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Analysis of Gadget Usage Intensity, Study Discipline, and Biology Learning Outcomes Among Grade X MIPA Students at MA Wahid Hasyim Balung Jember

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Abstract The usage of devices in schools, especially for academic reason, has become more widespread as technological developments have advanced. The intensity of gadget usage is generally related to students' study discipline, which in turn impacts their academic performance. MA Wahid Hasyim Balung Jember is one such institution that lets students to utilize technology for educational reasons. This study aims to examine the profile of gadget usage intensity, study discipline, and biology learning outcomes among Grade X MIPA students at MA Wahid Hasyim Balung Jember. The research adopts a quantitative approach with a descriptive quantitative research design. This study employs survey and documentation methods. The sampling technique used is non-probability sampling in the form of total sampling, with a population and sample size of 93 students. A questionnaire was utilized to gather information regarding the intensity of gadget usage and students' study discipline based on their personal experiences. Documentation was used to collect transcript data of the biology learning outcomes of Grade X MIPA students at MA Wahid Hasyim Balung Jember. The study employed a closed questionnaire with a Likert scale. All questionnaire items used in this study were tested and proven valid and reliable. Based on the research findings, it was discovered that the average intensity of gadget usage among Grade X MIPA students at MA Wahid Hasyim Balung Jember was 40, categorized as high; the average study discipline was 63, categorized as moderate; and the average learning outcomes were 39, categorized as low.

Keywords: Gadget usage intensity, Study discipline, Biology learning outcomes, MA Wahid Hasyim Balung Jember, Grade X MIPA

INTRODUCTION

The fast growth of technology has greatly accelerated the integration of information and communication technology systems in education (Chisango et al., 2020; Lawrence & Tar, 2018; Tokareva et al., 2018; Nasution & Rizka, 2024; Nasution & Sofyan, 2024). Following the issuance of circular letter number 36962/MPK.A/HK/2020 by the Ministry of Education and Culture of Indonesia regarding online learning and working from home, online learning or studying from home has been implemented since March 2020 as an effort to control the spread of COVID-19. Students are required to remain connected to their gadgets until the completion of their lessons and use these devices outside of class hours to complete various school assignments. This policy has led to more intensive gadget usage among students, especially for educational purposes, even after the pandemic has subsided.

The evaluation of learning is dependent on the achievement of learning outcomes, which serve as a mechanism to assess students' progress and success through the measurement of learning results (Dimyati & Mudjiono, 2009). Consequently, learning outcomes become an indicator of student success in the learning process, typically evaluated through numerical, alphabetical, or symbolic assessments. There are two factors that influence learning outcomes: internal and external factors (Ekawan, 2011). Internal factors include physiological and psychological aspects, while external factors encompass environmental influences and the use of learning tools.

One external factor that potentially correlates with learning outcomes is the intensity of gadget usage. Gadget usage intensity can be defined as the measure of how frequently an individual uses a device or engages in a specific activity (Yuniar & Nurwidawati, 2013). In the realm of education, the importance of gadget usage has become more pronounced given the rapid technological advancements. Students' awareness of technology can stimulate their creativity in utilizing it positively. However, students who are unable to balance gadget usage with positive activities are at risk of being adversely affected by its negative impacts.

One aspect related to students' ability to manage the intensity of their gadget usage, particularly for positive purposes, is study discipline. Study discipline plays a crucial role in character formation, as it helps enhance concentration, enabling students to better comprehend educational material (Hudaya, 2018). According to Mulyasa, discipline is a condition in which individuals voluntarily adhere to and comply with rules (Mulyasa, 2019). Study discipline can also be interpreted as adherence to school regulations to acquire beneficial knowledge (Hapsari, 2005).

The implementation of study discipline by students is essential as it prepares them for both daily life and future endeavors. As stated, “Ideally, the goal of discipline is for children to understand the ramifications of their actions and to develop self-control” (Mirdanda, 2018). Through this study discipline, students can discern right from wrong, thereby facilitating the smooth progression of the teaching and

learning process in schools and ultimately enhancing their academic performance (Kurniawan, 2018).

