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The Utilization Of Tablets And Audio-Visual Media Based On Universal Design For Learning (UDL) To Improve Learning Participation Of 2nd Grade Students In Inclusive Elementary Schools

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Abstract

This study aimed to analyze the effect of tablet utilization (X1) and audio-visual media use (X2) based on Universal Design for Learning (UDL) on the learning participation of 2nd grade students at SDN 016 Muara Wahau, East Kutai Regency. The research employed a quantitative correlational ex post facto approach with saturated sampling of all 2nd grade students (n=25). Data were collected using Likert-scale questionnaires (X1 and X2, 16 items each) and an observation sheet (Y, 16 items). Analysis included Pearson correlation, multiple linear regression, partial t-test, and simultaneous F-test. Results showed: (1) a positive and significant effect of tablet utilization on learning participation (r=0.821; t=9.485; sig.=0.000); (2) a positive and significant effect of audio-visual media on learning participation (r=0.706; t=7.136; sig.=0.000); and (3) both variables simultaneously had a significant effect on learning participation (F=100.621; sig.=0.000) with R Square=0.901. Tablet utilization contributed more (Beta=0.667) than audio-visual media (Beta=0.502). Integration of UDL-based tablets and audio-visual media is an effective strategy to improve student learning participation in inclusive elementary schools, particularly in remote 3T regions of Indonesia.

Keywords: audio-visual media, inclusive elementary school, learning participation, tablet, Universal Design for Learning (UDL)

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INTRODUCTION

Inclusive education is a fundamental approach in the modern education system that provides the widest possible opportunity for all students, including children with special needs, to learn together in a regular school environment. UNESCO (2009) asserts that inclusion is not merely placing students with special needs in regular classrooms, but rather creating an educational system that actively responds to the diversity of needs of all students. In Indonesia, the inclusive education policy is strengthened through the Minister of National Education Regulation Number 70 of 2009, which requires every educational unit to provide inclusive education services for children with special needs.

One of the biggest challenges in inclusive classrooms is the low learning participation of students, particularly in early grades. Wang, Fredricks, Ye, Hofkens, and Linn (2016) assert that quality learning participation consists of three dimensions: behavioral engagement, emotional engagement, and cognitive engagement.Without adequate participation, the teaching and learning process simply becomes a mechanical routine without real impact on student development (Hamalik, 2011).

The actual condition at SDN 016 Muara Wahau, East Kutai Regency, shows a concerning picture. Based on preliminary observations during January–February 2026, the majority of 2nd grade students exhibit symptoms of low learning participation: lack of focus when the teacher explains, not asking questions, not answering the teacher's questions, and not being actively involved in group discussions. Out of 30 observed students, no more than 5 students actively asked or responded to the teacher's questions in a single learning session.Learning strategies are still dominated by the conventional lecture method, which runs one-way from the teacher to the students.

The development of digital technology opens new opportunities for the world of education. The proposed solution is the utilization of tablets as access devices, audio-visual media as learning content, and Universal Design for Learning (UDL) as an integrated pedagogical framework. Tablets have been proven to be capable of increasing attention and learning motivation because they offer an interactive and multimodal learning experience (Dell, Newton, & Petroff, 2016). Mayer (2021), through the Cognitive Theory of Multimedia Learning, explains that visual and auditory channels can be optimized simultaneously through audio-visual media.

UDL is a neuroscience-based framework developed by CAST (2018) with three main principles: (1) Multiple Means of Representation, (2) Multiple Means of Action and Expression, and (3) Multiple Means of Engagement. Ok, Rao, Bryant, and McDougall (2017), through a

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systematic review of 18 studies, concluded that the consistent application of UDL principles improves the participation and learning outcomes of students with diverse needs. This study aims to analyze the effect of utilizing tablets and audio-visual media based on UDL on the learning participation of 2nd grade students in inclusive elementary schools in the 3T regions of Indonesia.

RESEARCH METHODOLOGY

This research employs a quantitative approach with a correlational ex post facto research type.The research was conducted at SDN 016 Muara Wahau, Muara Wahau District, East Kutai Regency, East Kalimantan Province, during the March–June 2026 period. The site selection was based on the consideration that SDN 016 Muara Wahau is an inclusive elementary school located in a 3T region, already has access to tablet devices, and the researcher is a 2nd grade teacher at the school.

