

Implementation of Digital Learning Media at a Muhammadiyah Boarding School Junior High School: Supporting and Inhibiting Factors

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Abstract: Boarding schools organise learning across a full twenty-four-hour cycle, which gives the implementation of digital learning media a dynamic distinct from that of regular schools, yet empirical study of such settings remains scarce in Indonesia. This study aimed to analyse the forms taken by the implementation of digital learning media, together with its supporting and inhibiting factors, at Muhammadiyah Boarding School Junior High School (SMP MBS) North Bengkulu. A qualitative approach with a descriptive design was used. Informants comprised one principal, thirteen teachers, and eight ninth-grade students. Data were collected through in-depth interviews, classroom observation, and teacher and student response questionnaires used complementarily, with instruments validated by an educational assessment expert and a language expert at a mean of 82.31% in the valid category. Analysis proceeded through data reduction, data display, and conclusion drawing, reinforced by source and technique triangulation. Implementation was found to be running well, with student responses at 81.71% (very good) and teacher responses at 80.41% (good). Dominant media were laptops and projectors (100%), Canva (88.89%), PowerPoint (66.67%), and YouTube (55.56%), while interactive platforms such as Kahoot! were used by only 22.22% of teachers. Use remains at the substitution level and uneven between teachers, with 55.56% using digital media fortnightly to monthly. The central finding is a gap between the availability of facilities and the regularity of their use, and between high student motivation and low active participation (71.43%). Optimisation therefore requires strengthened governance, teacher digital competence, and participatory activity design rather than additional infrastructure.

Keywords: Digital learning media; boarding school; supporting and inhibiting factors; technology integration

Abstrak:

Sekolah berasrama menyelenggarakan pembelajaran selama siklus dua puluh empat jam penuh, yang memberikan implementasi media pembelajaran digital dinamika yang berbeda dari sekolah reguler, namun studi empiris tentang lingkungan tersebut masih langka di Indonesia. Studi ini bertujuan untuk menganalisis bentuk-bentuk implementasi media pembelajaran digital, beserta faktor pendukung dan penghambatnya, di SMP Muhammadiyah (SMP MBS) Bengkulu Utara. Pendekatan kualitatif dengan desain deskriptif digunakan. Informan terdiri dari satu kepala sekolah, tiga belas guru, dan delapan siswa kelas sembilan. Data dikumpulkan melalui wawancara mendalam, observasi kelas, dan kuesioner respons guru dan siswa yang digunakan secara komplementer, dengan instrumen yang divalidasi oleh ahli asesmen pendidikan dan ahli bahasa dengan rata-rata 82,31% dalam kategori valid. Analisis dilakukan melalui reduksi data, penyajian data, dan penarikan kesimpulan, yang diperkuat oleh triangulasi sumber dan teknik. Implementasi ditemukan berjalan dengan baik, dengan respons siswa sebesar 81,71% (sangat baik) dan respons guru sebesar 80,41% (baik). Media yang dominan adalah laptop dan proyektor (100%), Canva (88,89%), PowerPoint (66,67%), dan YouTube (55,56%), sedangkan platform interaktif seperti Kahoot! hanya digunakan oleh 22,22% guru. Penggunaan masih berada pada tingkat substitusi dan tidak merata di antara guru, dengan 55,56% menggunakan media digital setiap dua minggu hingga sebulan sekali. Temuan utama adalah kesenjangan antara ketersediaan fasilitas dan keteraturan penggunaannya, serta antara motivasi siswa yang tinggi dan partisipasi aktif yang rendah (71,43%). Oleh karena itu, optimalisasi membutuhkan penguatan tata kelola, kompetensi digital guru, dan desain aktivitas partisipatif daripada infrastruktur tambahan.

Kata kunci: Media pembelajaran digital; sekolah berasrama; faktor pendukung dan penghambat; integrasi teknologi

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Introduction

Digital literacy in schooling now concerns more than reading and writing; it concerns how a learner makes sense of information in digital form (Sormin et al., 2017). Learning delivered through digital means encourages students to study independently and to manage their own learning in line with the competencies the world of work presently demands. The rapid development of information and communication technology has driven a corresponding development of learning resources and media, so that digital learning has become the characteristic form of education in the present era (Mulyaningsih & Saraswati, 2017; Azis, 2019). Indonesian law frames education as a conscious and planned effort to create a learning atmosphere in which learners actively develop their own potential (Undang-Undang RI No. 20 Tahun 2003).