MA Wahid Hasyim is a high school that has implemented online learning during the pandemic and continues to do so as of 2024. Interviews with biology teachers reveal that the use of gadgets is not new in the learning process at MA Wahid Hasyim. Starting with pandemic conditions that required students to study from home utilizing devices, this learning technique has persisted to this day, even though the epidemic has passed.

Biology, as a branch of natural science, focuses on the study of living organisms and their environments. In comprehending biology material, students are expected to use gadgets wisely, supported by good disciplinary attitudes, to overcome potential challenges. Therefore, it is crucial for students to possess good study discipline and effective skills in using gadgets for positive purposes, ultimately impacting their academic outcomes.

This study aims to provide an overview of the frequency of gadget usage, the level of study discipline, and the biology learning outcomes of students at MA Wahid Hasyim Balung Jember. The findings of this study are anticipated to serve as a foundation and input for formulating future educational curriculum policies in Indonesia concerning strategies for gadget use in learning, study discipline, and biology learning outcomes, particularly at MA Wahid Hasyim Balung Jember.

METHOD

Research Design

The research approach in this study is quantitative, employing a descriptive quantitative research design. This study utilizes survey and documentation methods. The survey method involves the use of questionnaires as the primary instrument for data collection. The documentation method entails gathering data from written documents produced by the institutions being studied. By using both survey and documentation methods, the researchers aim to identify the profile of gadget usage intensity, students' study discipline, and biology learning outcomes among Grade X MIPA students at MA Wahid Hasyim Balung Jember. The variables in this study are gadget usage intensity, study discipline, and learning outcomes.

Population and Sample

The population of this study consists of all Grade X MIPA students at MA Wahid Hasyim Balung Jember. The distribution of the population among these students is presented in Table 1.

Table 1. Population distribution of class X MIPA students at MA Wahid Hasyim Balung Jember.

No	Class	Total
1.	X MIPA 1	25 students
2.	X MIPA 2	33 students
3.	X MIPA 3	35 students
	Total	93 students

The sampling technique employed in this study is non-probability sampling in the form of total sampling. This technique involves using the entire population as the sample, due to the relatively small population size of fewer than 100 respondents. Consequently, the population and sample for this study consist of all 93 Grade X MIPA students at MA Wahid Hasyim Balung Jember, with 39 male students (42%) and 54 female students (58%).

Data collection and analysis techniques

Data collection techniques in this study include two methods: (1) questionnaires and (2) documentation. The questionnaire is a data collection technique that involves providing respondents with a set of written questions or statements to be answered. The documentation technique in this study includes photographs of research activities at MA Wahid Hasyim and transcripts of biology learning outcomes for Grade X MIPA students at MA Wahid Hasyim Balung Jember.

In this research, the questionnaire is used to gather information related to gadget usage intensity and students' study discipline based on their personal experiences. This study employs a closed questionnaire with a Likert scale. The researchers adapted the gadget usage intensity questionnaire developed by Supandi (2020) in his thesis at UIN Maulana Malik Ibrahim Malang, as it has been proven effective in measuring the variable of students' gadget usage intensity. The grid for the post-pandemic gadget usage intensity questionnaire can be seen in Table 2.

Table 2. Instrument grid for intensity of gadget use.

Aspect	Indicator	Question item		Number of questions
		Favorable	Unfavorable	
Frequency	The level of frequency in using gadgets	1, 2, 3, 7, 9,12	8, 10, 11	9
Duration	Length of time using the gadget	5	4, 6	3

The study discipline questionnaire in this research is adapted from a previous instrument used by Ahyuni (2021) in her study titled “The Influence of Self-Regulated Learning and Study Discipline on Learning Outcomes in Animalia Subject for Grade X MIPA Students at SMA Negeri 1 Suboh, Situbondo” at IAIN Jember. This questionnaire was adapted as it has been proven effective in measuring the variable of students' study discipline. The grid for the study discipline questionnaire can be seen in Table 3.

Table 3. Instrument grid for study discipline.

