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**Students' Perceptions of SMA Negeri 1 Toapaya Toward Gadgets in the Biology Learning Process****Elisa Oktaviani<sup>1\*</sup>, Miranda<sup>1</sup>, Marni<sup>1</sup>, Hermilah Putri<sup>1</sup>, Ruhil Amani<sup>1</sup>, Seren Natasea<sup>1</sup>, Adam Fernando<sup>1</sup>, Sri wahyuni<sup>2</sup>, Martina<sup>2</sup>**<sup>1</sup>Biology Education Study Program, Faculty of Teacher Learning and Education, Raja Ali Haji University Maritime, Dompok, Tanjungpinang, Indonesia<sup>2</sup>SMA Negeri 1 Toapaya, Jalan Gesek KM 25, Bintan, Indonesia\*Corresponding Author e-mail: [oktavianielisa101@gmail.com](mailto:oktavianielisa101@gmail.com)

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**ABSTRACT**

Digital media is any type of electronic media that can be stored, accessed, and changed by a computer. One of the Digital Media that is often used today is gadgets. Gadgets are small electronic devices that can be carried to find information or communicate with others. In this era of globalization, gadgets are also difficult to use in learning. The times allow the implementation of technology in the world of education. At SMA Negeri 1 Toapaya, one of them is driving school and has implemented an independent curriculum so that access to technology is needed in it. Therefore, especially in learning Biology. This study uses descriptive methods with quantitative data analysis techniques in the form of a questionnaire instrument covering 8 indicators. The results of this study found that SMA Negeri 1 Toapaya students tend to prefer learning using gadgets, because with gadgets they can access wider information so as to increase their understanding and confidence in learning.

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**INTRODUCTION**

Developments in the world of education are endless these days. In line with the changing times and the needs of society, education will continue to advance. Globalization demands that various countries, including Indonesia, continue to develop and not fall behind (Putri & Idris, 2022). In various aspects of life today, digital skills have become a basic necessity, whether in the workplace, social activities, or even education (Yeyendra et al., 2024). In this context, the use of gadgets has become a crucial instrument supporting flexible learning. Gadgets enable the implementation of more interactive and personalized learning models, where students can independently access learning materials through various educational applications (Putra et al., 2023). In addition to facilitating rapid access to information, gadget use has also been shown to increase student engagement in online collaboration processes, provided their use is accompanied by appropriate supervision from educators to minimize digital distractions (Sari & Ramadhan, 2022). Thus, gadget integration is not merely a complement, but a primary tool in creating an adaptive and inclusive learning ecosystem in the modern era.

In learning, devices play a crucial role, making it easier for teachers to convey extensive material to their students, enabling them to obtain the necessary information



(Santoso, 2020). In biology, the use of devices allows for the visualization of microscopic and abstract concepts that are difficult to observe directly through conventional means, such as cell structure or DNA replication. Through augmented reality (AR)-based applications and virtual simulations accessed through devices, students can explore human organ systems or ecosystems in three dimensions, which has been shown to significantly improve conceptual understanding and memory retention compared to traditional lecture methods (Syah et al., 2023). Furthermore, devices serve as portable laboratories, supporting biology practical activities both inside and outside the classroom. With high-resolution cameras and various integrated environmental sensors, devices make it easier for students to document living specimens, instantly identify species through AI-based applications, and collect real-time field data. The use of this technology not only improves students' digital literacy but also fosters a higher scientific attitude and learning motivation because the process of searching for biology information becomes more interactive and relevant to current technological developments (Pratama & Hidayat, 2022).

The use of devices increases learners' motivation to learn. To achieve optimal learning outcomes, learner motivation is very important. Motivation can come from within learners or from external sources. There are many ways educators can encourage learners to learn by using interesting and interactive media. Gadgets are easy to use and can be accessed at any time by learners, so their important role in learning today can be compared to printed books. The use of devices is associated with learner learning outcomes. As long as learners can use them correctly and not too much. Adding that the benefits of using devices include new friends and ease of long-distance communication (Rahma & Sandika, 2022).

