

Exploration of internet usage habits as a learning resource in basic biology concepts lectures

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Abstract

Keywords:
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Learning resources;
Digital literacy;

The present study has been designed to exploring undergraduate students' habitual patterns of using the internet as a source of information in lectures. The study's primary focus is on the intensity, the usability, and effectiveness data of this engagement in relation to digital literacy in higher education. Furthermore, in order to enhance digital literacy, it is imperative to acquire competencies in the following areas: digital skills, digital ethics, digital safety and digital culture. The research employs a qualitative approach with data collection techniques including in-depth interviews, observations, and document analysis. The findings reveal that undergraduate students frequently rely on the internet for additional references, completing assignments, and understanding challenging classroom materials. Undergraduate students' interest in the internet as a learning resource is influenced by the diversity of available information, ease of access, and the relevance of online materials to their academic needs. However, some obstacles are identified, such as difficulties in filtering valid information and limited digital literacy among some students. The study concludes that the internet serves as a valuable learning resource for students, yet its usage requires guidance to enhance digital literacy and critical thinking skills. The study's implications suggest that instructors should effectively integrate online learning resources into their teaching and develop strategies that encourage the optimal and guided use of the internet in academic learning.

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Introduction

The field of education is undergoing annual expansion, with technology playing a pivotal role in facilitating the learning process. The internet, in particular, has emerged as a significant tool in the teaching and learning process across various levels of education, ranging from elementary schools to universities. The adoption of technology in higher education is driven by the need to enhance the learning experience and activities for students.

The purpose of higher education is to provide students with the opportunity to access learning resources during lectures. Such facilities include wireless fidelity (Wi-Fi), e-learning and internet networks, which have been shown to enhance the quality of learning and assist students in their academic endeavours, such as writing articles and materials (Listya, Fitria, Triyana, & Asni, 2023).

According to Fred S Keller in research by (Salem & Arkiang, 2020), conventional methods applied to educational technology in the 1960s were criticized as not attracting enough

attention to learning and students were encouraged to freely access more widely to determine what they wanted to learn according to their interests, needs, and his abilities. Students can access information and interact remotely through developing internet technology. The use of the internet is used to condition students to learn independently. Through independent study, students become doers, as well as thinkers (Eliza et al., 2023). This aims to train students' independent learning, because the teacher is not the authority holder of knowledge. According to Kimber & Nikki in research by (Aziz, 2013), the internet provides opportunities to (1) increase access to information, (2) collect, analyze and organize information, (3) communicate ideas and information, (4) plan and organize activities, (5) collaborate with other people, (6) solve various problems, and (7) foster/develop cultural understanding. Students can access online various books in the library and articles in research journals, analyze information relevant to the material in the books, carry out online learning where students can complete online quizzes, can work together by sending e-mails to discuss teaching materials.

According to Siahaan in research by (Aziz, 2013), when planning to use the internet for learning, its function must be determined first. There are three functions of the internet in learning activities, namely as (1) complement, (2) supplement, or (3) substitute for school lessons. Utilization of the internet as a learning resource is carried out using various methods, including: reading texts, listening, watching videos, downloading learning resources in the form of journals, e-books, audiovisuals, websites), as well as discussing the information obtained with relevant sources, such as: teaching materials related to the discipline studied, both general knowledge and factual events. Effective use of the internet can enrich, add to and explore material that will and has been studied, thereby reducing the burden on teachers as facilitators. Information sources are flexible, so that users have no geographic, place and time restrictions in accessing the information.

Based on the results of the researcher's initial interview with the lecturer (29/08/2024), it was shown that there was a positive habit that was carried out at every meeting in the "Basic Concepts of Biology" course, namely studying the material using modules written by Raven & Johnson as the main reference. consistently by all students to get used to the use of credible learning sources from the start of lectures. Based on the results of the researcher's initial interviews with students, it was discovered that initially understanding the material with the English module was not easy. It's difficult to study this module because the translated words are messy and don't connect. So, we search for information via the internet that is easier to understand and quickly accessed. The intensity of internet use has a greater impact on transferring knowledge. The results of observations during lectures also showed that, most students looked for answers to quizzes given by lecturers via internet sites and there were other students who used translated Raven & Johnson modules. This student behavior illustrates the use of the internet as a learning resource. Students find it difficult to understand the biology module in English due to the lack of vocabulary, so they do not know the meaning of each word they learn. Therefore, students use internet facilities to interpret each word by word, which is very easy to access and understand. Based on the description above, it can be seen that the lecture system really needs the internet to collect information to strengthen the topic material being studied.