Aspect	Indicator	Question item		Number of questions
		Favorable	Unfavorable	
Time discipline	Discipline in attendance	1, 3	2, 4	4
Discipline of actions	Respecting teachers and school residents	5, 6	7	3
Discipline during learning	Actively participate in lessons	8		1
	Do practice questions from	9, 12	10, 11	4
Discipline in doing and collecting assignments	Collect assignments on time	14		1
	Discipline in taking tests		15, 19	2
	Consistent and independent in carrying out tasks	13, 16, 17, 18	20	5

All questionnaire instruments used in this study employ the Likert scale. The scoring weights for the Likert scale used are presented in Table 4.

Table 4. Likert scale scoring guide.

Statement	Assessment Weight	
	Favorable (Positive)	Unfavorable (Negative)
Strongly disagree	1	5
Disagree	2	4
Neutral	3	3
Agree	4	2
Strongly agree	5	1

Furthermore, the instruments used must meet validity and reliability standards. The researchers used respondents outside the sample, specifically randomly selected students, to test the validity and reliability of the instruments. The test respondents were all 30 students of Grade XI MIPA 3. The test results were calculated using SPSS version 22 software. To test the validity of the instruments in this study, the Pearson product-moment formula was used. The validity test results for the gadget usage intensity instrument identified 11 valid questions and one invalid question, specifically question number 4. The invalid question was subsequently eliminated by the researchers. A summary of the post-pandemic gadget usage intensity validity test results is presented in Table 5.

Table 5. Results of the validity test of the intensity of gadget use instrument.

No	r_{table}	r_{count}	Category	Decision
1.	0,361	0,523	Valid	Used
2.	0,361	0,503	Valid	Used
3.	0,361	0,436	Valid	Used
4.	0,361	0,244	Not valid	Not used
5.	0,361	0,492	Valid	Used
6.	0,361	0,670	Valid	Used
7.	0,361	0,888	Valid	Used
8.	0,361	0,766	Valid	Used
9.	0,361	0,586	Valid	Used
10.	0,361	0,486	Valid	Used
11.	0,361	0,602	Valid	Used
12.	0,361	0,822	Valid	Used

The validity test results for the study discipline instrument identified 20 valid questions and 4 invalid questions, specifically questions numbered 4, 5, 9, and 15. The invalid questions were subsequently eliminated by the researchers. A summary of the study discipline validity test results is presented in Table 6.

Table 6. Results of the validity test of the study discipline instrument.

No	r_{table}	r_{count}	Category	Decision
1.	0,3610	0,737	Valid	Used
2.	0,3610	0,479	Valid	Used
3.	0,3610	0,382	Valid	Used
4.	0,3610	0,166	Not valid	Not used
5.	0,3610	0,302	Not valid	Not used
6.	0,3610	0,596	Valid	Used
7.	0,3610	0,452	Valid	Used
8.	0,3610	0,460	Valid	Used
9.	0,3610	0,359	Not valid	Not used
10.	0,3610	0,509	Valid	Used
11.	0,3610	0,616	Valid	Used
12.	0,3610	0,621	Valid	Used
13.	0,3610	0,613	Valid	Used
14.	0,3610	0,687	Valid	Used
15.	0,3610	0,212	Not valid	Not used
16.	0,3610	0,397	Valid	Used
17.	0,3610	0,612	Valid	Used
18.	0,3610	0,631	Valid	Used
19.	0,3610	0,444	Valid	Used
20.	0,3610	0,600	Valid	Used
21.	0,3610	0,739	Valid	Used
22.	0,3610	0,610	Valid	Used
23.	0,3610	0,810	Valid	Used
24.	0,3610	0,720	Valid	Used

Subsequently, a reliability test was conducted on the instruments to determine the robustness or trustworthiness of the data generated. The reliability test was performed by comparing the Cronbach's alpha value with a significance level of 0.8. The criterion for the test is that if the Cronbach's alpha value is higher than 0.8, the instrument is considered reliable. The reliability test results for the gadget usage intensity instrument, comprising 12 questions, yielded a Cronbach's alpha value of 0.884, while the reliability test results for the study discipline instrument, comprising 20 questions, yielded a Cronbach's alpha value of 0.915. These results indicate that the instruments for gadget usage intensity and study discipline are reliable and can be used for the research. The data obtained were analyzed descriptive quantitatively using IBM SPSS 26 software.

