

***Trikaya Parisudha*-based learning management system development: Enhancing digital literacy and numeracy competencies**

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Abstract: This development research aimed to determine the validation level of the *Trikaya Parisudha*-based Learning Management System tool regarding digital literacy and numeracy literacy and to ascertain the practicality level of the Learning Management System tool simultaneously towards digital literacy and numeracy literacy among Primary School Education Study Program students. This research is categorized as R&D using the 4D model. The study data were collected using questionnaires. The questionnaire for validity assessment was delivered to the content and media experts. The questionnaire to evaluate the practicality of the Learning Management System was distributed to the students and lecturers of the Primary School Education Study Program at STAHN Mpu Kuturan Singaraja. Then, the data were analyzed quantitatively. This study found that the media, materials, and language of the *Trikaya Parisudha*-based Learning Management System developed were deemed valid by three experts. In terms of its practicality, this study confirmed that the *Trikaya Parisudha*-based Learning Management System media were categorized as very practical. Integrating the *Trikaya Parisudha* philosophy, which is deeply rooted in local cultural values, underscores the significance of embedding cultural context into educational resources, potentially improving students' engagement and producing a more comprehensive educational experience that aligns with students' backgrounds.

Keywords: *Digital literacy, Learning management system, Numeracy literacy, Trikaya Parisudha.*

1. Introduction

Digital literacy has created new social communication and interaction spaces that can occur anytime and anywhere [1]–[4]. The education sector is not exempt from various digital adoptions related to literacy responsibilities used as educational performance standards, mainly through e-learning content. The advancement of digitalization has both positive and negative impacts on elementary school students' Mental Health Literacy [5]–[10]. The positive impact includes easier access to necessary information and improved conversation flow. However, the negative impacts, such as aggression, selfishness, apathy, and offensive language, are equally significant.

The influx of foreign cultures into Indonesia, particularly among students, has led to both positive and negative effects, such as increased fanaticism and decreased tolerance, apathy, selfishness, and other ideologies. For the religious community in Bali, the *Tri Kaya Parisudha* philosophy serves as a primary life guide [11]–[13]. In Hinduism, the *Tri Kaya Parisudha* concept represents three sacred actions: *manacika* means to think well; *Wacika* means to speak well; and *kayika* means to act well. According to *Tri Kaya Parisudha*'s teachings, numeracy literacy is crucial in uniting the community and fostering peace and harmony, especially within religious educational institutions. STAHN Mpu Kuturan Singaraja, a Hindu religious college, must maintain harmony and moderation through quality integrated learning services.

Suardipa [14], who conducted the implementation of online learning at STAHN Mpu Kuturan, found that the online learning implemented by lecturers varied greatly, leading to complaints from

students about difficulties focusing due to the diverse platforms, some of which were paid. Observations in November 2022 indicated that the lack of a Learning Management System (LMS) on campus, relying only on Zoom Meet links, contributed to these issues. The campus has adequate digital facilities (LCDs, laptops, computer labs) and good internet bandwidth (300 Mbps). Further preliminary research by Suardipa [14] revealed that 71.4% of students were motivated to participate in online learning, with a 60.9% interaction rate between lecturers and students, indicating that while interaction was decent during the pandemic, it still needed improvement. Integrating the *Tri Kaya Parisudha* philosophy into the institution's vision and mission remains suboptimal, particularly in Numeracy Literacy. Considering the limited classroom space, there is an urgent need for an LMS, as identified from field observations with program heads who struggle to schedule room usage due to continued online classes.

An initial needs analysis in February 2023 involving four mathematics lecturers and twelve students who had taken elementary school mathematics revealed the following: 1) 75% of respondents experienced difficulties teaching elementary mathematics due to reduced face-to-face meetings, limited digital teaching media, and inadequate institutional LMS facilities; 2) Both lecturers and students used blended and hybrid learning modes, facing challenges with diverse applications like Google Classroom, Quizizz, Zoho, Zoom, Google Meet, etc., lacking a unified platform; 3) 83.3% of students had difficulty understanding numeracy competencies (numbers, algebra, geometry, measurement, data presentation); 4) Most lecturers and 58.3% of students had heard of and used an LMS, but not one based on local concepts to support numeracy literacy; 5) There was interest in developing and implementing an LMS based on local concepts like *Tri Kaya Parisudha* to enhance numeracy and digital literacy.