Evidence for the effect of such media is reasonably consistent. Sirait et al. (2025) found that the use of technology-based learning media had a positive effect on student learning outcomes, and Dewi et al. (2023) reported that digital learning media improved both motivation and learning outcomes among junior secondary students. Permana et al. (2024) reviewed effectiveness across the digitalisation era more broadly, while Judijanto (2024) identified teachers' level of digital literacy as a determining variable for the quality of learning. Nugraheni (2017) and Dina Hakiky (2020) documented positive effects on enthusiasm and motivation.

Availability of technology, however, does not by itself determine how it is used. Intan et al. (2024), working with the SAMR framework at a junior secondary school in Sungguminasa, found that substitution was by far the most common level of technology integration among teachers while redefinition was the rarest, and attributed this to three causes: limited teacher knowledge of information technology, limited school facilities, and the absence of space for teachers to develop their technological skills. Ningrum et al. (2024) observed a similar pattern with Canva, which teachers select because it is easy to operate and produces attractive output, but which they tend to use only for visual presentation rather than for productive student activity. Mufliva and Permana (2024) argue on this basis that strengthening teachers' digital capacity is a prerequisite, since investment in devices will not change classroom practice unless teachers' capacity as designers of learning grows with it.

Boarding schools present a distinct case that this literature has largely left unexamined. Because learners remain within the school environment for a full twenty-four-hour cycle, the use of digital devices requires regulation more stringent than

that of regular schools (Halim et al., 2020; Rahmawati & Suryana, 2021), and control over the use of technology becomes part of character formation rather than a purely technical matter (Nasution, 2022). Network capacity planning also differs, since all students access a single shared network simultaneously rather than separate household connections (Prasetyo & Yuliani, 2020). Yuhandri et al. (2022) examined digital learning in a modern Islamic boarding school, but empirical study of such settings remains limited overall, and no study has addressed SMP Muhammadiyah Boarding School (SMP MBS) North Bengkulu, the first boarding-based junior secondary school in the regency, inaugurated on 26 July 2021.

This study therefore analyses the implementation of digital learning media at SMP MBS North Bengkulu together with the factors supporting and inhibiting it. Two questions guide the research: how is digital learning media implemented at the school, and what supports and inhibits that implementation? The study contributes an account of digital learning in a boarding setting that distinguishes what the school has achieved from what remains uneven, and identifies where the constraint actually lies — a distinction that matters because the appropriate response to a shortage of infrastructure differs entirely from the appropriate response to a shortage of governance.

Method

Research design

This study used a qualitative approach with a descriptive research design, chosen because the aim was to obtain a complete and unembellished picture of how digital learning media are implemented at SMP MBS North Bengkulu rather than to test hypotheses or causal relationships between variables. In-depth interviews and direct observation allowed the researcher to understand the social context, the obstacles encountered, and the strategies teachers and students adopt in using digital media. Questionnaire data were used to enrich the description of teacher and student perceptions; they were not treated as statistical test data but tabulated simply and then deepened through interview and observation, so that interviews, observation, and questionnaires functioned complementarily.

Setting and participants

The research was conducted at SMP MBS North Bengkulu, located in Arga Makmur, North Bengkulu Regency, Bengkulu Province, with field data collected on 20–21 July 2026. Informants were determined by purposive sampling on the basis of direct involvement in digital learning, authority over school policy in the case of the principal, and

length of experience with digital learning in the case of students. They comprised one principal, who had held office for two years; thirteen teachers of Physical Education, English, Indonesian, Craft, Science, Mathematics, Islamic Religious Education, Tarikh, Civics, Social Studies, Arabic, and Guidance and Counselling, with teaching experience ranging from six months to three years; and eight ninth-grade students, chosen because that cohort had the longest exposure to digital learning at the school. Ninth-grade students also acted as observers for the classroom observation, accompanied by the researcher.

Not every instrument was returned complete, and this is reported here because it affects how the figures should be read. Of ten teacher interview sheets distributed, nine were returned complete and one blank. Seven of eight student interview sheets were complete. Six of eight observation sheets were complete, two being discarded because they were partially filled and contained tick marks whose column could not be determined. Seven of eight student response questionnaires could be tabulated. All teacher response questionnaires were returned filled, with one item left unticked on one sheet, which was treated as missing data rather than scored as zero.

Instruments and validation

Six instruments were used: interview guides for the principal, for teachers, and for students; an observation sheet for digital media-based learning; and response questionnaires for teachers and for students. Items were developed from the research focus indicators. Both questionnaires used a five-point Likert scale, and the observation sheet used a Guttman scale with Yes and No options. Instruments were validated by two experts, an educational assessment expert and a language expert, against the criteria of Akbar (2013), with instruments deemed usable at 75–100%.