Previous studies have discussed various aspects related to the use of the internet as a learning resource, such as supporting and inhibiting factors (Sasmita, 2020). However, from several previous studies, there are still several gaps that provide opportunities for further exploration. Although previous studies have identified supporting and inhibiting factors in internet use, these studies are limited to the context of the intensity of use expressed in general. In this study, researchers focused on UNY undergraduate students to explore more in-depth and contextual data about the intensity of use through habitual patterns of using the internet at this university which may have unique characteristics compared to other universities. Then, in this study, students were not able to choose credible sources of information, so the sorting of information sources on the internet cannot credibly prove their validity. Previous studies also focused more on internet usage patterns but did not identify the selection of internet sites frequently used by this class, so this research tries to fill the gap by exploring browsing history in using the internet as a learning resource. Therefore, the objectives in this study is to explore of undergraduate student behavior in intensity of use, factors that influence the effectiveness of use, and digital literacy skills in using the internet.

Method

This research was conducted at Yogyakarta State University with the main aim of exploring undergraduate students' habitual patterns of using the internet as a source of information in lectures. The researcher used a descriptive qualitative approach, According to (Leksono et al., 2013) the descriptive method is an attempt to process data into something that can be clearly described and yet be understood by people who do not directly experience it. Thus, the descriptive method is an approach to a behaviour, phenomenon, problem, event or discovery in the form of sentence meaning that provides a certain explanation.

Apart from that, to obtain accurate research data, researchers also analyze data obtained from various techniques through data reduction, presentation, verification and drawing conclusions(Sustiyo Wandu, Tri Nurharsono, 2013). Data analysis uses thematic analysis as an analytical technique that uses direct interaction with sources so that the data obtained from these sources can be sorted based on the detailed handling of the researcher. This analysis identifies patterns or patterns from the object of research (Heriyanto, 2019).

Researchers seek to understand undergraduate student behavior in using the internet during lectures in depth and present it in a way that is easy to understand so that it can make a significant contribution regarding credible learning sources. This study focuses on undergraduate student behavior in intensity of use, factors that influence the effectiveness of use, and digital literacy skills in using the internet. This study conducted unstructured interviews to collect data about students' views regarding the internet as a learning resource. In this study, the researcher acts as the main instrument in collecting data and acts as a non-participant observer where the researcher goes directly to the field and does not involve himself directly in the daily activities of the object being observed but only as an observer and data collector. Data reduction in this study was carried out by simplifying what was obtained when the researcher was in the field until all the data was collected and then presenting the data to draw conclusions.

The validity test employed in this study is a methodological approach that involves the integration of multiple sources of evidence or methods to enhance the reliability and robustness of the research findings. This approach is known as triangulation (Sugeng, 2014). There are three primary types of triangulation: data sources, data collection techniques, and time triangulation (Dawis et al., 2023). In this study, the triangulation method employed was data collection techniques triangulation.

Results and Discussion

This research has three main focuses, which include data on intensity, effectiveness, and usefulness of using the internet as a learning resource. Based on this focus, the results and discussions in this research are adjusted to the results of data in the field. The findings of this data are as follows.

Intensity Data

The experience of using the internet by undergraduate students at Yogyakarta State University varies greatly influenced by various factors, but internet usage activities were felt by all respondents to have emerged and increased after they became PGSD students. The general description of the length of time spent by respondents in utilizing the internet as a learning resource can be seen in table 1.

