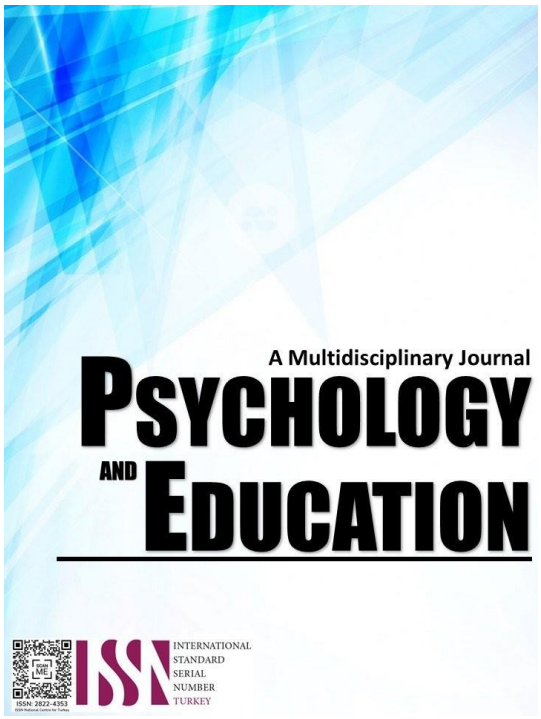
DIGITAL LITERACY SKILLS AND ONLINE INFORMATION SEARCHING STRATEGIES AS DETERMINANTS OF ACADEMIC PERFORMANCE OF BSIT STUDENTS



PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL

2023
Volume: 12
Pages: 1092-1108
Document ID: 2023PEMJ1127
DOI: 10.5281/zenodo.8305192
Manuscript Accepted: 2023-29-8

Psych Educ, 2023, **12**: 1092-1108, Document ID:2023 PEMJ1127, doi:10.5281/zenodo.8305192, ISSN 2822-4353
Research Article

Digital Literacy Skills and Online Information Searching Strategies as Determinants of Academic Performance of BSIT Students

Jennellie C. Graciano*, Ceasar Ian P. Benablo
For affiliations and correspondence, see the last page.

Abstract

This study sought to determine the significant influence of digital literacy skills and online information searching strategies on the academic performance of BSIT students. Utilizing quantitative descriptive-correlational research, the study involved first year BSIT students among selected higher education institutions in Davao del Sur. The results revealed that the level of digital literacy skills was very high as well as the level of online information searching strategies which was found to be also very high. Moreover, the overall level of academic performance of BSIT students was high. Digital literacy skills and online information searching strategies had a significant relationship with the academic performance of BSIT students. Also, the combined variables significantly influence BSIT students' academic performance.

Keywords: *education, information technology, digital literacy skills, online information searching strategies, academic performance, descriptive correlation, Philippines*

Introduction

Academic performance refers to a student's level of achievement in their academic endeavors. Assessments, tests, assignments, projects, and overall grades are commonly used to assess academic performance. However, most students struggle to do well at all levels, including tertiary education students. More students commit to readmission due to poor academic performance (Tadese et al., 2022). College students with poor academic performance show unsatisfactory results in their classroom assessments. They experience significant obstacles in learning and, thus, need help acquiring specific knowledge about the major subjects they take (Wu & Xin, 2019).

In South Africa, the challenges facing students at higher education institutions include poor academic performance, low participation rates, and poor knowledge production (Tanga & Maphosa, 2018). In Bangladesh, academic performance is challenging for students, especially among private Information and Communications Technology (ICT)-based colleges. For instance, in Daffodil International University (DIU), Students' academic performance has come under observation because there are over 5,000 at-risk students with low Cumulative Grade Point Averages (CGPA). These students could not graduate and may be required to repeat one or two courses with the lowest grades to raise their CGPA. For this reason, according to Shahjahan et al. (2021), it is necessary to adopt remedial actions to improve students' academic performance, particularly in private institutions.