This study highlights the necessity of developing an LMS for digital and numeracy literacy enhancement at the elementary education program at STAHN Mpu Kuturan Singaraja due to: 1) the lack of an appropriate LMS, 2) no agreement on e-learning content for teaching administration, leading to reliance on various free applications, 3) poorly compiled student-created teaching media, 4) suboptimal digital learning development, 5) the perception of mathematics as complex, and 6) a need for improved literacy, innovation, and creativity.

Considering these issues, developing an LMS for digital and numeracy literacy in classrooms is crucial. The LMS can serve as a platform for lecturers and students to share materials and assignments and create virtual classes through video conferencing, enhancing the understanding of abstract mathematical concepts with concrete digital content. This is particularly important for STAHN Mpu Kuturan Singaraja, where classroom construction is ongoing. Addressing these urgent needs, the research aims to develop a *Tri Kaya Parisudha*-based LMS for digital and numeracy literacy among elementary education students. The research objectives are: 1) to describe and analyze the development of a *Tri Kaya Parisudha*-based LMS for digital and numeracy literacy, 2) to determine the validity of the LMS, and 3) to assess the practicality of the LMS for digital and numeracy literacy.

2. Method

This research followed the 4D model (four-D model) proposed by Thiagarajan (1974), which consists of four stages: Define, Design, Develop, and Disseminate.

Table 1.
Distribution of research subjects.

No	Evaluation Step	Subject	Number
1	The <i>Tri Kaya Parisudha</i> -based learning management system validity	Content expert, language expert, and media expert	9
2	The <i>Tri Kaya Parisudha</i> -based learning management system practicality	Students of primary school education study program	6
		Lecturers of primary school Education study program	2

The Likert scale measures variables, which are broken down into indicators. These indicators form the basis for creating instrument items, which can be statements or questions. Responses to each item

on the Likert scale range from very positive to very negative, as follows: very good (score 5), good (score 4), fair (score 3), poor (score 2), and very poor (score 1).

Validity testing for the instrument content is conducted using Aiken's validity theory (Aiken's V). Aiken's formula calculates the content-validity coefficient based on an expert panel's evaluation of how well each item represents the measured construct [3], [15].

Practicality is a criterion for standard tests [2], [6], [16], [17]. Data on the practicality of the *Tri Kaya Parisudha*-based Learning Management System development were collected using a questionnaire. This questionnaire was administered to 6 students and two lecturers for evaluation. Minimum and maximum scores for each variable were determined based on the number of items and the range of gradation choices available in each questionnaire. Responses from lecturers and students were scored for each item as "Relevant" (1) or "Not relevant" (0). These raw scores were then converted to a scale of 100. The data quality for each variable was described based on these conversion results. The conversion guidelines in this study use Criterion-Referenced Assessment (CRA), as shown below.

The formula for assigning practicality values is as follows:

$$\text{Practicality} = \frac{\text{Received score}}{\text{Total Score}} \times 100\%$$

Hidayat (2017)

The operational definitions of research variables are descriptions of the variables used in this research based on their indicators, including:

- a) *Tri Kaya Parisudha*-based LMS, as referred to in this research, is a digital web-based software application designed to create, distribute, and manage learning content delivery. This system can help lecturers plan and create learning materials, manage students' learning activities, handle grading, compile student attendance, display transcripts, and manage the e-learning interface. The *Tri Kaya Parisudha* basis is used as the foundation for mapping the learning process flow by adopting the *Tri Kaya Parisudha* components (Kayika Option is performed for experimental/observation activities, writing experiment results, and answering questions on the experiment sheet; *Wacika* Option is conducted with presentations, discussions with the instructor as the moderator; whereas *Manacika* is done with reflection, asking questions, and receiving feedback from the lecturer).
- b) Numerical Literacy in this research refers to the concept of mastering the competencies of Numerical Literacy indicators, which are: 1) Estimating and calculating with whole numbers, using fractions, decimals, percentages, and ratios included in number material; 2) Recognizing and using patterns and relationships included in algebra material; 3) Using spatial reasoning and measurements included in geometry and measurement material; 4) Interpreting statistical information included in data processing material.
- c) Digital Literacy dimensions include: 1. Functional Skill Beyond; 2. Creativity; 3. Collaboration; 4. Communication; 5. Ability to Find and Select Information; 6. Critical Thinking and Evaluation; 7. Cultural and Social Understanding; 8. E-Safety [18].

