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Students' Communication Skills on the Human Digestive System Subject Reviewed from the Use of Gadgets

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Abstract: Communication skills are one of the important skills that students need to have in the 21st century, including in science learning. This study not only examines the use of gadgets and communication skills in general, but also describes students' scientific communication skills on the human digestive system, based on the category of gadget use. The research sample consisted of 52 students selected through cluster random sampling. The data collection process in this study used two instruments: an essay test to measure communication skills and a questionnaire to assess device usage. Both instruments underwent validity and reliability testing before being used in the study. The reliability coefficients for the communication skills instrument and the gadget usage instrument were 0.690 and 0.758, respectively. Data were analyzed descriptively by grouping students' communication skills based on gadget usage categories. The results showed that most students' gadget usage was in the high category, while most students' communication skills were in the medium category. In the very high gadget usage category, students' communication skills were evenly distributed across the high, medium, and low categories. In the high gadget usage category, most students were in the medium category, while in the medium gadget usage category, most students were also in the medium category. Furthermore, students' scientific communication skills still showed weaknesses in accessing information sources, explaining observation results, and presenting information. The study's conclusion showed that, across different gadget usage categories, students' communication skills varied within each category. The findings of this study provide information that teachers can use as a basis for designing more targeted use of devices during learning, especially to provide space for students to develop scientific communication skills.

Keywords: Communication Skills; Human Digestive System; Gadget Use.

Introduction

The development of digital technology has become a key characteristic of life in the 21st century. Education is one sector that has undergone changes along with advances in information technology. One rapidly growing form of technological development is the proliferation of gadgets [1]. Gadgets have become a daily necessity, including for students [2]. The use of gadgets can affect students' interests and motivation [3]. The use of gadgets can improve communication skills [4].

Communication skills themselves play a vital role in education. These communication skills are part of the 4C skills (Critical Thinking, Creativity, Communication, Collaboration) that students must possess in the 21st century [5]. Communication is the process of producing, conveying, and understanding information that occurs between two or more people [6]. In learning, students are required to re-explain the material in their own words [7].

The learning process is directed towards producing quality human resources. Students are also required to possess the skills to compete in various areas of life [8]. One important skill students must possess is communication, both verbal and written [9].

Ideally, communication skills help students present material, discuss it, and interact with peers and teachers. In this process, students have the opportunity to express their opinions, respond to the material, and deepen their understanding of the topics being studied [10]. Thus, communication is used not only to convey information but also to support students' learning, encourage greater student activity, and make it easier for them to understand the material being studied [11]. Interview results indicate that teachers have not yet conducted specific assessments of students' communication skills. Assessments still focus more on critical thinking skills, resulting in an unclear identification of students' development of communication skills. Observations are also general in nature and do not utilize structured assessment indicators.

During group discussions, students appeared quite active. However, some students still felt less confident and tended to be shy when expressing their opinions or providing feedback in front of the class. Students who were more frequently involved in communication generally had higher levels of ability and self-confidence. Communication skills will improve along with a person's high level of self-confidence [12].

Based on the interview results, most students already have and use personal devices, although some still use their

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parents' devices. The use of devices is generally directed to support learning activities, such as searching for information and accessing learning materials. In addition, teachers found that devices are used for other activities, such as live broadcasts on Instagram [13]. Outside of learning time, devices are also often used for non-academic activities, such as taking photos in class.

Research by [11] discusses effective communication in the learning process, so the study focuses on communication in general. Another study [12] examines students' interpersonal communication skills, with self-confidence as an additional aspect. Meanwhile, research [13]. discusses the use of gadgets in relation to students' learning interests as a research topic. These studies have different variable foci, so they do not specifically provide a description of students' scientific communication skills on material on the human digestive system, based on the category of gadget use.

Based on these conditions, the novelty of this study lies in its focus on students' scientific communication skills regarding the human digestive system, organised by categories of device use. This study does not examine the influence or relationship between device use and communication skills; rather, it describes students' communication skills within each device-use category. This study focuses on students' communication skills as the main variable and device use as the basis for grouping students. With this focus, this study is expected to provide teachers with information on students' scientific communication skills, which can be used to inform the use of devices to support science learning activities. This study aims to describe students' communication skills on the human digestive system material, categorised by their use of gadgets.