In the Philippines, Gocotano et al. (2021) reported that a number of students in higher education in the Philippines may face challenges in college performance due to a perceived lack of digital literacy skills. It is essential to conduct further research to explore and understand the broader factors influencing student performance in this context, which could yield varying results. On the other hand, online information-searching strategies have a significant impact on a student's academic performance. In the 21st-century students will need to choose the correct information that can provide a personal benefit or find solutions to their problems in learning (Ozkanal et al., 2021). On the contrary, Rodríguez et al. (2022) mentioned that students with poor ability to use online information-searching strategies are more likely to have problems in their academic performance.

Filipino students pursuing a bachelor's degree in information technology (BSIT) face academic performance challenges where they experience failures in their primary areas. A number of BSIT students demonstrate average skills and performance in lecture and laboratory classes. Relatively, the poor academic performance of the BSIT students is manifested through computer programming anxiety (Olipas & Luciano, 2020), poor test competence (Olipas & Cochanco, 2021), and inadequacies in on-the-job training performance (Mina et al., 2020). In fact, according to Garcia & Bongo (2021), despite some display skills in Multimedia and Network Management, they seem to be very poor in software development.

Hence, there is a need to intensify and augment the

delivery of concepts, theories, and the implementation or application of theories in the BSIT major subject through faculty development programs.In Davao Region, the study of Alipio (2020) suggested that poor academic performance among students is an emerging issue among schools. Varying challenges in their academic performance are shown through their low Weighted Point Average (WPA) and could result in a very high level of dropout intention, which is costly for both parents and students. Given these emerging issues, the researcher reviewed several studies which revealed the factors influencing the students' academic performance. The poor academic performance observed among BSIT students is mainly affected by factors including the lack of digital literacy skills and poor strategies in searching for information online. According to Abbas et al. (2019), digital literate students outperformed those with less access to technology in terms of academic performance. Students' ability to pass computer-related subjects was hampered by a lack of digital experience. Also, some studies (Amiri, 2009; Brown, 2009) revealed a positive relationship between digital literacy and students' performance. Thus, there is a need to conduct further research to explore and verify the findings in the context of other studies including my own.

The above-mentioned studies are studied separately for the three variables: digital literacy skills, online information searching strategies, and academic performance. Correlating these variables gave an inspiration to the researcher since she has not come across any study exploring the three variables among BSIT students as respondents, where they are expected to already possess the basic skills and competence in terms of digital literacy and online information searching strategies. Although there is already existing literature on the association between and among digital literacy skills and academic performance (Abbas et al., 2019; Amiri, 2009; Brown, 2009), and online information searching strategies and academic performance (Ozkanal et al., 2021), these studies dealt only with bivariate relationships and did not cover the interrelationships between and among the three variables in a single study. Only few of this research were conducted the educational settings especially among first year BSIT students, hence this study will be a contribution to generating new knowledge. The researcher was compelled to find the urgency of conducting the study with the hope that it would be an avenue for the improvement of the academic performance of BSIT students among colleges in Davao del Sur.

The findings of the study may help higher education institutions create intervention or enhancement activities to improve both digital literacy and online information searching strategies of BSIT students. To reach a wider audience, the results of the study may be presented to the Commission on Higher Education and academic administrators at academic institutions. Further, it is also hoped that this study may be presented at an academic conference, congress, or forum. Eventually, the researcher hopes to publish the study either in a local, national, or international refereed research journal. Humbly, this could be a great avenue for the researcher to expand the study, which is of great help in the new development in the area of teaching with Information Technology integration and thus contributes to the generation of new knowledge.