Table 1. Respondent's Period of Internet Use

Internet Usage Period	Frequency
5-8 months	0
9-12 months	2
1-4 years	25
5-8 years	10
More than 8 years	5
Total	42

From table 1, it can be seen that the internet knowledge possessed by respondents shows that most respondents use the internet as a learning resource for a period of 1-4 years, while other experiences are only around 9-12 months. Different time variations related to the period of internet utilization used by active PGSD S1 students are also influenced by the different backgrounds of respondents.

There is something interesting about the data in table 1 regarding the results of internet usage period data, namely that not a single student has used the internet for 5-8 months. This is a normal condition because the corona virus entered Indonesia in 2020. To anticipate the virus, learning was switched online. Teachers and students are very dependent on internet access in carrying out teaching and learning activities at their respective homes. Thus, over all it can be said that the use of the internet as a learning resource has been very intense for students since the last 4 years starting from the Google Meet and Zoom applications as online classrooms, assignments given to Google Classroom, digital teaching materials, and so on. Therefore, there are no students who have only had experience using the internet for around 5-8 months.

The high intensity of internet use is influenced by how much information is obtained by accessing it, so that students tend to depend on the internet during the learning process. The results of interviews with undergraduate students show that the internet acts as a learning resource for students. Lecturers use digital modules that can be used as references for the material being studied.

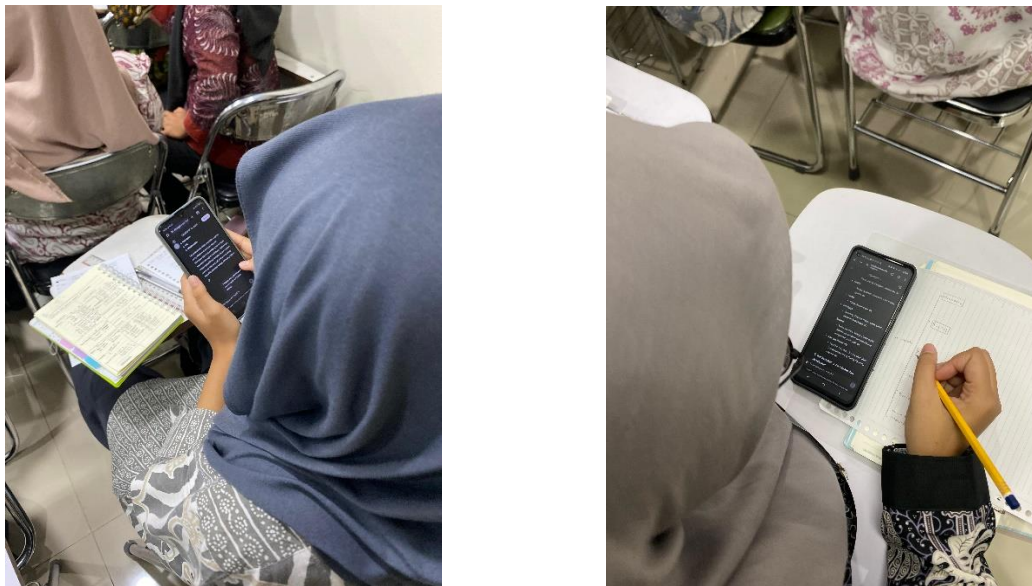


Figure 1. Use Gemini to Help with Assignment Needs

“Most of us prefer to use Gemini and Chat GPT as a type of digital learning resource. The reason we are interested in seeking information from both is to find quick and familiar answers used by the general public, which makes us trust the two sites more and doubt our own answers. In addition, educational websites that are often visited are Ruang Guru, Brainly, Zenius. When completing a lab report, we often use previous lab reports from other universities to provide a big picture obtained from the general news site, example Tribunnews, Kumparan, etc. On the other hand, when preparing a presentation, our material is only sourced from the e-module from (Beaver, 2011) as a reference required by the lecturer of the course. Meanwhile, we present material from the e-module that needs to be translated first with Google Translate and Bubble Translate” (12/09/2024).