FINDINGS AND DISCUSSION

The study reveals that the average intensity of students' gadget usage is 40, categorized as high, the average students' study discipline is 63, categorized as moderate, and the average students' learning outcome is 39, categorized as low. The research data are presented in Table 7.

Table 7. Research data.

Respondent	Intensity of students' gadget usage	Study discipline	Learning outcome
R01	51	88	56
R02	36	60	36
R03	32	59	32
R04	43	66	28
R05	28	72	28
R06	44	65	44
R07	32	67	32
R08	50	60	64
R09	32	61	20
R10	50	62	92
R11	49	70	60
R12	40	77	40
R13	40	72	40
R14	50	69	76
R15	46	78	76
R16	44	76	44
R17	42	79	24
R18	40	60	40
R19	44	50	44
R20	52	60	52
R21	48	67	48
R22	33	64	28
R23	44	71	44
R24	48	74	68
R25	44	72	44
R26	30	69	24
R27	40	49	40
R28	30	53	24
R29	53	48	28
R30	46	40	24
R31	31	60	24
R32	36	67	36
R33	34	68	20
R34	42	69	64
R35	48	65	56
R36	36	55	36
R37	40	65	28
R38	31	43	20
R39	31	66	20
R40	44	57	44
R41	37	75	16
R42	34	66	20
R43	36	69	36
R44	52	74	64
R45	32	65	32
R46	48	60	48
R47	30	41	28
R48	36	57	36
R49	38	80	12
R50	45	54	24
R51	40	53	40
R52	39	40	20

Respondent	Intensity of students' gadget usage	Study discipline	Learning outcome
R53	38	57	24
R54	33	51	12
R55	32	53	32
R56	36	70	36
R57	36	41	36
R58	39	42	20
R59	36	70	36
R60	52	68	68
R61	53	58	56
R62	36	54	36
R63	31	47	20
R64	44	49	28
R65	38	55	20
R66	37	55	24
R67	36	56	36
R68	48	67	48
R69	41	71	20
R70	36	48	36
R71	36	76	36
R72	48	74	84
R73	47	75	56
R74	32	45	32
R75	40	66	28
R76	36	67	36
R77	30	69	28
R78	46	75	72
R79	36	58	36
R80	39	67	28
R81	32	68	16
R82	33	70	24
R83	37	60	24
R84	49	57	58
R85	47	66	68
R86	45	79	60
R87	42	82	76
R88	43	79	60
R89	42	70	24
R90	36	77	36
R91	40	50	16
R92	52	51	52
R93	32	61	32
Total	3723	5861	3594
Average	**40**	**63**	**39**

The variable of students' gadget usage intensity, presented in Table 7, encompasses two aspects: frequency and duration of gadget use. In terms of frequency, 35% of students frequently use gadgets, followed by 31% very frequently, 21% moderately often, 10% rarely, and 3% never or very rarely. This frequency distribution is detailed in Figure 1.