SMA Negeri 1 Toapaya is one of the driving schools in Indonesia. The school has implemented the Merdeka Curriculum with student-centered learning and demands easy access to digital literacy. Students are freed to access information through the internet in learning. Especially in learning Biology, the teacher gives students the freedom to obtain other sources or references to increase their understanding of the material being studied. Teachers also give learners the opportunity to access the internet to help them in completing the assignments given. Apart from all the benefits of using devices in learning, it is also necessary to know that sometimes there are some students who may be distracted by the implementation of the use of these devices and instead focus more on the learning system without using devices. However, reflecting on this issue, there has been no research related to the use of gadgets in learning at the school. Therefore, this study aims to determine students' perceptions of the use of devices in learning, especially in biology subjects. Due to the increasingly widespread use of gadgets among students today, especially in searching for biological information, it is necessary to further study their impact and effectiveness.

## METHOD

This descriptive research uses a questionnaire that includes eight indicators about students' perceptions of the use of gadgets. This questionnaire was distributed to 186 students of class X and XI of SMAN 1 Toapaya with purposive sampling technique. Samples are selected based on specific criteria, considerations, or objectives relevant to the research topic. Samples are not chosen based on chance, but rather on specific characteristics to ensure the data is more representative. The questionnaire is organized into 40 statement items related to the topic discussed with a Likert scale type that includes 1-4 score frequencies. Indicators of students' perceptions of the use of devices can be seen in the following table.



**Table 1.** Indicators of Students Perceptions of Device Use

No	Indicators
1	Ease of access to information and understanding of material
2	Ease of communication and collaboration
3	Increased learning effectiveness
4	Ability to understand material interactively
5	Disruption of focus and concentration
6	Social and technical impacts
7	Students' views on the effectiveness of device use
8	Students' views on the sustainability of device use

The data were analyzed descriptively by calculating the frequency of scores selected by respondents. Then, the average of each statement item and indicator was calculated. The average percentage of each indicator obtained was calculated using the Microsoft Excel application. After that, the calculation results were interpreted qualitatively based on the following table.

**Table 2.** Interpretation of Student Perception Data

No	Percentage	Interpretation
1	75-100%	Excellent
2	50-74%	Good
3	25-49%	Fair
4	0-24%	Poor

## RESULTS AND DISCUSSION

The first indicator examines students' perceptions regarding the ease of access to information and understanding of Biology learning materials through the use of gadgets. Before presenting the detailed findings, it is important to note that this indicator reflects how digital tools support students in obtaining learning resources, enhancing comprehension, and increasing confidence in the learning process. The complete results of this analysis are presented in Table 3.

**Table 3.** Result of Data Analysis on Indicators of Ease of Access to Information and Understanding of Material

No	Statements	Frequency of Scores				Average (%)	Interpretation
		1	2	3	4		
1	The device makes it easy for me to find additional material related to Biology topics.	2	5	129	50	79,838	Excellent
2	The device makes it easy for me to find access broader and more relevant material.	1	5	145	35	78,629	Excellent
3	The use of online learning apps or platforms helps me understand difficult Biology concepts.	0	23	139	24	75,269	Good
4	Gadgets make it easier to access e-books or Biology course modules.	1	20	144	21	74,865	Good
5	I feel that the use of gadgets makes me more confident in learning Biology materials.	1	11	155	19	75,806	Excellent
<b>Average</b>						<b>76,881</b>	<b>Excellent</b>



Based on Table 3, the overall average score for this indicator is 76.88%, which falls into the *excellent* category. This result indicates that students generally have a very positive perception of the use of gadgets in facilitating access to information and improving their understanding of Biology materials. More specifically, most students agreed that gadgets enable them to easily find additional learning resources, access e-books or modules, and better understand complex Biology concepts through digital platforms. Furthermore, the use of gadgets was also found to contribute to increased self-confidence in learning, as students feel more prepared and supported by the availability of diverse information sources. These findings are consistent with previous studies. Prabandari & Salamah (2022) state that the use of gadgets allows students to access important information more easily and supports communication without distance limitations. In addition, gadgets provide flexibility in accessing various forms of learning materials, which can enhance students' engagement and comprehension.

The second indicator focuses on students' perceptions of the ease of communication and collaboration in Biology learning through the use of gadgets. This indicator is important because communication and collaboration are key elements in student-centered learning, especially in the context of digital-based education. The detailed results of this indicator are presented in Table 4.