3. Findings and Discussion

This developmental research uses a development model as the basis for product development. The model to be developed refers to the 4D model by Thiagarajan (1974). Based on the product development framework, the *Tri Kaya Parisudha*-based Learning Management System is expected to provide an active, integrative, and holistic learning experience to achieve learning objectives. The presentation of the *Tri Kaya Parisudha*-based Learning Management System theoretically can enhance students' digital skills and understanding of numerical concepts and their problem-solving application. This correlation underpins the idea that applying the *Tri Kaya Parisudha*-based Learning Management System can build students' digital and numeracy literacy skills.

The research "Development of the *Tri Kaya Parisudha*-based Learning Management System for Digital Literacy and Numeracy Literacy among PGSD STAHN Mpu Kuturan Students" employs the Research and Development (R&D) research design. R&D is an industry-based development model where research findings are used to design new products and procedures, which are then systematically tested, evaluated, and refined until they meet specific criteria of effectiveness and quality [19]. Developmental research produces a specific product and tests its effectiveness [20].

This research uses the 4D R&D research design (define, design, development, and dissemination) [21] with the following stages:

- 1) **Define:** Gathering necessary information (needs assessment) to draft or initially develop the *Tri Kaya Parisudha*-based Learning Management System for Digital Literacy and Numeracy Literacy through literature review and field/empirical studies.
- 2) **Design:** Drafting or initially developing the *Tri Kaya Parisudha*-based Learning Management System for Digital Literacy and Numeracy Literacy for PGSD STAHN Mpu Kuturan students.
- 3) **Development:** Validating and developing the *Tri Kaya Parisudha*-based Learning Management System for Digital Literacy and Numeracy Literacy for PGSD STAHN Mpu Kuturan students, resulting in a valid and reliable product ready for curriculum evaluation. After the product is completed, three experts—media experts, content experts, and language experts—validate it to ensure it is feasible and practical. A limited-scope practicality test follows this.
- 4) **Dissemination:** Spreading the product without the researcher's presence.

The discovery and identification of problems are the first and most essential steps in a research process [2], [6], [16], [22]. Researchers used the 4D development model (four D model) in this research and development. The steps in the 4D development model are Define, Design, Develop, and Disseminate [21].

The first stage that researchers carried out in this research was the define stage, namely the stage of searching for and collecting problems for which solutions would be sought. The researchers collected this problem by conducting pre-research, interviews, and giving pre-research questionnaires to PGSD STAHN Mpu Kuturan Singaraja students in 2023. This aims to collect initial data as consideration and reference in further product development. This stage is critical because it determines the shape, quality, and results of the product being developed.

Interviews were conducted with PGDH lecturers who teach elementary mathematics. Interviews are unstructured but still use question guidelines so as not to stray from the topic of discussion. The results of the interviews provide information that there are still students who experience difficulties, according to the lecturers' views. Apart from teaching obstacles, researchers also asked about the electronic learning media used by lecturers when teaching, and both had the same answer: the electronic media that was often used was still limited to PowerPoint slides. Researchers also asked about the efforts of lecturers on campus to create and develop electronic learning media. The interviewees also had the same answer: they had never made anything besides PowerPoint slides. Based on this information, researchers gained motivation to continue the research to the final stage and create interactive mathematics learning media using the *Trikaya Parisudha*-based Learning Management System (LMS), with the subject matter being numeracy.

Apart from interviews, researchers collected information using pre-research questionnaire instruments at the define stage. Based on the results of the questionnaire analysis, most students gave positive responses regarding the development of this learning media. Data obtained from the questionnaire provides information about students' learning difficulties, whether they want to learn using the *Trikaya Parisudha*-based Learning Management System (LMS) learning media, and information about smartphone users.

After the define stage, the next stage is the design stage, the design or planning stage is the stage where all its components are designed for the product. At this stage, we discuss more detailed technical matters about the product that will be developed, from the main material, product design, material composition, validation instruments, manufacturing planning stages, product testing stages, and stages of how to mass distribute the finished product later. This stage also plays an important role in the success of the product that the researcher develops because it is at this stage that all plans and concepts

are created. This concept starts from the material and manufacturing process to the distribution of the final product. Apart from the concept, at this stage, solutions are also formulated for various risks that may occur during the product manufacturing process from start to finish. These risks include damaged products and errors, manufacturing failures due to unforeseen events, and time management so that all research runs smoothly, smooth and successful.