Research Questions

The purpose of this study was to determine the significant influence of digital literacy skills and online information searching strategies on the academic performance of BSIT students in Davao del Sur. It specifically aimed to answer to the following questions:

1. What is the level of digital literacy skills of BSIT students in terms of:
   1.1 Operating mobile devices;
   1.2 Handling and avoiding technical difficulties;
   1.3 Operating download files;
   1.4 Informal internet skills;
   1.5 Communication internet skills; and
   1.6 Content creation internet skills?
2. What is the level of online information searching strategies of BSIT students in terms of:
   2.1 Evaluation;
   2.2 Select main ideas;
   2.3 Control;
   2.4 Purposeful thinking;
   2.5 Disorientation;
   2.6 Trial and error; and
   2.7 Problem solving?
3. What is the level of academic performance of BSIT students?
4. Is there a significant relationship between:
   4.1 Digital Literacy Skills and Academic Performance of BSIT Students, and
   4.2 Online Information Searching Strategies and Academic Performance of BSIT Students?
5. Do digital literacy and online information searching strategies significantly influence the academic performance of BSIT students?

Methodology

Research Design

The study utilized the quantitative research method, specifically the descriptive-correlational approach. A method for testing objective hypotheses by looking at the relationship between variables is quantitative research. These variables can be measured, normally on instruments, so that numbered data can be analyzed using statistical procedures (Creswell, 2012). When investigating phenomena and their relationships in a systematic way, quantitative research methods are employed to deal with numbers and anything measurable. They are utilized to answer questions on relationships within measurable variables with an intention to explain, predict and control a phenomenon (Leedy, 1993).Specifically, Aggarwal (2019) labeled descriptive research as devoted to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation. The right analyses, interpretations, comparisons, and discovery of patterns and linkages were all part of this kind of research.

Also, Creswell (2012) described descriptive-correlation as a statistical test to establish patterns for two variables. Moreover, correlational design is a type of nonexperimental research in which the researcher measures two variables and assesses the statistical relationship (i.e., the correlation) between them with little or no effort to control extraneous variables (Jhangiani et al., 2015). Mertler (2018) further asserted that understanding the nature and strength of the relationship between two or more variables can help predict future conditions or behaviors in one variable from what is presently known of another variable by employing predictive correlational design.In this study, the digital literacy, online information searching strategies, and academic performance of BSIT students were investigated. Finally, the relationship between the independent variables (digital literacy and online information searching strategies) and dependent variable (academic performance of BSIT students) were correlated.

Research Locale

This study was conducted among selected higher educational institutions in Davao del Sur, Philippines. To observe anonymity, the name of the schools was coded College A, B, and C. These colleges were chosen since these schools offer BSIT programs. The province is bordered to the north by Davao City, the south by Davao Occidental, the west by North Cotabato and Sultan Kudarat, the south-by- South Cotabato and Sarangani, and the east by the Davao Gulf. Currently, Davao del Sur covers 1,984.01 square kilometers of land. In this study, Davao del Sur was chosen to be the research locale since the province has higher education institutions (HEIs) which offers Bachelor of Science Information Technology (BSIT). These HEIs are concerned about the attainment of the expected Program Education Objectives and Student Learning Outcomes for BSIT learners.

The three colleges are located in the province of Davao del Sur in which College A is a catholic school run by the brothers of sacred heart which offers BSIT program including Bachelor of Arts, Business, Accountancy, Education, Engineering and other Health Science-related courses. College B is a catholic school run by RVM sisters which offers BSIT program as well as Education, Business and Hospitality-related courses. Lastly, College C is private non- sectarian school which also offers BSIT program along with Bachelor of Arts, Business, Accountancy, Education, and Engineering-related courses. These three colleges offer BSIT course with similar prospectus contents as prescribed by the Commission on Higher Education (CHED) – Policies, Standards and Guidelines No. 25, series of 2015. Their BSIT programs usually require at least 21 units of courses per semester.

The following inclusion criteria were taken into account when conducting this study. First, the school where the students were enrolled were open to participating in the study. Second, the issue with the academic performance of BSIT students was common at the institution. These three schools were chosen since they officer BSIT program. Also, they were chosen accordingly based on the ability to provide the needed number of respondents for this investigation. Furthermore, aside from the number of available respondents, the researcher had teacher-acquaintances who assisted her in the process. Figure 2 showed the map of the Philippines depicting Davao del Sur where the study was conducted.