One example of internet utilization is digital teaching materials. This utilization is driven by the characteristics of the internet that have a positive impact on the world of education (Dan & Widyana, 2019), namely: First, scope. Internet access makes it easy for students to search for and explore wider information from anywhere. Second, topicality. The information accessed is always updated and free of charge. Third, personalization. Textbooks that are not relevant to the reader's needs. The internet helps students in completing assignments where the material is presented according to the level of difficulty and students can adjust to their abilities. Learn to use the internet by accessing and downloading relevant information, interacting with sources, interacting with others about sources, analyzing and responding to sources.

The results of the study showed that, on average, students access the internet for learning purposes around 4-5 times a week, with a duration varying between 1 to 3 hours per session. So that most students use the internet regularly as a supporting medium in understanding lecture materials, completing assignments, or looking for additional explanations. Around 70% of respondents admitted to using the internet every time they face difficulties in understanding the material or when they need additional references. In other words, the high frequency of internet use shows that the internet has become a reliable source, especially in the academic field. This is triggered by several things, including flexible internet use, supporting independent learning, getting information in a timely manner with various types of information.

Based on research by (Dan & Widyana, 2019), it shows that the reason students use the internet is due to internal factors, one of which is that cognitive needs are met. The form of fulfilling cognitive needs is building learning independence and the emergence of curiosity. Both of these attitudes are factors in utilizing the internet as a learning resource. If the characteristics of learning independence are associated with individual needs, then it will initiate individuals to explore the diversity of information sources needed. Individuals with learning independence will learn something important, be able to solve new problems, and handle critical situations based on theories from experts. The internet can meet certain knowledge and information needs, so there is no search and exploration tool that exceeds the internet in terms of speed, ease, diversity of information, and wealth of learning resources which are not limited by place, space and time to access them. This means that the internet is the main choice to be used as a learning resource for students with learning independence.

Usability Data

The activity of fulfilling the need for information through internet access carried out by S1 PGSD students has different benefits. This is influenced by the motivation for using the internet. Based on the research of (Mujahidi & Zuraidah, 2014), the answers given by respondents regarding the benefits of using the internet were obtained as many as 43 out of 100 students who responded that the internet was a tool to help understand the material. Judging from the results of the respondents, it can be seen that the motivation for using the internet is relevant to the benefits received by S1 PGSD students. The use of the internet is in accordance with learning achievements where the information accessed meets the needs of students. This is different from the results of respondents in this study as described in table 2.

Table 2. Benefits of Using the Internet

Benefits of Using the Internet	Frequency
Understanding the material	8
Communication and entertainment media	2
Help with assignment needs	32
Total	42

Based from table 2, it can be seen that the benefits of the internet for respondents show that most respondents use the internet to help with assignments, both online quizzes, practical references, mid-semester exams, and final semester exams, while other benefits are only as a means of communication & entertainment.

The results of this study indicate that 85% of respondents agree that the internet helps them understand difficult lecture materials, while 80% feel that the internet makes it easier for them to complete academic assignments, so that the majority of students feel significant benefits from using the internet as a learning resource. This is considered a positive assessment of the benefits of the internet. Students view the internet as an effective tool for expanding knowledge, adding references, and obtaining the latest information that may not be available in printed materials. In addition, the internet is also able to explain simpler alternatives to complex concepts. The benefits of using the internet in various aspects have a positive impact on the learning process for students.

In addition, the possibility of this response also raises a negative view that, searching for assignment answers via internet access is feared to use unreliable sources. The references used must first be identified regarding the validity of the data in them. This needs to pay attention to the credibility criteria of data before being used as a reference. This is in line with the results of interviews with undergraduate students, it was explained that they are still unfamiliar with being able to know whether a source is credible or not when collecting references via the internet. This happens because undergraduate students have not mastered the correct digital literacy skills.