Research Methods

Research Design

The approach applied in this research is quantitative, with a descriptive research design. The quantitative approach is a research method that uses numerical data to obtain information and answer research questions [14]. Through this approach, the data obtained can be analyzed objectively, allowing the research results to accurately reflect the actual conditions based on the calculations and data processing performed. Meanwhile, descriptive research aims to systematically, factually, and accurately describe or provide an overview of a particular phenomenon, condition, or symptom based on field data [15]. Thus, descriptive research does not focus on providing treatment to the research object but rather emphasizes revealing the conditions as they occur, based on observations and data collected.

Subjects and Time of Research

This study involved eighth-grade students at SMP Negeri 6 Tanjungpinang who participated in science learning activities as research subjects. The selection of subjects was based on the research objective to obtain an overview of the conditions of eighth-grade students during science learning. The study was conducted in the odd semester of the 2025/2026 academic year, with a three-month implementation period, from January to March 2026. During this period, the researcher conducted the data collection, observation, and analysis stages related to the research variables.

Research Population and Sample

The research population comprises all individuals or objects that meet the research criteria and are the target of the researcher's observations, forming the basis for drawing conclusions [16]. In this study, the population comprises all eighth-grade students at SMP Negeri 6 Tanjungpinang who were registered for the 2025/2026 academic year. The students are divided into four classes, namely VIII.1, VIII.2, VIII.3, and VIII.4, with the number of students in each class ranging from 31 to 32 people. The number of students in each class is detailed in Table 1.

Table 1. The population of Class VIII Students of SMP Negeri 6 Tanjungpinang

No	Class	Amount
1	VIII-1	31
2	VIII-2	32
3	VIII-3	32
4	VII-4	32
Total		127

The sampling technique used was cluster random sampling, which involves selecting samples from naturally formed clusters. Because cluster random sampling was used, two classes were randomly selected using a spinning method to ensure each class had an equal chance of selection. Based on the draw results, the classes selected as research samples were VIII.2 and VIII.3. Dalam hal ini, sampel yang terpilih berjumlah 52 siswa.

Research Ethics

This research was conducted after obtaining research permission from SMP Negeri 6 Tanjungpinang. Prior to data collection, students were given an explanation of the study's purpose, procedures, and use of data. Student participation in the study was voluntary, following consent from participants and relevant parties. Student identities are not included in the presentation of the research results, and all data obtained are used solely for research purposes.

Research Variables

The research involves two main variables, namely communication skills and gadget use. Indicators for both variables are presented in Tables 2 and 3.

Table 2. Communication Skills Indicators

No	Indicator
1	Information retrieval
2	Scientific reading
3	Scientific writing
4	Observing
5	Information representation
6	Knowledge presentation

[17]

Table 3. Device Usage Indicators

No	Indicator
1	Knowing the functions and types of device applications
2	Able to operate gadgets
3	Duration of device use
4	Frequency of gadget use

[18]

Data Collection Techniques

Data on communication skills were collected using a six-question essay-based test. Each question item is structured around communication skill indicators, including information retrieval, scientific reading, scientific writing, observation, information representation, and knowledge presentation. Student answers are assessed using a scoring rubric developed from the communication skill indicators and the answer criteria students must demonstrate for each question item. The rubric is used to assign scores based on the quality of student answers, so that the assessment is not based solely on whether an answer is correct or incorrect, but on whether the criteria are met according to the measured indicators. The rubric is validated by expert lecturers along with the essay test instrument to ensure the appropriateness of the questions, indicators, and scoring criteria.

Validity testing was carried out using product-moment correlation using SPSS, with a significance level of 5%. Items that meet the validity criteria are deemed suitable for use in research. Test results indicate that all questions are valid and can be used as data-collection tools. Furthermore, reliability testing yielded a Cronbach's Alpha value of 0.690. This value indicates the internal consistency of the communication skills instrument and is considered reliable for research use.