**Table 4.** Results of Data Analysis on Indicators of Ease of Communication and Collaboration

No	Statements	Frequency of Scores				Average (%)	Interpretation
		1	2	3	4		
1	It helps me communicate with my teacher when I need help in studying Biology.	2	25	137	22	74,328	Good
2	I can easily discuss Biology assignments with friends using chat applications on devices.	3	17	131	35	76,209	Excellent
3	The document sharing feature on my device helps me complete group tasks faster.	0	9	145	32	77,957	Excellent
4	My device makes it easier for me to join online discussion forums about Biology.	0	15	154	17	74,462	Good
5	It allows me to ask questions to the teacher outside of class time.	0	28	130	28	74,193	Good
<b>Average</b>						<b>75,429</b>	<b>Excellent</b>

Based on Table 4, the overall average score for this indicator is 75.43%, which is categorized as *excellent*. This finding indicates that students have a highly positive perception of the role of gadgets in facilitating communication and collaboration during the Biology learning process. Specifically, students reported that gadgets enable them to communicate more easily with teachers when they encounter difficulties in understanding the material. In addition, chat applications allow students to discuss assignments with peers efficiently, promoting active exchange of ideas and collaborative problem-solving.

Furthermore, the availability of document-sharing features supports faster completion of group tasks, while online discussion forums provide broader opportunities for students to engage in academic discussions beyond the classroom. The flexibility to ask questions outside of formal class hours also enhances the responsiveness of the learning



process and accommodates individual learning needs. These results suggest that gadgets significantly contribute to creating a more interactive and flexible learning environment.

These findings are supported by previous studies. (Potensia et al. (2021) explain that gadgets function as effective communication tools that enable individuals to interact easily without spatial limitations. In an educational context, this facilitates continuous interaction between students and teachers. In addition, Siringoringo & Alfaridzi (2024) emphasize that the integration of digital technology in learning allows students to collaborate, participate in discussions, and access learning content regardless of location, thereby promoting a more dynamic and inclusive learning environment.

The third indicator examines students' perceptions of the role of gadgets in improving the effectiveness of Biology learning. This aspect is essential because learning effectiveness reflects how well students can manage their study activities, access materials, and achieve learning objectives through the integration of technology. Before presenting the findings in detail, it is important to emphasize that this indicator highlights the extent to which gadgets support independent learning, time management, and efficiency in completing academic tasks. The detailed results for this indicator are presented in Table 5.

**Table 5.** Results of Data Analysis on Indicators of Increased Learning Effectiveness

No	Statements	Frequency of Scores				Average (%)	Interpretation
		1	2	3	4		
1	It helps me organize my Biology study schedule independently.	2	16	158	10	73,521	Good
2	By using gadgets, I can review the Biology material taught in class.	0	4	149	23	75,134	Excellent
3	Online learning platforms such as Google Classroom or Zoom make learning Biology more effective.	6	60	109	11	69,354	Good
4	It allows me to complete Biology tasks faster than using manual methods.	0	17	145	24	74,596	Good
5	I feel that device-based learning is more efficient because it reduces the use of printed books.	3	33	131	96	72,311	Good
<b>Average</b>						<b>72,983</b>	<b>Good</b>

Based on Table 5, the overall average score for this indicator is 72.98%, which falls into the *good* category. This result indicates that students generally perceive the use of gadgets as beneficial in enhancing the effectiveness of their Biology learning, although the impact is not as strong as in the previous indicators. In particular, students reported that gadgets help them organize their study schedules more independently and allow them to review learning materials flexibly outside classroom hours. The availability of various digital platforms also enables students to access diverse learning resources, such as videos, articles, and interactive content, which support deeper understanding of the subject matter.

Furthermore, the use of gadgets was found to improve efficiency in completing assignments, as students can work faster compared to manual methods. The reduced reliance on printed books also reflects a shift toward more practical and accessible digital learning resources. However, some responses indicate that not all digital platforms are perceived as equally effective, suggesting that the quality of digital tools and their implementation plays an important role in determining learning outcomes.