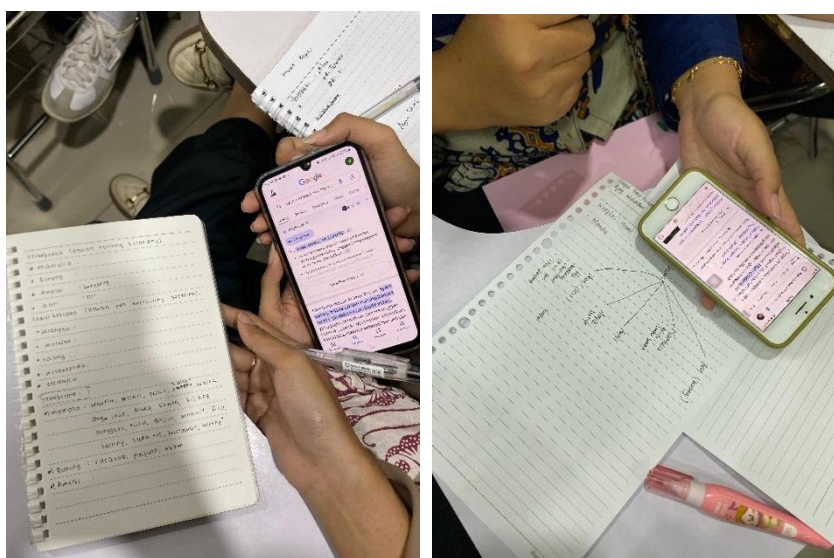


Figure 2. Using an uncredible internet site

In the basic biology concept course, we have never searched for sources from Google Scholar, Sinta, Scopus, and the like. We admit that we are still unfamiliar with identifying valid and relevant scientific articles obtained from the internet. This is related to a lack of understanding of the criteria for sources to be considered credible. In addition, we also find it difficult to distinguish between credible sources and popular sources, such as the news site that often appears on the search homepage. Therefore, we need to take

training or provide topics related to this before starting to write. We also have not mastered how to cite sources properly and correctly. During this lecture, we refer to sources in the form of digital books. In addition, we also often access YouTube to understand the material in video form” (10/10/2024).

Based on the results of the interview, it can be seen that information is very easy to obtain for free in the digital era, but it will affect the quality of the information from the level of credibility of the data. That way, it is difficult to distinguish which is valid or not, so it is necessary to know how to find credible sources. This is reinforced by research by (Apriandi, Boedi Maritasari, Maulida, & Karmila, 2024), which states that the higher the credibility of a person or a source, the more likely the information conveyed is accepted and trusted by others. Scientific sources are academic sources packaged in the form of articles, books, or other written works that are more reliable and credible as references than searching through blogs or news articles. This is because scientific sources have gone through strict reviews and criticism from experts in their fields.

Effectiveness Data

The utilization of facilities that provide internet services is optimized well including the actions of respondents when finding information. The level of relevance of information to learning needs will be related to what actions respondents will take when they find the information. The form of action when finding information is divided into three ways, namely: downloading, printing it, or just reading it directly on a computer monitor. These three actions are carried out simultaneously because the information to be printed must be saved first and before being saved, the relevance of the information must be ensured by reading it on the monitor.

The results of this study indicate that the use of the internet as a learning resource is still not fully effective for most students. Most students find it difficult to find accurate and credible information due to a lack of digital literacy skills. More than 50% of students reported that they had difficulty distinguishing between credible and non-credible sources, and had difficulty using the information in academic assignments. The effectiveness of the internet as a learning resource is highly dependent on students' ability to sort and manage the information they find. Lack of mastery of digital literacy, especially in recognizing credible sources and using the information appropriately, reduces the effectiveness of internet use in the student learning process.

Information obtained through the internet is in digital form. Respondents' actions are not only sufficient to read information on the computer monitor when searching, so respondents need to reread it elsewhere. Therefore, the treatment or follow-up action that is often taken by respondents to their search results is to print and/or download the search results to be saved. Respondents' actions in finding information on the internet differ from one another. To illustrate how respondents' behaviour or actions treat information searched through the internet can be seen in table 3.

Table 3. Respondents' Treatment of Search Results

Answer Options	Respondents' Answers
Downloading	10
Print	0
Read only on monitor	32
Total	42

It can be seen in table 3. explains that, the most respondents' actions that always read first indicate that often the information received is temporary, there is no desire to repeat, because it is only to find answers and not to understand new material. Based on the table above, it is also possible to assume that the three actions can be done simultaneously in responding to the information found. Table 3. shows that the ability to master internet technology greatly influences the function of the internet as a learning source for respondents. This discussion is further discussed in the results of interviews with S1 PGSD students regarding the form of respondents' actions towards information from the internet in the form of reading e-modules on the monitor will have a bad impact on eye irritation.