Research Respondents

The study involved 202 first year BSIT students from the three (3) higher education institutions in Davao del Sur offering BSIT program. The number of student responses was determined by stratified random sampling. A stratified random sampling is one in which a sample is drawn at random from each

subgroup after the population has been divided into strata (or subgroups). Where there is a great lot of variances within a population, stratified sampling is sometimes used. Its purpose is to ensure that every stratum is adequately represented (Ackoff, 1953).

A total of 439 respondents who are BSIT students from the three colleges wherein College A has 343, College B has 52 and College C has 44 accordingly. . By using the Rao soft Calculator, the number of respondents per school was identified. There were 156 respondents from College A, 25 from College B and 21 from College C, which has a total of 202 respondents. According to Guilford (1954), an absolute minimum of 200 samples are required for Pearson Correlation analysis. This study was limited only to first year BSIT students enrolled in General Education and Professional Education regular course offerings. These course offerings with the same number of units and different General Education but the Professional Subjects are all the same. Those students from other programs enrolled in each college including senior high schools under the ICT track were excluded in this study. The participants in this study had the freedom to leave the study at any time and without consequence. In the event that pre-determined students from the targeted number of respondents will withdraw during the actual surveys, the researcher made sure to look for other students from each school to ensure the attainment of a minimum 200 respondents for the study.

Research Instruments

The researcher adapted research questionnaires from the study of Atoy et al. (2020). Part I of the instruments of the study include Digital Literacy Skills Scale and Part II was the Online Information Searching Strategies Scale. These two instruments were results of confirmatory factor analysis. The confirmatory factor analysis of college students' digital literacy skills showed high β coefficient to construct ranging from β= .18 to β= .24, while the confirmatory factor analysis of online information searching strategies of college students also showed high β coefficient to construct ranging from β= .13 to β= .37 which confirms their validity. Originally, all the instruments adapted used an 8-point Likert scale ranging from agree to a large extent (8) to disagree to a large extent. But in this study, the instruments were down to five-point Likert scale. A 5-point scale is simpler and easier for respondents to understand and use compared to an 8-point scale. It may lead to less confusion and more accurate responses.

To further describe the tool, the questionnaire on the Digital Literacy Skills (Atoy et al., 2020) of students has six indicators: operating mobile devices, handling and avoiding of technical difficulties, operating download files, informal internet skills, communication internet skills, and content creation internet skills. It was Five-point Likert scale, ranging from "strongly disagree", "disagree", "moderately agree", "agree", and "strongly agree" with values from 1-5 assigned to each alternative. There were 13 statements for operating mobile devices, six statements for handling and avoiding technical difficulties, two statements for operating download files, ten statements for informal internet skill, eight statements for communicational internet skill, and six statements for content creation internet skill which the respondents will answer using the Likert scale. The different statements pertaining to the six indicators were the basis in gathering the data of the respondents' level of digital literacy skills. The results were interpreted based on the matrix that follows. The matrix contained the range of means, descriptive level, and interpretation.

Data Gathering Procedure

Preliminary to the conduct of the study, the researcher sought ethical clearance from the Research Ethics Committee. Permission to conduct the study was given to the researcher from the graduate school dean after having been granted the said permission. Upon the approval of the permission from graduate school dean , the researcher sought permission and approval from the school administrators of the selected participating schools. When all the permission letters were approved, the researcher coordinated with the advisers to meet the respondents in their respective schools during the limited or expanded face-to-face classes. Before asking the permission of the respondents, the researcher explained first the study's objectives and methods. Then, the researcher provided and explained the purpose and the essential parts of the Informed Consent Form (ICF) and Assent Form. After agreeing to be part of the study, the respondents signed the ICF. Then, the researcher administered the research questionnaire.