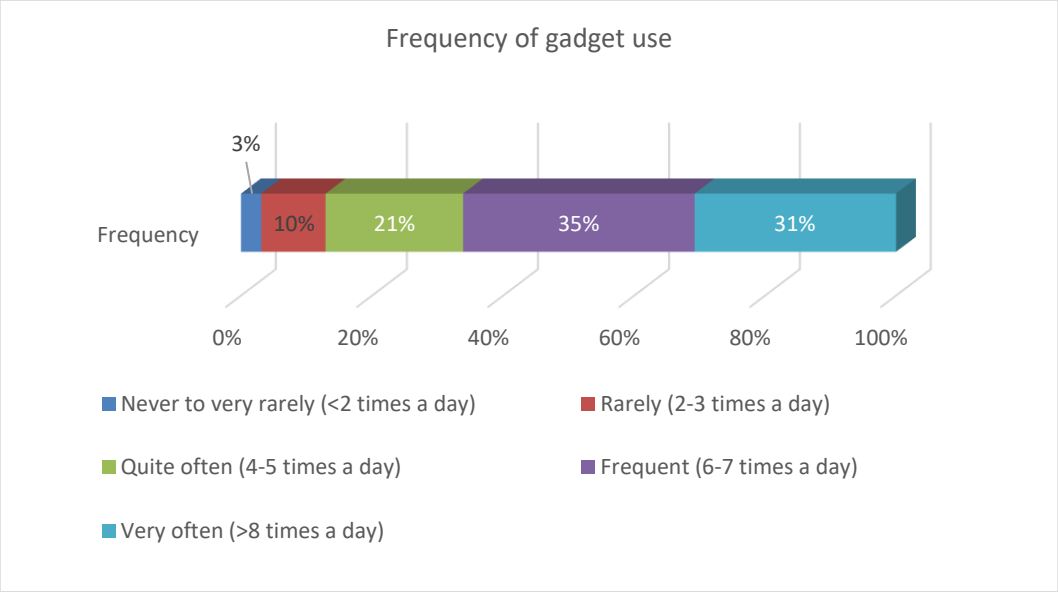

Figure 1. Data on the frequency of gadget use by students.

Regarding duration, 35% of students use gadgets for a moderate length of time daily, followed by 27% for a long duration, 19% for a short duration, 12% for a very long duration, and 6% for very short to no duration at all. The distribution of usage duration is illustrated in Figure 2.

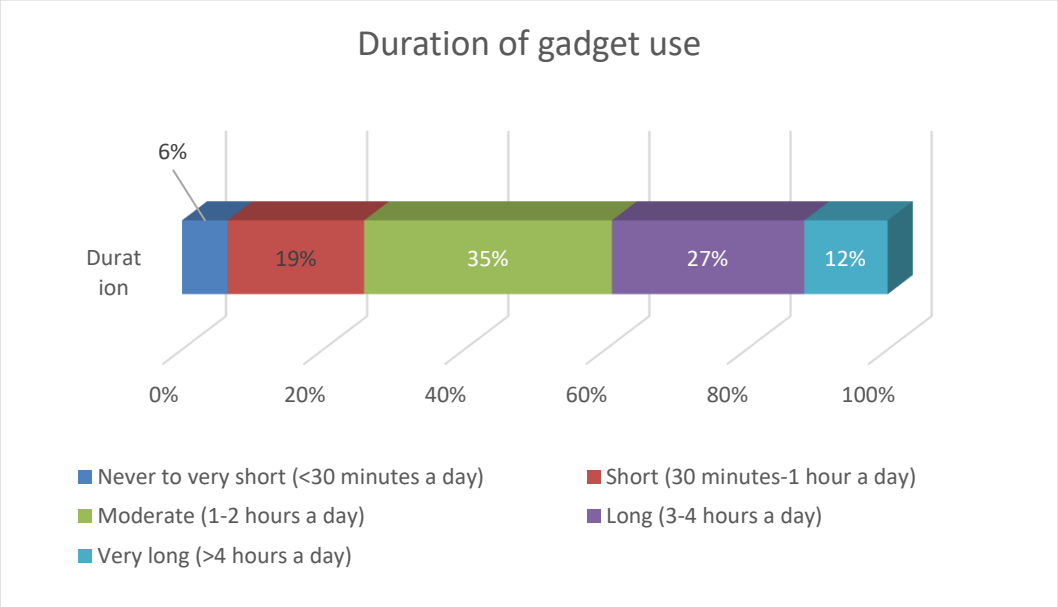

Figure 2. Data on the duration of gadget use by students.

The findings indicate that the average intensity of gadget usage among students is 40, categorized as high (Table 7). Thus, this study demonstrates that the majority of grade X MIPA students at MA Wahid Hasyim Balung Jember engage in intense daily gadget use. Specifically, most students frequently use gadgets six to seven times daily (Figure 1) and for one to two hours per day (Figure 2). Observations by the researchers indicate that students often use their free periods to play with gadgets, primarily for information retrieval.

These findings are consistent with previous studies, such as Haryanti et al. (2022), which found that high school students use gadgets intensively while at school. Similarly, Ningrum et al. (2019) reported that respondents with high screen time spent twice as much time on gadgets compared to those with low screen time, primarily using them for games, YouTube, and information searches, with Instagram being the most frequent use.