The third stage, carried out after the design/planning stage, is the development/development stage. This stage is critical because all manufacturing, validation, and testing processes are carried out at this stage. Development is the process of making plans created at the design stage become a reality. This stage is also the longest in the research process. The first job in this process is to create products using a Learning Management System (LMS) based on *Trikaya Parisudha*. The reasons and considerations for researchers using this software are because the final product used is more effective and exciting.

The *Trikaya Parisudha*-based Learning Management System (LMS) learning media that is ready and completed is then validated and evaluated by experts to obtain suggestions and input for improvements being developed. The selection of validators is determined based on expertise in the field relevant to the module being developed. Namely, there are 3 lecturers each for media practitioners, material experts, and language experts. Experts conduct trials and review learning media, then fill out a validation questionnaire to assess the level of suitability of the module, which can then be tested on students in the field. Improvements are made several times and adjusted to suit needs until the validator indeed declares the learning media suitable.

The assessment carried out by material experts covers several aspects, namely the presentation of material, content, and language. Improvements given by the validator generally include images of material and questions that must be corrected, font size must be consistent, including examples of geometric shapes in everyday life, pictures of geometric elements must be more precise, sample questions are increased, and the editing of essay and multiple-choice questions is corrected. Material improvements are carried out twice per validator. After correcting notes from the validator, the final results will be declared with the criteria "valid" so that the learning media developed is suitable for use in the teaching and learning process in the classroom.

Based on the results of validation by material experts, it was obtained that the material expert validator's assessment of the 11 item items contained ten items that had a validity interpretation of "high" and 1 item had a validity interpretation of "quite high" with an average score of 0.87 in the High category, meaning according to the assessment of the learning media material expert *Trikaya Parisudha* based Learning Management System is suitable for use in terms of material. However, during the assessment stage, there were several notes from experts as suggestions for improvement, and the researchers revised them, including inputting images that are adapted to everyday life; and) improving the editing of multiple-choice questions so that the meaning of the questions is more precise.

Based on the results of validation by material experts, the material expert validator's assessment of the 10 item items was obtained; there were seven items with a validity interpretation of "high," and 3 item items received a Validity Interpretation of "quite high" with an average of 0.83. The validation interpretation was categorized as high, which was appropriate to the learning objective. The *Trikaya Parisudha*-based Learning Management System is suitable for use in terms of media. However, during the assessment stage, there were several notes from experts as suggestions for improvement, and the researchers have revised them, including 1) The *Trikaya Parisudha*-based LMS is good, and it is hoped that all options/button options will be active when clicked;

Based on the results of validation by Pata language experts, the material expert validator's assessment of the 11 item items was obtained; there were 9 items that had a validity interpretation of "high," and 2 item items had a validity interpretation of "fairly high" with an average of 0.83. The validation interpretation was categorized as high, meaning that it said assessment of language expert validators, the *Trikaya Parisudha*-based Learning Management System learning media is suitable for use from a linguistic perspective. However, during the assessment stage, there were several notes from experts as suggestions for improvement, and the researcher revised these. The description of the improvements provided by the expert team includes: (1) The *Trikaya Parisudha*-based LMS has been

designed to suit student characteristics, and it is best that the language level used is also adjusted; (2) please fill in a brief explanation of the new terms.

Media expert assessments include aspects of the appearance of learning media and ease of use (Lo, K., Gupta, 2018; Moll, S. E., 2018; Reis, A.C., 2022; Sarit Barzilai, (2020). Improvements provided by validators are existing images in the lecturer's reading room must be deleted, the images in the material must be corrected because there are many pictures that are wrong, the question images must be corrected, create examples of student users and create examples of lecturer users and add internet links to search for material [23]–[25]. The aim of the validator's comments is to make the learning media images look more attractive and interactive "so that the learning media developed by researchers has met the appropriate criteria so that it can be used in classroom teaching and learning activities.