The researcher personally responded to any queries or clarifications that respondents had while filling out the questionnaire during the course of the investigation. The researcher retrieved all of the respondents' completed questionnaires once they have provided all necessary information and completed the survey. The concerned administration then issued a Certificate of Appearance to the researcher to attest to their sincerity

in gathering information from the study's research participants. After the surveys were successfully retrieved, the data were gathered and tallied. The necessary statistical tools were then used to extract the crucial data, which then interpreted and subjected to further research.

Statistical Tools

The descriptive statistics such as mean and standard deviation, and inferential statistics like Pearson-r technique, and regression analysis were used to process the data.

Mean. This was used in giving a concise description of the levels of digital literacy skills, online information searching strategies and academic performance of BSIT students.
Standard Deviation. This was used to determine how spread out, how far or how close the students' responses were in relation to the mean.
Pearson-r. This was utilized to examine the relevance of the relationship between BSIT students' academic performance and their digital literacy skills as well as their use of online information searching strategies.
Multiple Linear Regression Analysis. This was used to investigate the significance of the influence of digital literacy skills and online information searching strategies on the academic performance of BSIT students.

Ethical Considerations

Ethical standards were established in conducting the study. To ensure that ethical guidelines are followed, the study had undergone checking by the University of Immaculate Conception's Ethics Review Committee. This verified and confirmed that the research brought no potential harm, risk or danger to the respondents. The contents were also validated and checked for false or erroneous data that might be embedded in the study. This evaluation complied to the requirements for the ethics protocol and be cleared for implementation using accepted ethical procedures and guidelines.Social Value. Making an action plan to address the requirements of the respondents will make use of the study's findings. During trainings, conferences, and symposiums, the researcher will present the findings to the respondents and the participating schools. The relevant information to be generated form this study may help the school administrators in initiating interventions such as seminars, trainings, and workshops to students. In addition, the findings and recommendations will serve as the respondents' reference in enhancing themselves to succeed academically. Moreover, this study will be uploaded to various research platforms for future researchers and for the community to have easy access.

Informed Consent. The researcher of this study used the Informed Consent Form (ICF) in seeking the approval of the BSIT students to participate in the study. Informed consent form contained the key elements or information that respondents need to know in order to make a decision to volunteer for a research study. It also included the respondent's confirmation to voluntarily participate in the study.

Indicated in the ICF the respondents' role and willingness to participate in the study. When the study was completed, the researcher will inform the respondents and the participating schools of the findings by presenting the study at trainings, conferences, and symposiums. The study will also be uploaded in various research platforms so that the respondents and the community can have easy access.Vulnerability of Research Participants. Vulnerable participants are those who are relatively or incapable of deciding whether to participate or not to participate in a study for reasons such as physical and mental disabilities, poverty, asymmetric power relations, and marginalization, among others and who are at higher risk for some harms (NEGHHR, 2017). In this study, the BSIT student respondents were adults capable of making sound judgments about whether they want to participate in the research or not and of reading and signing the written consent form; hence, they were not considered vulnerable.

Further, the respondents' identities were kept confidential, and coding was used in addition to having them oriented on the nature of the study and that I do not have asymmetric power relation over them. The respondents were not being coerced or pressured into taking part in the study. With this, the researcher valued the respondents' participation and place their welfare as the highest priority during the course of the study. Hence, voluntary participation was practiced. The researcher ensured that the respondents have the freedom to choose whether to engage in the study or not, without facing any negative consequences. On this note, an Informed Consent Form was sought from the respondents.

On top of everything, the safety of the respondents was strictly observed. The researcher made sure that the research questionnaires were not exposed to risks of any form, including, but not limited to, inflections on physical, psychological, social nor economic aspects.

The respondents may also discontinue their participation at any time without penalty. The researcher ensured that the respondents were fairly treated, highly respected and consistently protected.