Gadgets have applications that can provide information through images, sounds, movements, and colors, either naturally or manipulated. This can help teachers to create



an interesting and varied learning atmosphere, so that learning becomes more interactive and effective. Through devices, two-way communication occurs dynamically in learning, while in the absence of devices, teachers are accustomed to talking in one direction and students tend to be inactive (Restela & Putri, 2023). With the presence of the internet through devices, access to information from all over the world has become easier and faster. This transformation has changed various aspects of human life and shifted many things from manual systems to online-based systems. The internet and gadgets have now become an integral and fundamental part in fulfilling information and communication needs, making it one of the main human needs, especially in the field of education to improve learning effectiveness (Restela & Putri, 2023). Prabandari & Salamah (2022) also note that the use of the internet is crucial in today's educational landscape. In this digital age, the internet revolution has the potential to transform the way we learn and access information. The integration of the internet into education enhances the learning experience and shifts the paradigm—demonstrating that technology is not an obstacle to fostering a love of learning, provided it is used effectively.

The fourth indicator examines students' perceptions of their ability to understand Biology material interactively through the use of gadgets. This indicator is particularly important because Biology often involves abstract concepts and complex processes that require visualization and interactive approaches to facilitate deeper understanding. Therefore, the integration of digital tools is expected to enhance students' comprehension through engaging and dynamic learning experiences. The detailed results of this indicator are presented in Table 6.

**Table 6.** Results of Data Analysis on Indicators of Ability to Understand Material Interactively

No	Statements	Frequency of Scores				Average (%)	Interpretation
		1	2	3	4		
1	Interactive animations on devices help me understand complex biological processes.	0	18	149	19	74,731	Good
2	Biology-based educational games on devices improve my understanding of certain topics.	0	16	144	26	75,134	Excellent
3	I find it easier to understand Biology diagrams or graphs through apps on my device than printed books.	2	28	137	19	73,387	Good
4	I feel that the quizzes or practice questions available on my device help me prepare for the Biology exam.	0	15	149	22	74,731	Good
5	The Biology experiment simulation video that I accessed through my device increased my interest in learning.	1	10	156	19	74,328	Good
<b>Average</b>						<b>74,462</b>	<b>Good</b>

Based on Table 6, the overall average score for this indicator is 74.46%, which is categorized as *good*. This finding indicates that students generally perceive gadgets as effective tools for supporting interactive understanding of Biology materials. Specifically, students reported that features such as interactive animations, educational games, digital diagrams, and online quizzes help them better grasp complex concepts. In addition, simulation videos of Biology experiments were found to increase students' interest in



learning, suggesting that visual and interactive media play a crucial role in enhancing engagement and comprehension.

The results also show that digital applications allow students to visualize abstract biological processes more clearly compared to conventional printed materials. This supports the idea that interactive learning environments can improve conceptual understanding by combining multiple forms of representation, such as text, images, audio, and animation. Furthermore, the availability of instant feedback through quizzes and practice questions enables students to evaluate their understanding in real time, thereby promoting more effective learning.

These findings are consistent with previous studies. Haka et al. (2020) explain that interactive multimedia provides various features that can enhance students' critical thinking skills, particularly when dealing with complex and abstract subject matter. Through interactive learning media, students are encouraged to actively engage in the learning process and apply their knowledge to solve problems. In addition, Marhaeni et al. (2020) state that multimedia-based learning, which integrates text, images, videos, and animations, can significantly improve the quality of the learning process and student learning outcomes. This type of media stimulates multiple senses simultaneously, making learning more interesting and effective.

The fifth indicator examines students' perceptions regarding the disruption of focus and concentration caused by the use of gadgets in Biology learning. This indicator is essential to understand the potential negative impacts of technology integration, particularly in relation to students' attention and learning discipline. While gadgets provide many benefits in accessing information and supporting learning activities, they may also introduce distractions that affect students' ability to concentrate. The detailed results of this indicator are presented in Table 7.

**Table 7.** Results of Data Analysis on Indicators of Focus and Concentration Disorders

No	Statements	Frequency of Scores				Average (%)	Interpretation
		1	2	3	4		
1	The use of gadgets often tempts me to open social media while studying Biology.	9	61	106	9	67,607	Good
2	I find it difficult to concentrate on studying Biology because of the notifications that pop up from other apps.	9	67	102	8	65,457	Good
3	Gadgets cause me to put off completing Biology assignments more often.	10	75	89	12	65,725	Good
4	Using gadgets for too long makes me feel tired when studying Biology.	6	76	97	7	65,591	Good
5	I feel annoyed by advertisements or pop-ups that appear when studying Biology using gadgets.	10	32	120	24	68,682	Good
<b>Average</b>						<b>66,612</b>	<b>Good</b>

Based on Table 7, the overall average score for this indicator is 66.61%, which falls into the *good* category. This finding indicates that although students acknowledge the benefits of gadgets, they also experience moderate levels of distraction during the learning process. Specifically, students reported that the use of gadgets often tempts them to open social media while studying, which can reduce their focus on Biology materials. In addition,



notifications from various applications were identified as a significant source of distraction, making it difficult for students to maintain concentration during learning activities.