Once the learning media is declared valid, it means that the learning media is suitable for testing students in the learning process. This stage is included in the product testing stage. Based on the results of research on the practicality test, it was found that the response of lecturers who taught elementary mathematics and students who used the *Trikaya Parisudha*-based Learning Management System was 94.71%, so the media was declared very practical in learning elementary mathematics.

The effectiveness of the Moodle Learning Management System (LMS) learning media is categorized as high. This happens because of the learning management system's characteristics, namely using self-service and self-guided services to collect and deliver learning content quickly. consolidate training initiatives on a scalable web-based platform supporting portability and standards. Apart from that, other LMS functions are useful for helping lecturers determine the collection of assignments and student learning outcomes.

It becomes easier for lecturers to communicate, discuss, and provide direction to students regarding learning references, thereby creating effective and efficient teaching and learning activities. Apart from lecturers, students also benefit from the learning management system. Students can easily search for learning material references, communicate with friends online, and complete lecturer assignments.

4. Conclusion

The *Trikaya Parisudha*-based Learning Management System (LMS) was effectively developed through definition, design, development, and dissemination stages. Three experts validated the system's media, content, and language, confirming its validity. Additionally, testing by elementary school mathematics instructors and student representatives indicated a high practicality score of 94.71%. Despite these positive results, the study's limitations include a small sample size and a focus on a specific educational context. Future research should explore the LMS's effectiveness in diverse educational settings and with a larger group of participants to enhance the generalizability of the findings.

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References

- [1] K. Y. Jin, F. Reichert, L. P. Cagansan Jr., J. Torre, and N. Law, "Measuring digital literacy across three age cohorts: Exploring test dimensionality and performance differences," *Comput. Educ.*, vol. 157, p. 103968, 2020, doi: 10.1016/j.compedu.2020.103968.
- [2] Y. Eshet-Alkalai, "Digital literacy: A conceptual framework for survival skills in the digital era," *J. Educudaction, Multimedia, Hypermedia*, vol. 13, pp. 93–106, 2019, doi: 10.1016/j.compedu.2020.103980.
- [3] A. W. Lazonder, A. Walraven, H. Gijlers, and N. Janssen, "Longitudinal assessment of digital literacy in children: Findings from a large Dutch single-school study," *Comput. Educ.*, vol. 143, p. 103681, 2020, doi: <https://doi.org/10.1016/j.compedu.2019.103681>.
- [4] S. Barzilai, S. Mor-Hagani, A. R. Zohar, T. Shlomi-Elouz, and R. Ben-Yishai, "Making sources visible: Promoting multiple document literacy with digital epistemic scaffolds," *J. Comput. Educ.*, vol. 157, pp. 1–17, 2020, doi: 10.1016/j.compedu.2020.103980.
- [5] A. C. Reis, R. Saheb, and T. Moyo, "The impact of mental health literacy training programs on the mental health literacy of university students: A systematic review," *Prev Sci*, vol. 23, pp. 648–662, 2022, doi: 10.1007/s11121-021-01283-y.
- [6] S. Hunt, Y. Wei, and S. Kutcher, "Addressing Mental Health Literacy in a UK University campus population:

- Positive replication of a Canadian Intervention," *Health Educ. J.*, vol. 78, no. 5, pp. 537–544, 2019.
- [7] Y. Wei, W. Carr, R. Alaffe, and S. Kutcher, "Mental Health Literacy Development: Application of Online and In-Person Professional Development for Preservice Teachers to Address Knowledge, Stigma, and Help-Seeking Intentions," *Artic. Can. J. Behav. Sci.*, vol. 52, no. 2, pp. 107–114, 2020, doi: 10.1037/cbs0000164.
- [8] P. Patalay *et al.*, "A pre-post evaluation of OpenMinds: A sustainable, peer-led mental health literacy programme in universities and secondary schools," *Prev. Sci.*, vol. 18, no. 8, pp. 995–1005, 2017.
- [9] S. E. Moll, S. Patten, H. Stuart, J. C. MacDermid, and B. Kirsh, "Beyond silence: A randomised, parallel-group trial exploring the impact of workplace mental health literacy training with healthcare employees," *Can. J. Psychiatry*, vol. 63, pp. 826–833, 2018.
- [10] K. Lo, T. Gupta, and J. L. Keating, "Interventions to promote mental health literacy in university students and their clinical educators. A systematic review of randomised control trials," *Heal. Prof. Educ.*, vol. 4, pp. 161–175, 2018.
- [11] I. G. Astawan, I. G. P. Suryadarma, Sujarwo, D. Dike, and I. Stevanus, "Tri kaya parisudha learning model and its effect on critical thinking skill," *Eur. J. Mol. Clin. Med.*, vol. 7, no. 6, pp. 579–592, 2020.
- [12] N. K. A. Pradnyanita, "Pendidikan andragogi dalam membentuk anak suputra melalui ajaran tri kaya parisudha," *JAPAM (Jurnal Pendidik. Agama)*, vol. 2, no. 02, pp. 132–137, 2022.
- [13] I. G. Astawan, L. P. Tirtayani, N. W. Mahayanti, K. E. K. Adnyani, K. R. Arthana, and D. Dike, "Tri kaya parisudha learning model and its effect on critical thinking skill," *Eur. J. Mol. Clin. Med.*, vol. 7, no. 6, pp. 579–592, 2020.
- [14] I. P. Suardipa, I. M. Sedana, and I. K. Widiara, "Pembuatan Perangkat Pembelajaran Berbasis LMS (Penyusunan Perangkat, Media Pembelajaran dan Asessment Berbasis Digital System) Pada Dosen SD Kecamatan Banjar Kabupaten Buleleng," *Caraka J. Pengabd. Kpd. Masy.*, vol. 1, no. 2, pp. 135–144, 2023.
- [15] J. W. Creswell, *Research design: Qualitative, quantitative, and mixed methods approaches*, vol. 4. London: Sage publications, 2014.
- [16] N. Dantes and L. Handayani, *Peningkatan Literasi Sekolah dan Literasi Numerasi Melalui Model Blanded Learning Pada Siswa Kelas V SD Kota Singaraja. Laporan Penelitian*. Singaraja: Universitas Pendidikan Ganesha, 2021.
- [17] E. Nurul, "Pengembangan Learning Management System (LMS) dengan Desain Pedati pada Pembelajaran Bahasa Indonesia di Program Studi Pendidikan Sekolah Dasar," vol. 13, no. 2, 2021.
- [18] C. Hague and S. Payton, "Digital literacy across the curriculum: A future lab handbook." 2010, [Online]. Available: <https://www.nfer.ac.uk/publications/futl06/futl06.pdf>.
- [19] N. Putra and N. Dwilestari, *Penelitian kualitatif PAUD pendidikan anak usia dini*. Jakarta: Raja Grafindo Persada, 2012.
- [20] Sugiyono, *Metode penelitian Kualitatif Kuantitatif dan R&D*. Bandung: Alfabet Bandung, 2018.
- [21] S. Thiagarajan, D. S. Semmel, and M. I. Semmel, *Instructional development for training teachers of exceptional children*. Bloomington: Indiana University, 1974.
- [22] E. N. Mualimah, U. Usmaedi, A. S. Pamungkas, P. Siswanto, and E. Solihatulmilah, "Pengembangan Learning Management System (LMS) dengan Desain Pedati pada Pembelajaran Bahasa Indonesia di Program Studi Pendidikan Sekolah Dasar," *Prim. J. Keilmuan dan Kependidikan Dasar*, vol. 13, no. 2, pp. 105–118, Dec. 2021, doi: 10.32678/primary.v13i2.5190.
- [23] N. P. A. T. Utami, "Penerapan Model Pembelajaran Ctl (Contextual Teaching And Learning) Berbantuan Konsep Tri Kaya Parisudha Untuk Meningkatkan Aktivitas Dan Prestasi Belajar Pendidikan Agama Hindu Dan Budi Pekerti," *J. Widya Sastra Pendidik. Agama Hindu*, vol. 5, no. 2, pp. 39–47, 2022.
- [24] G. P. Yustika and S. Iswati, "Digital Literacy in Formal Online Education: A Short Review," *Din. Pendidik*, vol. 15, pp. 66–76, 2020.
- [25] M. M. Zagoto and O. Dakhi, "Pengembangan Perangkat Pembelajaran Matematika Peminatan Berbasis Pendekatan Saintifik Untuk Siswa Kelas XI Sekolah Menengah Atas," *J. Rev. Pendidik. dan Pengajaran*, vol. 1, no. 1, pp. 157–170, 2018.