy makes this e-module not only valid and engaging but also capable of providing a significant pedagogical impact on students' numeracy literacy abilities.

Conclusion

Based on the results of this study, the ethnomathematics-based electronic module using the Auditory, Intellectual, and Repetition (AIR) model was proven to be highly valid according to field experts and media experts, received very positive student responses, and was proven effective in improving students' numeracy literacy. Therefore, this module is suitable for use as an innovative teaching material that integrates mathematics learning with local cultural contexts. However, this study has several limitations, including a limited sample size, reliance on the availability of digital devices, and limited coverage of the material within a specific cultural context. Consequently, further research is recommended to involve a more diverse sample, expand the cultural context and learning materials, and develop additional interactive features to optimize the use of the electronic module. These findings demonstrate the

importance of developing contextual, innovative, and culturally based digital teaching materials to improve numeracy literacy while supporting more meaningful mathematics learning.

Conflict of Interest

The researcher revealed that there was no conflict interest.

Authors' Contributions

The first author, I.F., was responsible for designing the research, developing the research instruments, conceptualizing the research ideas, collecting data, analyzing and processing the data, and presenting the research results and discussion. The second author, S.A., contributed to revising the manuscript and aligning the overall content of the study. The third author, N.R.D., participated in refining the study and discussion and approved the final version of the manuscript. The contribution percentages for conceptualization, preparation, and revision of this article are as follows: I.F.: 50%, S.A.: 25%, and N.R.D.: 25%.

Data Availability Statement

The authors declare that the data supporting the findings of this study will be made available by the corresponding author, I.F., upon reasonable request.

References

Herawati, N. S., & Muhtadi, A. (2020). Pengembangan Modul. *Jurnal At-Tadbir STAI Darul Kamal NW Kembang kerang*,*4*(1), 57–69. http://ejournal.kopertais4.or.id/sasambo/index.php/atTadbir

Hidayati, N. A., & Darmuki, A. (2021). Penerapan Model Auditory Intellectually Repetition (AIR) untuk Meningkatkan Kemampuan Berbicara Pada Mahasiswa. *Jurnal Educatio FKIP UNMA*, *7*(1), 252–259. https://doi.org/10.31949/educatio.v7i1.959

Info, A. (2020). *Development of edutainment-based explosion box*. *03*(March), 57–65. https://doi.org/10.24042/ijsme.v3i1.5866

Laili, I., Ganefri, & Usmeldi. (2019). Efektivitas pengembangan e-modul project based learning pada mata pelajaran instalasi motor listrik. *Jurnal Imiah Pendidikan dan Pembelajaran*, *3*(3), 306–315. https://ejournal.undiksha.ac.id/index.php/JIPP/article/download/21840/13513

Lisnani, L., Indra Putri, R. I., Zulkardi, Z., & Somakim, S. (2022). Studi Etnomatematika: Rumah Limas Di Museum Negeri Sumatera Selatan Balaputera Dewa. *Teorema: Teori dan Riset Matematika*, *7*(2), 351. https://doi.org/10.25157/teorema.v7i2.7585

Luthfiana, M., & Wahyuni, R. (2019). Penerapan Model Pembelajaran Auditory, Intellectually, Repetition (Air) terhadap Hasil Belajar Matematika Siswa. *Jurnal Pendidikan Matematika (JUDIKA EDUCATION)*, *2*(1), 50–57. https://doi.org/10.31539/judika.v2i1.701

Manurung, S. H. (2016). Upaya Meningkatkan Kreativitas Dan Hasil Belajar Siswa Dengan Menggunakan Model AIR (Auditory, Intellectually, Repetition) Pada Siswa Kelas VII MTs Negeri Rantauprapat. *Jurnal EduTech*, *2*(1), 97–107.

Nurdyansyah, H. (2018). *Pengembangan Modul Ajar Berbasis Kurikulum 2013*.

Patriana, W. D., Sutama, S., & Wulandari, M. D. (2021). Pembudayaan Literasi Numerasi untuk Asesmen Kompetensi Minimum dalam Kegiatan Kurikuler pada Sekolah Dasar Muhammadiyah. *Jurnal Basicedu*, *5*(5), 3413–3430. https://doi.org/10.31004/basicedu.v5i5.1302

Kognitif: Jurnal Riset HOTS Pendidikan Matematika
https://doi.org/10.51574/kognitif.v5i4.3913 Volume 5, No 4, October - December 2025, pp. 1693 – 1704

Pratama, R. A., & Yelken, T. Y. (2024). Effectiveness of ethnomathematics-based learning on students' mathematical literacy: a meta-analysis study. *Discover Education*, *3*(1). https://doi.org/10.1007/s44217-024-00309-1

Rahmawati, N. D., Zakaria, M. H., & Endahwuri, D. (2023). Analisis Kemampuan Literasi Numerasi Dalam Menyelesaikan Masalah Program Linear Ditinjau Dari Kepribadian Siswa. *JIPMat*, *8*(1), 113–123. https://doi.org/10.26877/jipmat.v8i1.15194

Reflina, R., & Rahma P, F. L. (2023). Analisis Kemampuan Literasi Numerasi Dalam Menyelesaikan Soal Programme for International Student Assessment (Pisa). *Jurnal Karya Pendidikan Matematika*, *10*(1), 11. https://doi.org/10.26714/jkpm.10.1.2023.11-20

Riset, J., & Pendidikan, H. (2025a). *Kognitif*. *5*(July), 994–1004. Riset, J., & Pendidikan, H. (2025b). *Kognitif*. *5*(August), 1121–1131.

Sma, T., & Smk, M. A. (2023). Symmetry: Pasundan Journal of Research in Mathematics Learning and Education. *Symmetry: Pasundan Journal of Research in Mathematics Learning and Education*, *8*(2), 216–225. https://doi.org/10.23969/symmetry.v8i2

Sulistiyowati, W. (2017). Buku Ajar Statistika Dasar. *Buku Ajar Statistika Dasar*, *14*(1), 15–31. https://doi.org/10.21070/2017/978-979-3401-73-7

Supriadi, Sani, A., & Setiawan, I. P. (2020). Integrasi Nilai Karakter dalam Pembelajaran Keterampilan Menulis Siswa. *YUME : Journal of Management*, *3*(3), 84–93. https://doi.org/10.2568/yum.v3i3.778

Syahid, L., Djabba, R., & Mukhlisa, N. (2021). Penerapan Model Pembelajaran Auditory Intellectually Repetition Untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar di Kabupaten Barru. *Pinisi Journal of Education*, *1*(2), 2189–2198.

Widodo, S., Ladyani, F., Asrianto, L. O., Rusdi, Khairunnisa, Lestari, S. M. P., Wijayanti, D. R., Devriany, A., Hidayat, A., Dalfian, Nurcahyati, S., Sjahriani, T., Armi, Widya, N., & Rogayah. (2023). Metodologi Penelitian. In *Cv Science Techno Direct*.

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