Furthermore, some students admitted that the use of gadgets can lead to procrastination in completing assignments, as well as physical fatigue due to prolonged screen time. The presence of advertisements and pop-ups was also reported to interfere with the learning process, creating additional cognitive distractions. These findings suggest that while gadgets support learning, their uncontrolled use may negatively impact students' focus and overall learning effectiveness. These results are consistent with previous studies. Marhaeni et al. (2020) explain that excessive smartphone use can reduce students' concentration and learning interest, as learners may become more engaged with entertainment features than with academic activities.

The eighth indicator examines students' perceptions of the social and technical impacts of using learning applications in Biology learning. This indicator is important to understand how technological factors, such as internet connectivity and device performance, as well as their influence on social interaction, affect the learning process. In addition to providing benefits, the use of digital devices may present challenges that can influence students' motivation and interaction within the learning environment. Therefore, this indicator highlights both the opportunities and potential constraints associated with technology integration in learning. The detailed results of this indicator are presented in Table 8.

**Table 8.** Results of Data Analysis on Social and Technical Impact Indicators

No	Statements	Frequency of Scores				Average (%)	Interpretation
		1	2	3	4		
1	Gadgets reduce my direct interaction with friends and teachers when studying Biology.	11	71	96	7	65,860	Good
2	I am more likely to study alone with my devices than to have a face-to-face discussion with friends.	17	81	79	9	63,440	Good
3	A slow internet connection often prevents me from accessing Biology materials	4	21	127	34	72,177	Good
4	Technical glitches in the learning application make the learning process less effective.	2	28	140	16	71,908	Good
5	Using gadgets too often makes me lose motivation to learn manually (without gadgets).	6	65	106	9	69,892	Good
<b>Average</b>						<b>68,655</b>	<b>Good</b>

Based on Table 8, students' perceptions of the social and technical impacts on learning applications are categorized as good, as indicated by an average percentage of 68.655%. This finding implies that technical constraints, such as unstable internet connections, do not significantly hinder students' motivation to learn. Instead, students demonstrate a level of adaptability in utilizing digital devices as learning tools, particularly in biology learning, which often requires access to diverse and up-to-date information sources.

The positive perception towards device usage suggests that technology integration in learning not only supports cognitive aspects, such as knowledge acquisition, but also contributes to affective aspects, namely sustaining students' motivation. This indicates that students are not merely passive users of technology but are able to optimize its function to support their learning needs. Furthermore, the finding that device usage does not reduce



social interaction among members of the school under study reflects that technology, when used appropriately, can complement rather than replace direct social engagement in the learning environment.

These results are consistent with Meliasari (2021), who highlights that the use of devices can enhance students' abilities and broaden their knowledge through easy and rapid access to information. In addition, Herawati (2019) emphasizes that digital devices facilitate communication and information exchange regardless of distance, which strengthens collaborative learning opportunities. Therefore, the integration of devices in learning can be understood as a supportive factor that enhances both individual learning outcomes and social interaction, provided that it is managed effectively within the educational context.

The ninth indicator examines students' views on the effectiveness of using gadgets in Biology learning. This indicator is important to understand the extent to which technology contributes to improving the quality of learning, including aspects such as learning interest, flexibility, creativity, and students' learning strategies. In the context of 21st-century education, digital devices function not only as supporting tools but also as means to optimize a more adaptive and interactive learning experience. Therefore, this indicator highlights students' perceptions of how gadgets support the effectiveness of Biology learning. The detailed results of this indicator are presented in Table 9.