Meanwhile, data on device usage were collected through a closed-ended questionnaire that elicited quantitative responses from students to each statement. The questionnaire uses a Likert scale with a score range of 1-4 to measure students' responses to each statement. Before being used in this study, the questionnaire also underwent validity and reliability testing. Validity testing was conducted on each statement item to determine its suitability for measuring device usage indicators. The testing was conducted using the product-moment correlation at the 5% significance level. Statement items that met the validity criteria were deemed suitable for use in the study. Based on the test results, the instrument has a Cronbach's Alpha of 0.758, indicating internal consistency and reliability for use in this study.

Data Analysis Techniques

Communication Skills Data Analysis

Communication skills test results obtained from students were calculated and converted into percentages. The percentage calculation used the following formula [19].

$$\text{Percentage} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\%$$

Next, the data on communication skills are grouped into the categories shown in Table 4.

Table 4. Communication Skill Level Criteria

Percentage	Criteria
80 % > x	Very high
60 < x ≤ 80 %	High
40 < x ≤ 60 %	Currently
20 < x ≤ 40 %	Low
x ≤ 20 %	Very low

[20]

Device Usage Data Analysis

The data from the gadget usage questionnaire completed by students were calculated and converted into percentages. The percentage calculation is based on the following formula [19].

$$\text{Percentage} = \frac{Score\ Obtained}{Maximum\ Score} \times 100\%$$

Next, data on device usage are grouped into the categories shown in Table 5.

Table 5. Criteria for Gadget Usage Levels

Percentage	Criteria
81 - 100 %	Very high
61 - 80 %	High
41 - 60 %	Medium
20 - 40 %	Low
0 - 20 %	Very low

[21]

Analysis of Communication Skills Based on Gadget Usage Categories

Student communication skills data were first analyzed using descriptive statistics to obtain student scores. The scores are categorized into communication skill levels (very high, high, medium, low, and very low) according to the criteria in Table 4. After that, the students' gadget usage data were analyzed using the gadget usage assessment rubric presented in Table 5 to determine each student's gadget usage level. Based on the results of the two analyses, data on students' communication skills are presented for each category of device use to provide an overview of their distribution. The next step is to interpret each group to identify communication-skill tendencies at each level of gadget use. The results of the analysis are then presented to provide an overview of students' communication skills by gadget usage category.

Results and Discussion

Device usage data from 52 students was analyzed using the descriptive answers provided. The results were then grouped by questionnaire scores and presented in Table 4.

Table 6. Student Groups Based on Gadget Usage Levels

Device Usage Categories	Percentage	Number of Students
Very high	81 - 100 %	6
High	61 - 80 %	40
Medium	41 - 60 %	6

Based on Table 6, the distribution of gadget usage levels shows that the majority of respondents fall into the high category. This is demonstrated by the largest number of respondents, which falls within the 61-80% range, totalling 40 students. A total of 52 students completed essay questions to assess their communication skills. The data were then grouped by score and presented in Table 7. The most frequently found category of gadget usage is the high category.

Table 7. Student Groups Based on Communication Skill Levels

Communication Skills Category	Percentage	Number of Students
High	$60 < x \leq 80$ %	16
Medium	$40 < x \leq 60$ %	28
Low	$20 < x \leq 40$ %	8

Table 7 shows that the frequency of students' communication skills tends to be in the moderate category. This is evident from the largest number of respondents, who fell within the $40\% < x \leq 60\%$ range, with 28 students. The most common communication skill category found was moderate. Students' communication skills were then analyzed based on six indicators.

Table 8. Student Communication Skills Indicators

No.	Indicator	Percentage	Category
1.	Information retrieval	53 %	Medium
2.	Scientific reading	50 %	Medium
3.	Scientific writing	58 %	Medium
4.	Observing	61 %	High
5.	Information representation	52 %	Medium
6.	Knowledge presentation	49 %	Medium
Average		54 %	Medium

Based on the analysis of each indicator, students' communication skills showed variation across indicators. The observing indicator achieved the highest percentage, at 61%, while the knowledge presentation indicator achieved the lowest, at 49%. Overall, these results indicate differences in the distribution of achievement across each communication skill indicator. Students' communication skills were then grouped based on their device usage categories. The grouping results for each device usage category are presented in Figures 1, 2, and 3.

Figure 1 presents the analysis of students' communication skills in the very-high-gadget-usage category. In this category, there are six students, evenly distributed across the communication skill levels. Two students, or 33.3%, fall into the high category, two students, or 33.3%, fall into the medium category, and two students, or 33.3%, fall into the low category. Next, Figure 2 presents the results for students' communication skills in the high-gadget-usage category, showing the distribution across communication skill categories.