Risks, Benefits and Safety. The researcher was aware of the possible risks that the respondents might encounter in the conduct of the study. Anxiety and fear might be felt by the respondents before and after answering the questionnaire. With this, the researcher assured the respondents that they indicated their degree of agreement and disagreement on the statements in the questionnaire and that their participation was of great help in addressing the problems related to the academic performance of BSIT students.

In addition, confusions might arise when answering the research questionnaire so the researcher assisted the respondents on their queries. The respondents also accorded with ample time in answering the questionnaire so that they won't feel pressured. Moreover, the researcher strictly followed the guidelines of the Inter-Agency Task Force in conducting the study during the limited or expanded face-to-face classes.

The findings of this study will be utilized in making an action plan on how to address the needs of the respondents. For the purpose of transparency and responsibility of the researcher, the participating schools will be informed of the results and recommendations of the study at trainings, conferences, and symposiums. The relevant information to be generated in the study will help the school administrators and teachers in initiating interventions such as seminars, trainings, and workshops to BSIT students. In addition, the results will serve as the respondents' reference in enhancing themselves to succeed academically.

Furthermore, the safety of the respondents was on top of the researcher's priority. With this, the respondents had the prerogative to write their name in the questionnaire or not. The data gathered were purely confidential and were analyzed to verify the findings of the study.

Privacy and Confidentiality of Information. The researcher followed the Data Protection Act of 2012's guidelines for information privacy and confidentiality. The state's policy was to uphold the fundamental human rights of communication and privacy while ensuring the free flow of information to foster innovation and development. Accordingly, the survey participants were given the assurance that any information they provide were kept private and confidential. Furthermore, none of the responders' personal data were made public. Hence, strict compliance was observed.

Justice. The respondents of this study were chosen fairly by the researcher. The respondents included in the study were the BSIT students among higher education institutions in Davao del Sur. Other programs among these HEIs were excluded from this study. In selecting the respondents, stratified random sampling was used so that groups were adequately represented. Slovin's formula was also used so that the number of respondents per school was identified.

In addition, the researcher gave tokens in a form of mobile load to all the respondents as a way of saying thank you for helping the researcher in the research. Respondents used their personal money or mobile loads in asking and clarifying questions will be reimbursed by the researcher. Moreover, the respondents, the participating institution, and the community as a whole, will have equal access to the outcome and conclusions of this research. This will provide them relevant information and intervention to address their needs.

Transparency. The study was conducted with complete transparency. The researcher explained the precise aims and processes to the respondents during the brief face-to-face sessions so they may comprehend the study and its objectives. Prior to the study's execution, the respondents also got clear instructions and emphasis on their right to provide informed consent.

When the study was completed, the researcher ensured that the respondents had easy access to the findings of the study. The findings were relayed to the respondents and the participating institutions in multimodal ways through printed and online document forms. The researcher will present the study to the participating schools and respondents during trainings, conferences, and symposiums. Moreover, the researcher will upload the study in various research platforms so that respondents can have access to it. Furthermore, contact numbers, email, and social media accounts will be provided by the researcher to the respondents or their parents and guardians in case they want to have access of the study.

Moreover, the researcher ensured to clearly eliminate the conflict of interest (COI) by ensuring that the researcher had no relationship either financial and/or non-financial to another person or organization that might cause unwanted impacts on the research report. Further, there was no set of conditions in which a

professional judgment concerning primary interest such as the respondents' welfare or the validity of the research tends to be influenced by a secondary interest such as academic gains or recognitions. The writings in this paper did not utilize any form of untruthfulness to harm the welfare of the respondents. All the information written will be checked and validated by the panel of experts. Moreover, deceit was also avoided in which evidence that the benefit of misleading the respondents outweigh any potential harm to them.

Qualification of the Researcher. The researcher's education and seminars qualified her to supervise the conduct of the study. The researcher earned a baccalaureate degree in Bachelor of Science in Information Technology and had earned Education degree. In addition, she attended seminars and trainings about research organized by CHED. Also, Ceasar Ian P. Benablo, MIT was also assigned as an adviser who guided and assisted the researcher in carrying out the study. Hence, the researcher was capable of administering the research.