Data analysis

Observation data were analysed descriptively and narratively; Yes and No answers were not converted into scores or percentages but read as markers of the presence or absence of a condition, with differences between observers traced and explained. Interview data were analysed through data reduction, data display, and conclusion drawing. Questionnaire data were tabulated and converted into percentages using $P = (\Sigma \text{ obtained score} / \Sigma \text{ maximum score}) \times 100\%$, where the maximum is the product of the number of filled items, the number of respondents, and the highest score on the scale. Percentages were interpreted following Arikunto (2013) as 81–100% (very good), 61–80% (good), 41–60% (fair), 21–40% (poor), and $\leq 20\%$ (very poor). Credibility was

established through source triangulation across principal, teachers, and students, and technique triangulation across interview, observation, and questionnaire; where findings diverged, the divergence was examined and explained rather than set aside.

Results and Discussion

Instrument validation

Validation results are presented in Table 1.

Table 1. Instrument validation by expert

Validator	Score	Max	%
Educational assessment expert	66	80	82.50
Language expert	41	50	82.00
Mean	—	—	82.31

The two experts produced almost identical judgements, differing by only 0.50 percentage points, so the instruments met requirements for content validity and linguistic validity in balanced measure. Of the 26 assessment items awarded by the two experts, 23 received a score of 4 and three received 5, with none at 3 or below. The three highest-scoring items concerned the construction of student questionnaire statements, the depth of the interview guide questions, and comprehensibility of message. Neither expert wrote comments or proposed revisions, and the instruments were used in the field without amendment.

Implementation of digital learning media

Teacher questionnaire results by indicator are presented in Table 2.

Table 2. Teacher responses by indicator (n = 13)

Indicator (teacher questionnaire)	%
Integration of material	86.15
Facilities and infrastructure	86.15
Continuity of use	86.15
Student motivation	83.08
Type of media	81.54
Lesson preparation	80.00
Student participation	80.00
Effectiveness	80.00
Technical obstacles	80.00
Digital ability	78.46
Fit to the boarding environment	78.46
Frequency of use	76.92
School support	75.38
Digital evaluation	73.33
Overall	80.41

Overall teacher response reached 80.41%, in the good category, and student response 81.71%, in the very good category. Among teachers, five respondents (38.46%) fell in the very good category and eight (61.54%) in the good category, with none below; the range between highest and lowest score was 16 points, and the coefficient of variation 9.43% indicates a homogeneous distribution. Among the seven students tabulated, three (42.86%) were very good and four (57.14%) good, with a range of 21 points and a coefficient of variation of 12.57%. Students' experience of digital learning was thus more varied than teachers' experience of delivering it, which is unsurprising given that each student encounters a range of teachers with differing intensities of use while each teacher assesses only their own practice.

The distribution of teacher answers explains the overall figure. Of 194 filled items, 38 were Strongly Agree (19.59%), 124 Agree (63.92%), 30 Undecided (15.46%), two Disagree (1.03%), and none Strongly Disagree. The dominance of Agree, reaching almost two-thirds of all answers, places the overall percentage at 80.41%, precisely at the upper boundary of the good category. Teachers generally accept that digital learning media are in use, but the strength of that conviction has not reached a high level. More telling is where the thirty Undecided answers cluster: on digital evaluation (4), school support (4), lesson preparation (3), and type of media (3). Both leading clusters are structural rather than individual, which locates the remedy at the level of school management rather than individual teacher initiative.

The devices and platforms teachers reported using are presented in Table 3.

Table 3. Digital devices and platforms reported by teachers (n = 9)

Device or platform	n	%
Laptop and projector	9	100.00
Canva	8	88.89
Microsoft PowerPoint	6	66.67
YouTube	5	55.56
Google Form	4	44.44
Smartphone	3	33.33
Kahoot!	2	22.22
Gemini	1	11.11

Use is dominated by presentation and delivery media. No teacher reported routine use of a Learning Management System such as Google Classroom or Zoom, although every observer answered Yes to the observation indicator on the availability of a digital learning platform — a gap indicating that availability has not been followed by use. The pattern places implementation at the substitution level, in which digital media replace

the function of conventional media in presenting material, rather than at a transformative level enabling forms of learning not otherwise possible. This corresponds closely to Intan et al. (2024), who found substitution dominant and redefinition rarest. Of the three causes they identified, two apply here — limited teacher digital competence and limited training — while the third, limited facilities, does not, since digital facilities at SMP MBS are adequate. The prominence of Canva likewise matches Ningrum et al. (2024) on its ease of operation and its tendency to remain confined to visual presentation.