Figure 2 presents the analysis of students' communication skills in the high-gadget-usage category. Based on the analysis, students' communication skills in this category show variation. In the high-gadget-usage category, there are 40 students, divided into three communication-skill categories. 21 students (52.5%) are in the moderate category, 13 (32.5%) in the high category, and 6 (15%) in the low category. Next, Figure 3 presents the results of the analysis of students' communication skills in the moderate gadget-usage category, showing the distribution across communication-skill categories.

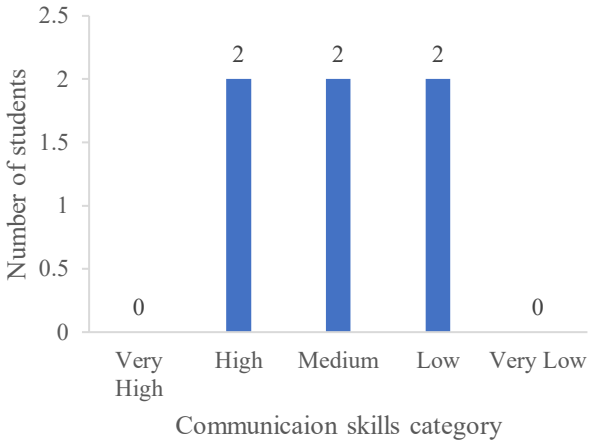


Figure 1. Communication Skills Based on Gadget Usage Category: Very High

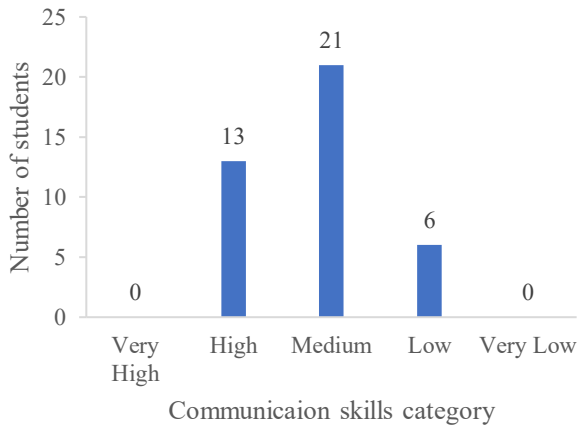


Figure 2. Communication Skills Based on High Gadget Usage Category

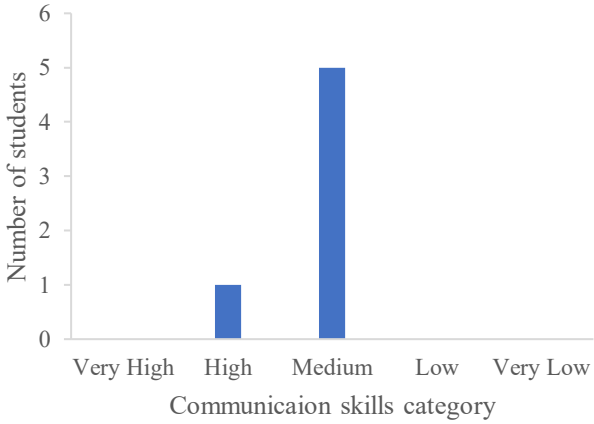


Figure 3. Communication Skills Based on Moderate Gadget Usage Category

Figure 3 presents the analysis of students' communication skills in the moderate gadget-use category. Based on the analysis, students in the moderate gadget-use category tend to have fairly good communication skills. In this category, there are six students divided into two communication skill categories. The majority of students are in the moderate category (5 students, 83.3%), while 1 student (16.7%) is in the high category.

Analysis of Communication Skills Based on the Category of Very High Gadget Use

The results of the study indicate that students in the very high gadget-usage category have diverse communication skills, with equal numbers in the high, medium, and low categories. This illustrates that the very high gadget-usage category does not indicate a single dominant communication-skill category. Therefore, the results of this study are best understood as a description of students' communication skills in the very high gadget-usage category.