The variable of student study discipline, detailed in Table 8, includes four aspects and seven indicators. The time discipline aspect, indicated by punctual attendance, has a 72.6% adherence rate. The behavioral discipline aspect, indicated by respect for teachers and school staff, has a 55.6% adherence rate. The discipline during lessons aspect, consisting of active participation (54.2%) and completion of teacher-assigned tasks individually or in groups (59.2%), is also examined. The final aspect, discipline in task completion and submission, includes timely submission (62.2%), disciplined test participation (67.6%), and consistent independence in task completion (62.8%). The overall discipline indicators are depicted in Figure 3.

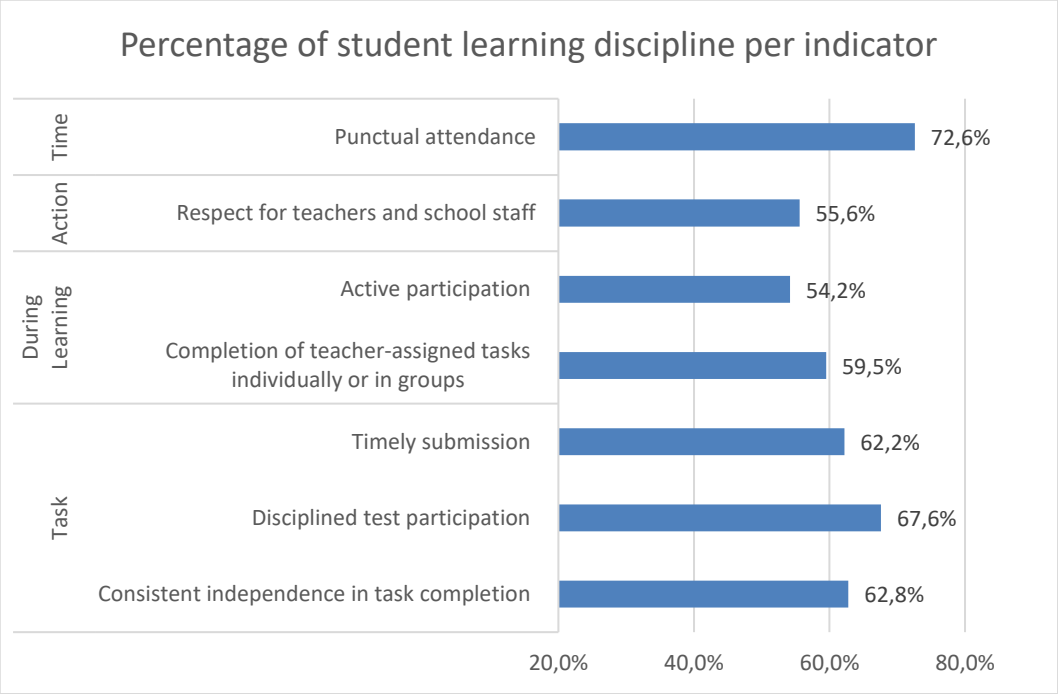

Figure 3. Data on the percentage of student learning discipline per indicator.

The average study discipline score of 63, categorized as moderate (Table 7), suggests that the majority of grade X MIPA students at MA Wahid Hasyim Balung Jember exhibit moderate study discipline. This finding aligns with Arista (2018), who found that the majority of students at SMA Negeri 1 Kadamean Gresik exhibited moderate study discipline (60%).

Based on the indicators, the majority of students, accounting for 72.6%, demonstrate punctual attendance. This observation is corroborated by the researchers' observations, which indicate that most students consistently arrive on time for their classes. Punctual attendance is indicative of strong study discipline, as it reflects a student's commitment to not missing instructional material delivered by teachers. Students who consistently arrive on time have likely prepared their materials well in advance, possibly the night before or at least a few hours before class. Such students also engage in preparatory activities to ensure timely attendance, such as waking up early, personal grooming, having breakfast, and donning their school uniforms punctually. This behavior signifies a deliberate intent to attend classes on time, thus contributing to the development of robust study discipline. Lajim (2022) posits that internalizing the character of discipline requires habitual practices, with daily punctual attendance being a crucial routine for students.