Intensity of use is uneven. Four teachers (44.44%) used digital media weekly or more often, while five (55.56%) used it fortnightly to monthly, three of them only once a month. The questionnaire confirms this: the frequency-of-use indicator reached only 76.92%, with not a single Strongly Agree answer. Agreement between two different instruments strengthens the conclusion that digital learning has not become an institutionalised routine but still depends on the initiative and competence of individual teachers, a pattern Nasrullah and Handayani (2023) attribute to teacher readiness as the principal determinant. The principal's statement that the school had only recently begun implementing digital learning, together with the low school-support indicator (75.38%), gives reasonable context for a school established only in 2021.

Measured against the characteristics of digital learning set out by Alya (2020) — interactivity, learner independence, and accessibility — the school satisfies two of three. Accessibility is well met, independence reached 82.86% on the student questionnaire, but interactivity is weakest at 71.43% for activeness and 77.14% for interaction among students, and 80.00% for participation among teachers.

Comparison of teacher and student perceptions

Because both questionnaires used the same five-point scale and fifteen indicators, direct comparison was possible. Results for the principal aspects are presented in Table 4.

Table 4. Comparison of teacher and student perceptions

Aspect	Teachers	Students
Digital evaluation	73.33%	82.86%
Facilities and access	86.15%	85.71%
Frequency of use	76.92%	85.71%
Participation and activeness	80.00%	71.43%
Technical obstacles	80.00%	71.43%
Learning motivation	83.08%	80.00%
Overall	80.41%	81.71%

Students rated implementation higher than teachers on six of eleven comparable aspects, teachers rated it higher on three, and two were near-identical. Two comparisons carry particular weight. The largest gap, 9.53 points, appears on digital evaluation: teachers awarded 73.33% with four of twelve respondents Undecided, while students awarded 82.86% with no negative answers. The direction matters — students feel helped by digital quizzes in gauging their own ability, while teachers themselves are not yet confident in using digital media for assessment and feedback. The obstacle in the evaluation dimension therefore originates with the educator, not the learner.

Conversely, near-perfect agreement appears on facilities and technology access, differing by only 0.44 points (86.15% teachers, 85.71% students). This agreement across two independent sources supports the conclusion that digital infrastructure is adequate and no longer the principal constraint. The three aspects rated higher by teachers are the ones that warrant attention: participation and activeness (80.00% against 71.43%), technical obstacles (80.00% against 71.43%), and learning motivation (83.08% against 80.00%). On participation in particular, students rate their own activeness lower than teachers rate it, so the weakness is not merely observed from outside but acknowledged by the learners themselves.

Supporting factors

Four supporting factors emerged. The first and strongest is the availability of facilities provided by the school, mentioned by 88.89% of teacher informants and corroborated by the principal's statement, the observation results, and the 86.15% questionnaire indicator. The second is the existence of policy and supervision at the operational level: observers unanimously confirmed a specific schedule for digital media use, principal supervision, and platform usage guidance. In a boarding context such instruments matter more than in regular schools precisely because students remain on site around the clock (Halim et al., 2020; Rahmawati & Suryana, 2021).

The third is teachers' openness to professional development: 66.67% had attended training related to digital learning, 44.44% explicitly named competence improvement as an optimisation strategy, and the continuity indicator reached 86.15% with no negative answers. The fourth is student motivation and acceptance: interest reached 88.57%, the expectation that digital media be used more often reached 91.43%, and 85.71% of student informants said they enjoyed learning with digital media. Student readiness has thus outrun the level of implementation achieved, which is consistent with Putri and Sari (2022) on positive

learner acceptance as a precondition for improved motivation, and constitutes a resource the school has not yet fully drawn on.

Inhibiting factors

The most prominent inhibitor is network instability, mentioned by 66.67% of teacher informants and experienced by 85.71% of students. This appears at first to contradict the observation result, in which every observer recorded that internet was available, and the 80.00% technical-obstacles indicator among teachers. The contradiction resolves once availability is distinguished from stability and teacher access patterns from student access patterns. The network exists physically, but its stability is not guaranteed when many users draw on it simultaneously — a condition students meet more often than teachers. Wulandari and Rahayu (2023) and Siregar et al. (2020) report network instability as a leading obstacle to digital learning in Indonesia generally.

The second inhibitor is internal: limited teacher digital competence, mentioned by 44.44% of informants. Not one of the nine teachers rated themselves as proficient in operating digital media and applications, and the digital-ability indicator reached 78.46%, good but short of very good. This also explains why use remains confined to presentation applications and video and why interactive platforms are little used. The third is the incompleteness of formal policy and evaluation mechanisms: the principal stated that the school had only recently begun implementing digital learning, and school support reached only 75.38% with four respondents Undecided. Abdullah (2018) argues that the shift from conventional to technology-based learning requires change at the level of institutional policy, not only in individual teacher practice.