**Table 9.** Results of Data Analysis on Indicators of Learners' Views on the Effectiveness of Using Gadgets

No	Statements	Frequency of Scores				Average (%)	Interpretation
		1	2	3	4		
1	I feel that the use of devices makes learning Biology more interesting than traditional methods.	6	32	135	13	71,774	Good
2	With gadgets, learning Biology becomes more flexible because it can be done anywhere.	0	16	144	26	75,672	Excellent
3	I feel that gadgets are an important tool to support Biology learning in the digital era.	0	8	151	27	75,806	Excellent
4	The use of devices in learning Biology increases my creativity in understanding the material.	0	14	153	18	75,672	Excellent
5	It helps me strategize my Biology study better.	2	18	146	20	74,865	Good
<b>Average</b>						<b>74,757</b>	<b>Good</b>

Based on Table 9, students' perceptions of the effectiveness of using gadgets in Biology learning fall into the good category, with an average percentage of 74.757%. This result indicates that the use of digital devices is perceived to contribute positively to the learning process, particularly in enhancing students' interest, flexibility, and understanding of Biology material. The high rating on the flexibility aspect suggests that students experience greater ease in accessing learning anytime and anywhere, making the learning process more adaptable to individual needs.

Furthermore, the positive perception of gadgets in enhancing creativity and learning strategies indicates that students are not merely passive users of technology, but are able to utilize it to develop more effective learning approaches. This reflects a shift toward more independent and technology-supported learning. However, the overall classification of "good" (rather than "excellent") suggests that there is still room for optimization,



particularly in maximizing the use of technological features and providing proper guidance to ensure more effective utilization.

These findings are in line with Angelica (2023), who states that gadgets play a crucial role in the digital era by facilitating access to information and supporting both online and offline learning processes. Therefore, the use of gadgets in Biology learning can be understood as a supporting factor for learning effectiveness, provided that it is integrated appropriately with suitable instructional strategies.

The tenth indicator examines students' views on the sustainability of using gadgets in Biology learning. This indicator is important to understand students' long-term acceptance of technology integration, including their support for continued use, the role of teachers in facilitating technology-based learning, and the need to balance digital tools with direct instructional guidance. In the context of continuous technological development, it is essential to evaluate whether students perceive gadgets as a temporary support tool or as a sustainable component of the learning process. Therefore, this indicator highlights students' perspectives on the future use of gadgets in Biology learning. The detailed results of this indicator are presented in Table 10.

**Table 10.** Results of Data Analysis on Indicators of Learners' Views on the Sustainability of Using Gadgets

No	Statements	Frequency of Scores				Average (%)	Interpretation
		1	2	3	4		
1	I support the continued use of devices in Biology learning in the future.	1	14	149	22	73,924	Good
2	Teachers need to use devices more often to deliver Biology materials interactively.	0	47	123	16	73,252	Good
3	The use of devices in learning Biology needs to be balanced with direct guidance from the teacher.	2	12	131	41	76,075	Excellent
4	Gadgets are an irreplaceable tool in modern Biology learning.	2	43	127	14	71,639	Good
5	I believe learning Biology using devices can improve my performance in this subject.	2	15	145	24	75,672	Excellent
<b>Average</b>						<b>74,112</b>	<b>Good</b>

Perceptions of the use of gadgets in learning biology in this indicator have a good interpretation. This can be seen from the average percentage obtained of 74,112%. From this data, it can be seen that some students by using gadgets make it easier for them to find information and increase understanding and knowledge related to biological material, therefore they support the continued use of gadgets in learning biology in the future and teachers can also more often convey information related to biological material interactively. According to Kartika & Hendrawan (2024) states that digital technology in educational institutions as a learning medium, can be as a learning medium to access information on learning materials or as a medium to support learning activities related to assignments.

In the 4.0 era, the use of gadgets cannot be eliminated because it is one of the main needs of humans today. After the development of technology which is getting more sophisticated every day, the media with the development of the times also experienced developments in online media. Online media has various types, from those that convey news to making it easier for humans to interact, one of which is social media, with the existence of social media making it easier for humans to communicate with each other online, there are many types of social media such as Instagram, TikTok, Facebook, and X.



However, there are concerns about ethical violations. However, there are concerns about violations of interacting ethics, especially on social media. Language that should be a good and polite means of communication is instead used in some groups for racism, attacking, humiliating, so that it can have a detrimental impact on others. The first pillar of Indonesia's Vision 2045 is human development and mastery of science and technology. To realize this vision, the government needs to utilize the demographic bonus by developing quality human resources. With this, the quality of people in Indonesia will improve with better and more equitable education. Mastery of science and technology (IPTEK) is the key to building the nation's competitiveness, including in terms of communication in the 0.4 era. One of the perspectives in human development in the 0.4 era is the progress to communicate ethically on social media. Education about ethics in social media can create human resources who not only understand technology, but are also wise in using it. Communication on social media requires the same ethics as in real life. Although there is freedom of expression, users must still respect the norms and values that apply, so as to avoid speech that hurts or triggers bullying (Michellia et al., 2024).