The population as well as the research sample is all 2nd grade students, totaling 25 individuals, using a saturated sampling (census) technique. This is because the population size is relatively small and does not exceed the limit of 100 respondents (Arikunto, 2012). All students consist of regular students and students with special needs who learn together in one inclusive classroom.

The research variables consist of two independent variables and one dependent variable. The first independent variable (X1) is the utilization of UDL-based tablets, measured through a 16-item 1–5 Likert scale questionnaire with indicators: content interactivity, use of educational applications, operational ease, and frequency of use. The second independent variable (X2) is the use of UDL-based audio-visual media, measured through a 16-item 1–5 Likert scale questionnaire with indicators: visual quality, audio quality, content relevance, and presentation variety. The dependent variable (Y) is student learning participation, measured through a 16-item 0–4 scale observation sheet with indicators: attention, active engagement, and learning response.

All instruments have been validated by an expert (Dr. Shely Cathrin, S.Fil., M.Phil.) and tested for reliability using the Cronbach Alpha coefficient. Data analysis techniques include: descriptive statistics, Shapiro-Wilk normality test, linearity test, Pearson Product Moment correlation test, multiple linear regression analysis, partial t-test, and simultaneous F-test using the SPSS Version 20 program.

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RESEARCH RESULTS

The descriptive analysis results show that tablet utilization (X1) obtained a maximum score of 67, a minimum of 30, a mean of 49.12, and a standard deviation of 10.791. The majority of students are in the high (40.0%) and very high (36.0%) categories. The use of audio-visual media (X2) obtained a maximum score of 70, a minimum of 31, a mean of 53.16, and a standard deviation of 11.473, with the majority (56.0%) in the very high category. Student learning participation (Y) obtained a maximum score of 54, a minimum of 10, a mean of 32.64, and a standard deviation of 12.172. The majority of students are in the high category (36.0%), but there are still 20% of students with low participation.

Table 1. Statistical Description of Research Variables

Variable	Min	Max	Mean	SD
X1 (Tablet)	30	67	49,12	10,791
X2 (Audio-Visual)	31	70	53,16	11,473
Y (Study Participation)	10	54	32,64	12,172

The analysis prerequisite test shows that the data of the three variables are normally distributed based on the Shapiro-Wilk test (X1: W=0.958; sig.=0.368; X2: W=0.963; sig.=0.451; Y: W=0.971; sig.=0.614), with all significance values above 0.05. The linearity test indicates that the relationship between Y and X1 (sig. Deviation from Linearity=0.412) and between Y and X2 (sig.=0.387) is linear. Thus, the assumptions of normality and linearity are met so that parametric statistical analysis can proceed.

Table 2. Results of Pearson Correlation and Multiple Linear Regression

Variable	r	Beta	t count	Sig.
X1 (Tablet) → Y	0,821	0,667	9,485	0,000
X2 (Audio-Visual) → Y	0,706	0,502	7,136	0,000
Uji F Simultan (X1+X2 → Y)	0,949	R^2=0,901	F=100,621	0,000

The result of the first hypothesis test (H1) shows that there is a positive and significant effect of utilizing UDL-based tablets on student learning participation (r=0.821; t=9.485 > t table 2.069; sig.=0.000). The correlation value of 0.821 indicates a very strong relationship between the two variables. This finding is in line with the research of Hidayat (2020), which found that the use

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of tablet applications significantly improved the communication and engagement of students with special needs. Touchscreen-operated tablets provide an interactive and multimodal learning experience according to the principles of Multiple Means of Representation and Engagement in UDL (CAST, 2018), which is proven to be able to increase students' attention, active engagement, and learning response.

The result of the second hypothesis test (H2) shows that there is a positive and significant effect of using UDL-based audio-visual media on learning participation (r=0.706; t=7.136 > t table 2.069; sig.=0.000). The correlation value of 0.706 falls into the strong category. This aligns with Mayer (2021), who states that humans possess two information processing channels that can be optimized simultaneously through audio-visual media. Suwahyo, Setyosari, and Praherdhiono (2022) also proved that UDL-based audio-visual media increases learning access for students with special needs inclusively. The combination of visual and auditory elements creates a more concrete and engaging learning experience, thus motivating students to participate more actively.