Adequacy of Facilities. The researcher was certain that materials, software, equipment and facilities were adequate for the conduct of the study. The Online Public Access Catalog was equipped with journals, theses, and dissertations that were useful throughout the research process. In addition, ProQuest Dissertations and Theses Database were accessible for references. Moreover, online articles in news portals were readily available. Furthermore, the academe where the researcher studies, have pool of experts and research practitioners like data analyst that offered online assistance among students. Thus, the researcher was positive that facilities were accessible and adequate when this study was conducted.

Community Involvement. The final product of this research was directed towards community involvement. Academic community and academic members will learn, collaborate, support, enhance, co-create and help generate the results of the study. After completing the study, the researcher will disseminate the results to the respondents and the participating schools during trainings, conferences, and symposiums. This will serve as the respondents' underpinning in enhancing themselves and succeeding academically. The findings and recommendations will help the school administrators in initiating interventions such as seminars, trainings, and workshops to BSIT students. Moreover, this study will be uploaded to various research platforms so that future researchers and the community as a whole can have easy access.

Results and Discussion

Level of Digital Literacy Skills of BSIT Students

Shown in Table 1 is the level of digital literacy skills of BSIT students. The indicators are presented with its corresponding mean and standard deviation; these indicators include operating mobile devices, handling and avoiding technical difficulties, operating download files, informal internet skills, communication internet skills, and content creation internet skills. The overall mean score is 4.46 which is described as very high. This result indicates that digital literacy skills of BSIT students is always manifested. This means that most of the respondents utilize digital tools skillfully. The six indicators' mean score ranges from 3.92 to 4.85. Further, the standard deviation runs from .31 to .75, indicating that standard deviations are less than 1. The students' responses about their digital literacy skills are fairly consistent.

The overall very high level of digital literacy skills of BSIT students implies that the BSIT students show skills in operating various digital tools including mobile phones. They are adept in troubleshooting and downloading files. They can also navigate effectively through the internet for searching, communication and creating content. This is in parallel with the studies of Hariati (2021), Kaeophanuek et al. (2018) and Rusydiyah et al. (2020) which revealed that students have very high level of digital literacy among higher education institutions in Asia. Further, this finding affirms the results of the study of Gutierrez-Angel et al. (2022) which showed that university students are digitally literate and make efficient use of both the Internet and digital media. In this sense, students have higher level in skills related to digital platforms and communication applications. Further, the finding aligns with the idea of Coffin Murray & Pérez (2017) which stated that digital literacy among students is displayed as they show how adept they are at working with files, which includes using web-based or internet tools to carry out complex operations. Also, it affirmed the statement of other authors literacy (Chetty et al., 2018; Perdana et al., 2019) which avowed that digital literacy appears to be a minimum set of abilities that enable students to work efficiently with software tools or when doing simple information search tasks. Skills includes the ability to create and critique digital content.