Subsequent indicators of study discipline among grade X MIPA students at MA Wahid Hasyim Balung Jember, in descending order of adherence, include discipline in taking exams, consistent and independent task completion, timely submission of assignments, completing practice questions from teachers both individually and in groups, respecting teachers and school staff, and active participation in lessons. Overall, the study finds that the students' study discipline is categorized as moderate. Therefore, it is recommended that the school administration and academic community actively work to instill the character of discipline in students, as the potential for improvement remains significant and achievable.

The variable of student learning outcomes, as presented in Table 7, is predominantly low, with 51% of students falling into this category, followed by 20% moderate, 16% very low, 11% high, and 2% very high. The distribution of learning outcomes is illustrated in Figure 4.

The average learning outcome score of 39, categorized as low (Table 4), indicates that the majority of grade X MIPA students at MA Wahid Hasyim Balung Jember have low academic performance. Similar findings have been reported by Nasution et al. (2017), where the average biology learning outcome among high school students was low, scoring 32.8. Other studies, such as those by Putri et al. (2023), Rahma & Ristiono (2021), and Mas’ud (2018), corroborate these findings, indicating a widespread issue of low biology learning outcomes among high school students in Indonesia. Nasution et al. (2023) found that while the average biology learning outcome was moderate, it was still below the minimum mastery criteria (KKM), scoring 50.49. These consistent findings underscore the need for

interventions to enhance biology learning outcomes, starting with problem analysis and implementing effective solutions.

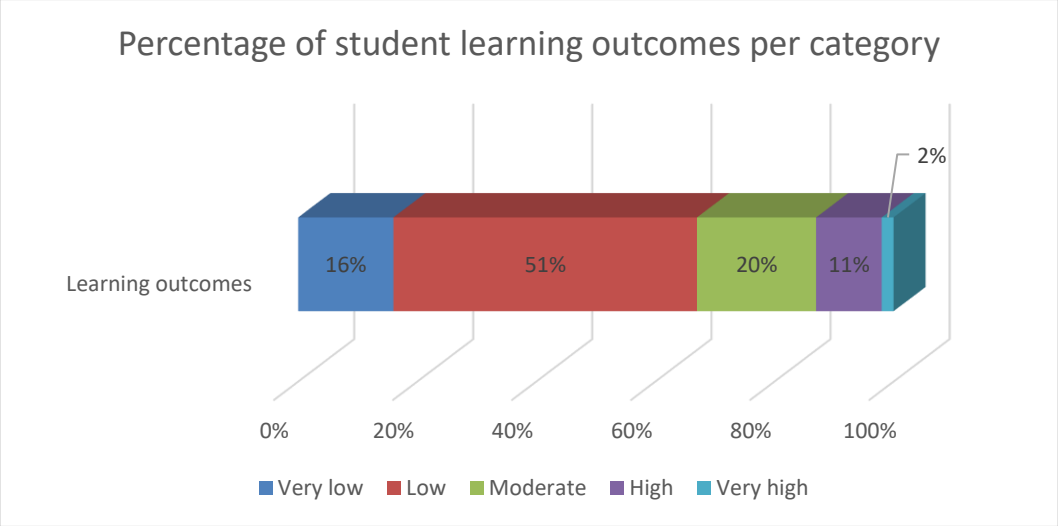

Figure 4. Data on the percentage of student learning outcomes per category.

CONCLUSION

This study reveals that the average intensity of students' gadget usage is 40, categorized as high, encompassing two aspects: frequency and duration of gadget use. In terms of frequency, the majority of students, 35%, infrequently use gadgets. Regarding duration, 35% of students use gadgets for a considerable length of time daily (1-2 hours per day). The average study discipline score is 63, categorized as moderate. The indicator with the highest adherence is punctual attendance, with 72.6% of students consistently arriving on time, while the remaining 27.4% do not. The lowest indicator is active participation in lessons, with 54.2% of students actively engaging in class, and the remaining 45.8% not participating actively. The average student learning outcome score is 39, categorized as low. This is primarily dominated by the low performance category, comprising 51% of the students, whereas only 2% of the students fall into the very high performance category.

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