The result of the third hypothesis test (H3) shows that there is a positive and significant simultaneous effect of utilizing UDL-based tablets and audio-visual media on learning participation (F=100.621 > F table 3.44; sig.=0.000). The R Square value of 0.901 indicates that the two variables jointly explain 90.1% of the variance in student learning participation, while the remaining 9.9% is explained by other factors. The obtained regression equation is Y = -21.026 + 0.783X1 + 0.517X2. Based on the Beta values, tablet utilization (Beta=0.667) provides a relatively larger contribution compared to audio-visual media (Beta=0.502), indicating that the interactivity and autonomy aspects offered by tablets have a more dominant role in improving learning participation in inclusive classrooms.

This research finding reinforces the study results by Ok et al. (2017), which concluded that the consistent application of UDL principles increases the participation of students with diverse needs. The integration of tablets and audio-visual media designed based on UDL principles is capable of shifting classroom dynamics from originally passive and one-way to active, interactive, and student-centered. This is highly relevant in the context of SDN 016 Muara Wahau as a school in a 3T region that has a fairly high diversity of learning needs, where conventional approaches are no longer adequate in supporting the learning development of all students.

CONCLUSION

This study concludes that: (1) there is a positive and significant effect of utilizing UDL-based tablets on the learning participation of 2nd grade students at SDN 016 Muara Wahau (r=0.821;

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t=9.485; sig.=0.000); (2) there is a positive and significant effect of using UDL-based audio-visual media on student learning participation (r=0.706; t=7.136; sig.=0.000); and (3) simultaneously, the utilization of UDL-based tablets and audio-visual media has a positive and significant effect on student learning participation (F=100.621; sig.=0.000; R Square=0.901). Tablets provide a relatively larger contribution (Beta=0.667) compared to audio-visual media (Beta=0.502). The integration of both UDL-based media is an effective learning strategy and is recommended to be implemented in inclusive elementary schools, particularly in the 3T regions of Indonesia.

REFERENCES

Arikunto, S. (2012). *Prosedur penelitian: Suatu pendekatan praktik* (Edisi revisi). Rineka Cipta.

CAST. (2018). *Universal design for learning guidelines version 2.2.* Retrieved from http://udlguidelines.cast.org

Dell, A. G., Newton, D. A., & Petroff, J. G. (2016). *Assistive technology in the classroom: Enhancing the school experiences of students with disabilities* (3rd ed.). Pearson.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109. https://doi.org/10.3102/00346543074001059

Hamalik, O. (2011). *Proses belajar mengajar.* Bumi Aksara.

Hidayat, R. (2020). Penggunaan aplikasi tablet untuk meningkatkan komunikasi dan keterlibatan siswa berkebutuhan khusus. *Jurnal Pendidikan Luar Biasa, 16*(1), 1–12.

Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press.

Ok, M. W., Rao, K., Bryant, B. R., & McDougall, D. (2017). Universal design for learning in pre-K to grade 12 classrooms: A systematic review of research. *Exceptionality, 25*(2), 116–138.

Pekrun, R. (2018). Control-value theory: A social-cognitive approach to achievement emotions. In A. J. Elliot (Ed.), *Advances in motivation science* (Vol. 5, pp. 153–191). Elsevier Academic Press.

Peraturan Menteri Pendidikan Nasional Nomor 70 Tahun 2009 tentang Pendidikan Inklusif bagi Peserta Didik yang Memiliki Kelainan dan Memiliki Potensi Kecerdasan dan/atau Bakat Istimewa.

Sugiyono. (2020). *Metode penelitian kuantitatif, kualitatif, dan R&D* (Edisi 2). Alfabeta.

Suwahyo, A., Setyosari, P., & Praherdhiono, H. (2022). Media audio-visual berbasis UDL untuk meningkatkan akses belajar siswa berkebutuhan khusus secara inklusif. *Jurnal Kajian Teknologi Pendidikan, 5*(1), 78–90.

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UNESCO. (2009). *Policy guidelines on inclusion in education.* UNESCO Publishing.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Wang, M. T., Fredricks, J. A., Ye, F., Hofkens, T. L., & Linn, J. S. (2016). The math and science engagement scales: Scale development, validation, and psychometric properties. *Learning and Instruction, 43,* 16–26. https://doi.org/10.1016/j.learninstruc.2016.01.008

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