This section presents the recapitulation of students' perception data across all indicators to provide a comprehensive overview of how gadgets are perceived in Biology learning. By examining all indicators collectively, it becomes possible to identify general trends in students' responses, including the overall level of acceptance, perceived benefits, and potential limitations of gadget use in the learning process. The detailed results of this recapitulation are presented in Table 11.

**Table 11.** Recapitulation of Data on All Indicators

<b>Indicators</b>	<b>Average (%)</b>	<b>Interpretation</b>
Ease of access to information and understanding of material	76,881	Excellent
Ease of communication and collaboration	75,429	Excellent
Increased learning effectiveness	72,983	Good
Ability to understand material interactively	74,462	Good
Disruption of focus and concentration	66,612	Good
Social and technical impacts	68,655	Good
Students' views on the effectiveness of device use	74,757	Good
Students' views on the sustainability of device use	74,112	Good
<b>Average</b>	<b>73,044</b>	<b>Good</b>

Based on Table 11, it can be seen that the students' perceptions of the use of gadgets in learning Biology on the whole indicator has a good interpretation. This can be seen from the overall average percentage obtained of 73,044%. From the overall perception data, it can be seen that most of the students agree with the use of devices in learning, especially in biological material. In addition to making it easier to find information related to biological material, devices also make it easier to access learning platforms. This can make students more confident in learning, especially in biology subjects. According to the opinion Hidayati et al. (2022) Perception is a response found in each individual through a process based on feelings and experiences. Responding to something (stimulus) each individual produces a different opinion, because the opinion of each individual is different.

Currently, the online platforms that are often used in several universities in organizing the teaching and learning process are Zoom and Google Classroom. Zoom is an application with video conferencing services made practical with the aim of presenting an online meeting atmosphere. Meanwhile, Google Classroom is an efficient web service or application to facilitate teachers in managing teaching materials and assignments. Whatsapp group/group chat is a complementary medium in delivering learning tasks. Online learning is considered an innovative approach that is designed in such a way, learner-centered, interactive, and able to provide a conducive learning environment to anyone, anywhere, and anytime by using digital technology integrated with various forms of learning materials that are accessible and flexible (Mustofa et al., 2019). This agrees with



Puspaningtyas & Dewi (2020) Google Classroom is a good and easily accessible platform for learning. On the platform, there are several menu options that make the learning process and delivery of material easier.



**Figure 1.** Data Collection Documentation



**Figure 2.** Data Collection Documentation

## **CONCLUSION**

Based on the research results and discussions that have been presented, it can be concluded that students of SMA Negeri 1 Toapaya have a good perception of the use of gadgets in the biology learning process. Indicator 1 shows that students at SMA Negeri 1 Toapaya feel that gadgets make it easier for them to find additional materials, improve their understanding of the material being studied, help understand learning concepts, facilitate access to e-books and make them more confident in learning, especially in biology subjects. Meanwhile, the results of indicator 2 show that gadgets can facilitate communication with teachers when they need help in understanding the lesson material. Gadgets can also increase effectiveness in learning. By using gadgets, students can access various sources of information more quickly and easily, and interact more interactively and improve their ability to understand the material interactively. This can be seen from the average percentage results in indicators 3 and 4. From the results of indicators 5 and 6, it can be concluded that the use of gadgets in learning sometimes disturbs the focus of some students because some secretly open other sites besides learning, but it turns out that this



does not interfere with their motivation in learning. The use of gadgets also facilitates students' creativity and improved understanding of the material, reflecting the effectiveness of gadgets in biology learning, as well as their ability to search for information and enhance their understanding and knowledge of biology. The overall indicator score was 73.044%. This concludes that students' perceptions of gadget use in biology learning are generally positive. Most students at SMA Negeri 1 Toapaya agreed with the use of gadgets in learning, particularly in biology. Besides facilitating the search for information related to biology, gadgets also facilitate access to learning platforms. This can boost students' confidence in learning, particularly in biology. Gadget use is indeed crucial for education, but it must be limited and structured to ensure effectiveness, increase focus on learning, and prevent addiction.

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