The use of devices in learning activities can be directed to support students in obtaining information and accessing learning resources. However, device use must be accompanied by learning activities that provide opportunities for students to process information, express opinions, and communicate actively. Appropriate device use can support learning activities when directed to meet learning needs [22].

Analysis of Communication Skills Based on the High Gadget Usage Category

Based on the high gadget usage category, most students' communication skills are at a moderate level. High-intensity gadget usage is also a condition that needs to be considered in learning activities. Previous research indicates that excessive gadget use should be considered in relation to students' communication skill development [23]. In this case, teachers play an important role in helping students develop their communication skills during the learning process. Teachers not only deliver learning materials but also need to design learning activities that help students actively express ideas, opinions, and information. The development of students' communication skills depends on teachers' role in the learning process [24].

In addition to teachers' roles, the choice of learning methods is important for improving students' communication skills. Teachers need to create learning experiences that not only use devices as a learning medium but also encourage students to remain actively engaged in communication throughout the learning process [25]. The use of devices in learning can be accompanied by discussions, presentations, group work, and writing activities so that students still have the opportunity to process and convey the information they obtain. Therefore, the use of devices can be integrated into learning activities while still providing space for students to communicate actively [26].

The communication skills test results also showed variation across each indicator measured. The observing indicator achieved the highest percentage, while the knowledge presentation indicator achieved the lowest. The higher percentage for the observing indicator may be related to science learning activities that provide students with opportunities to observe objects, images, or visual information. Conversely, the lower percentage for the knowledge presentation indicator indicates that knowledge presentation remains a crucial aspect, particularly in organizing and conveying information clearly. In the information retrieval indicator, some students provided logical answers, but still failed to include clear and relevant reference sources. This may be due to students' limited ability to document the sources of information used in accordance with reference-writing rules. In the scientific reading and scientific writing indicators, students' answers still tended to reuse information from the questions without further processing it in their own language. Meanwhile, in the information representation indicator, the presentation of information as tables or graphs still showed some inaccuracies. In the knowledge presentation indicator, some students' answers were incomplete and lacked clear explanations, resulting in an unstructured presentation of ideas [27], [28].

Analysis of Communication Skills Based on Moderate Gadget Usage Category

In the moderate gadget-use category, most students' communication skills are also moderate. This indicates that limited use of gadgets provides students with the opportunity to process information and express their ideas and thoughts [29]. Targeted use of gadgets can also provide students with opportunities to engage with digital learning resources while simultaneously participating in independent learning activities [30]. Thus, students are not overly dependent on gadgets and still have the opportunity to process information independently.

This study has several limitations that should be considered when interpreting the results. The study was conducted at a single school with a relatively small sample size, so the results may not be representative of students at other schools. Furthermore, the study used a descriptive design, so the results provide only a snapshot of the distribution of students' communication skills across device usage categories and cannot be used to determine relationships or influences between variables. Future research could involve a larger sample size, multiple schools, and employ different research designs to obtain a broader picture.

Conclusion

Based on the research results, in the very high gadget-usage category, there was no clear trend toward any particular communication-skill category, as students were evenly distributed across the high, medium, and low categories. In the high-gadget-usage category, students' communication skills tended to fall in the medium category. Similarly, in the moderate gadget-usage category, students' communication skills tended to fall in the medium range. Overall, most students' communication skills fell into the medium category. These results indicate that students with high levels of device use do not necessarily possess higher-level communication skills. Therefore, device use in learning needs to be guided and supported to better support

learning activities. Teachers can guide students to utilize devices to search for relevant information, read scientific sources, write down information, explain observations, represent information, and present knowledge. The use of devices directed at these activities is expected to support the development of students' scientific communication skills. Further research is recommended, involving a larger sample size and multiple schools to obtain a broader picture. Furthermore, correlational or experimental studies could be conducted to further examine the relationship or influence of device use on students' scientific communication skills. Future research could also consider the type of application, the purpose of use, and students' activities when using devices for learning.

Author's Contribution

P. H: contributing to the research conceptualization, conducting data collection and data analysis, preparing the original draft of the manuscript, and revising the manuscript. D. S and T. A: research supervision, directing the research concept, reviewing the manuscript content, validating the research instruments prior to field testing for validity and reliability, and providing suggestions and corrections for the improvement of the article.

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