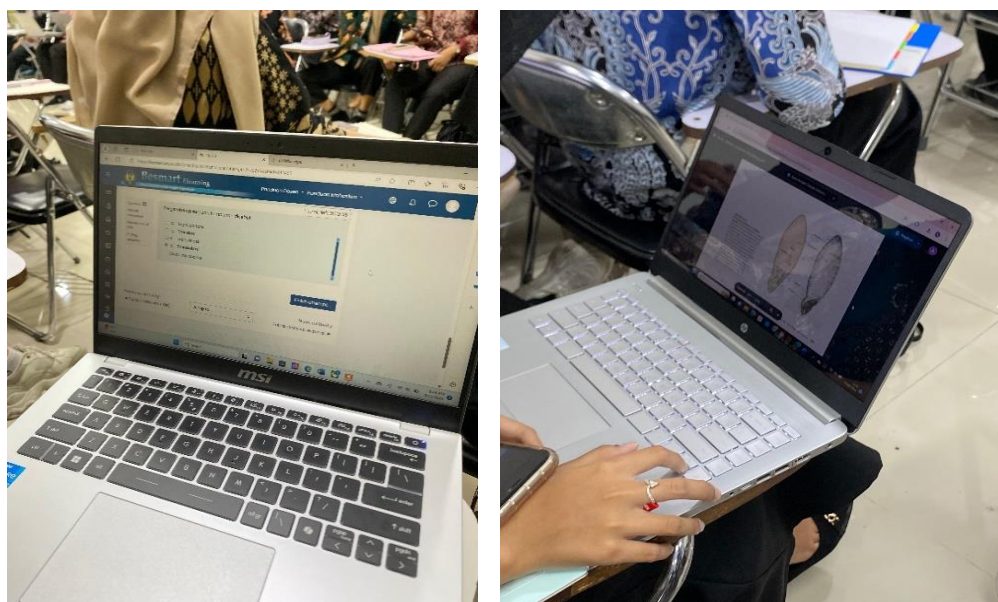


Figure 3. Using E-Modul Shared to The Be-Smart UNY Application as a Learning Reference

Since this lecture, we have always received referrals from lecturers to access e-books through Be-Smart UNY, so we never use printed books to understand new material. We also never translate e-books with printed dictionaries, but rely on Google Translate automatically. The obstacles we often experience are sore and stinging eyes when reading in front of a laptop screen regularly, making it uncomfortable while studying. Another obstacle is studying with English language modules. Even though they have been translated, the results still contain several sentences that are messy and cannot be read

properly. This makes us switch references to internet sites. Obstacles like this can reduce the effectiveness and dependence of students' learning on the internet" (12/09/2024). Based on the interview results, it can be seen that, using the internet as a learning source, the material being studied should be downloaded, then printed, thereby reducing the intensity of the eyes on the computer screen which is not good for health.

Conclusion

Based on the intensity data, we can see the pattern of student habits marked by the increasing frequency of searching for information through web applications, such as Gemini and Chat GPT. Both have multimedia features that support independent and flexible learning processes for students. Based on the effectiveness data, the high accessibility of internet usage in searching for test answers than textbooks. Based on the usability data, we can describe the low digital literacy skills of undergraduate students in using the internet as a source of information. In fact, undergraduate students consider all sources that look "official" or "popular" as credible sources. In other words, critical thinking skills are still low to identify valid and relevant information. Overall, the internet has proven to be a potential and relevant learning resource for biology undergraduate students.

Credit Authorship Contribution Statement

Firda Luthfia Nada: Conceptualization, Methodology, Software, Visualization, Formal analysis, Writing – original draft, Writing – review & editing. **Wuri Wuryandari:** Conceptualization, Methodology, Formal analysis, Resources, Writing – review & editing, Supervision, **Bambang Saptano:** Visualization, Formal analysis, Funding – review.

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