The fourth is limited training, with 33.33% of teachers never having attended digital learning training, and the fifth is power outages, mentioned by 22.22% of informants — least frequent but capable of halting all digital activity at once. Beyond these, the study identified an obstacle specific to the boarding context: a gap in students' understanding of the device-use regulations in the dormitory. Although 85.71% of students recognised the existence of such rules on the questionnaire and most observers confirmed that written regulations were available, student answers in open interview were divided, with some stating they did not know the rules. Students recognise that the regulation exists but have not absorbed its content, which risks inconsistent conduct outside formal lesson hours.

Motivation, participation, and the boarding context

Digital learning had a positive effect on motivation: student interest reached 88.57%, learning motivation 80.00%, the teacher indicator on student motivation 83.08%, and 85.71% of student informants reported feeling more enthusiastic, while 55.56% of teachers said students became more active and enthusiastic. A consistent gap nevertheless separates motivation from participation. Activeness in asking questions and discussing reached only 71.43%, with four of seven respondents Undecided, and interaction 77.14%; the observation sheets recorded their single No answer on precisely the indicator of active student involvement. The qualitative data explain why: the digital activity students undertake most often is watching video, while productive activities such as online discussion, quizzes, or presentation remain limited.

This carries a theoretical implication worth stating plainly. Motivation raised by digital media does not translate automatically into active participation. Media used in a one-way format position the student as a recipient of information, however high the level of interest. Asmara and Jumri (2021) hold that learner participation improves only when media are designed to demand active response rather than merely to present information; Dewi et al. (2023) found gains in motivation and outcomes together only when media required students to produce work; and Puspitoningrum et al. (2024) found platform effectiveness dependent on activity design placing learners as active users. The weakness observed here lies in the design of the learning activity, not in the medium.

Two further findings are specific to the boarding setting. Restrictions on personal device use support learning discipline and reduce the risk of misuse, but simultaneously limit opportunities for independent study using digital sources outside lesson hours; independence reached 82.86%, but largely within the frame of school-provided devices, principally Chromebooks. Since technology access reached 85.71%, the limiting factor is the rule governing use rather than the availability of devices. Second, students judged the fit between digital media use and dormitory scheduling at 82.86%, while teachers rated fit to the boarding environment at only 78.46% with one respondent disagreeing — students experience the timing as well integrated while some teachers still find it difficult to align digital media use with a dense dormitory agenda.

Limitations

Several limitations qualify these findings. Field data were collected across two days, so the account

represents a snapshot rather than the dynamics of implementation across a semester. Student informants were drawn only from grade IX, and several instruments were returned incomplete, reducing the effective number of respondents. Perception data were not complemented by documentary evidence of learning outcomes, so conclusions about the effect of digital learning on academic achievement rest on the reported judgements of principal, teachers, and students — judgements that themselves differed, the principal being the most cautious. No reliability test was performed on the questionnaires.

Conclusion

Digital learning media at SMP Muhammadiyah Boarding School North Bengkulu are implemented well. Observation showed that almost every component examined — facilities and infrastructure, rules and policy, and learning activity — was present and operating, with student responses at 81.71% (very good) and teacher responses at 80.41% (good). Media are used mainly through laptops, projectors, Canva, PowerPoint, and YouTube for delivering material, so use remains at the substitution level, while interactive platforms and learning management systems are not yet used optimally and intensity varies between teachers. Supporting factors comprise adequate facilities, school policy and supervision, teachers' openness to developing their competence, and high student motivation and acceptance. Inhibiting factors comprise network instability, limited digital competence among some teachers, incomplete policy and evaluation mechanisms, limited training, and power outages, together with boarding-specific conditions arising from device restrictions outside lesson hours and shared network access.

The central finding is a gap between the availability of facilities and the regularity of their use, and between high student motivation and low active participation. Optimisation at this school therefore requires strengthened governance, improved teacher digital competence, and the design of participatory activities rather than further investment in infrastructure. Future research should widen the range of respondents to grades VII and VIII, observe at several points across a semester, complement perception data with learning outcome documents, test the reliability of the questionnaires, and develop action or development research focused on raising student activeness, which was the weakness most consistently found here.

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Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Fauzan: conceptualization, methodology, investigation, data curation, writing—original draft. Adi Asmara: supervision, validation, writing—review and editing. Rizki Pratama: supervision, methodology, writing—review and editing.

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