Table 1. *Level of Digital Literacy Skills of BSIT Students per Indicator*

Indicators/Statements	*Mean*	*Sd*	*Description*
1.1 Operating Mobile Devices			
1. Knowing how to open a new tab in my browser.	4.90	0.36	Very High
2. Knowing how to go to the previous page when browsing the Internet.	4.86	0.40	Very High
3. Knowing how to turn my mobile phone off.	4.91	0.35	Very High
4. Knowing how to use the refresh function.	4.88	0.37	Very High
5. Knowing how to download apps to my mobile device.	4.90	0.33	Very High
6. Knowing how to install apps on a mobile device.	4.89	0.39	Very High
7. Knowing how to upload files.	4.87	0.40	Very High
8. Knowing how to download files.	4.90	0.35	Very High
9. Knowing how to connect to a WIFI network.	4.86	0.40	Very High
10.Knowing how to bookmark a website.	4.73	0.58	Very High
11.Knowing how to use shortcut keys.	4.64	0.62	Very High
12.Knowing how to download/save a photo.	4.92	0.33	Very High
13.Knowing how to adjust privacy settings.	4.81	0.44	Very High
Category Mean	4.85	0.31	Very High
1.2. Handling and Avoiding of Technical Difficulties			
14. Knowing how to fix a problem if a technical problem occurs while I'm using the Internet,	4.06	0.81	Very High
15. Knowing how to open a Web address directly without using a search engine like Google.	4.23	0.91	Very High
16. Knowing some good ways to avoid computer viruses.	4.27	0.85	Very High
17. Knowing how to make pop-ups or ads disappear.	4.35	0.86	Very High
18. Knowing how to complete online forms.	4.52	0.72	Very High
19. Knowing how to keep track of the costs of mobile app use.	4.29	0.82	Very High
Category Mean	4.29	0.60	Very High
1.3 Operating Download Files			
20. Knowing which apps are safe to download.	4.55	0.68	Very High
21.Finding reference online and knowing how to open downloaded files.	4.71	0.54	Very High
Category Mean	4.63	0.55	Very High
1.4 Informal Internet Skill			
20. Easy to find information on the internet.	4.64	0.63	Very High
21. Good at finding formation online.	4.48	0.66	Very High
22. Knowing how to use a wide range of strategies when searching for information online.	4.33	0.76	Very High
23. Finding it easy to decide what the best keywords are to use for online searches.	4.32	0.81	Very High
24. Confident selecting search results.	4.45	0.73	Very High
25. Normally looking at more than the top three search results.	4.39	0.81	Very High
26. Finding it easy to verify information I have retrieved.	4.29	0.79	Very High
27. Feeling confident in my evaluation of whether a website can be trusted.	4.31	0.80	Very High
28. Generally, comparing different websites to decide if information is true.	4.47	0.73	Very High
29. Carefully considering the information I find online.	4.54	0.67	Very High
Category Mean	4.42	0.55	Very High
1.5 Communicational Internet Skill			
30. Knowing when should and shouldn't share information online.	4.63	0.68	Very High
31. Careful to make comments and behaviours appropriate to the situation I find myself in online	4.71	0.59	Very High
32. Knowing how to change who I share content with (e.g., friends, friends of friends or public).	4.67	0.61	Very High
33. Knowing how to remove friends from my contact lists.	4.76	0.54	Very High
34. Confident about writing a comment on a blog, website, or forum.	4.77	0.57	Very High
35. Feeling comfortable deciding who to follow online.	4.29	0.89	Very High
36. Knowing how to use emoticons.	4.66	0.62	Very High
37. Knowing which information should and shouldn't share online.	4.68	0.67	Very High
Category Mean	4.65	0.42	Very High

1.6 Content Creation Internet Skill			
40.Feeling confident putting video content, I have created online	3.80	1.13	High
41.Feeling confident writing and commenting online.	4.05	0.92	High
42.Knowing how to create something new from existing online such as images, music, or video.	4.33	0.89	Very High
43.Knowing how to make basic changes to the content that others have produced	4.07	0.89	High
44.Knowing how to design a website.	3.63	1.17	High
45. Knowing which different types of licenses apply to online content.	3.64	1.13	High
Category Mean	3.92	0.75	High
Overall Mean	4.46	0.39	Very High

Among the digital literacy skills, operating mobile devices got the highest category mean of 4.85 described as very high indicating that it was always manifested. Its standard deviation is .31 which is lower than 1 implies that the respondents' consistency of responses minimally varies. Notably, the statement that got the mean rating of 4.92 is on the statement *Knowing how to download/save a photo* described as very high which means that students are very highly skillful in terms of this aspect. On the other hand, the statement *Knowing how to use shortcut keys*, got the mean of 4.64 which still means that students are very highly skillful in terms of this aspect. This is in support to the statement of Atoy et al. (2020) that one of the skills in digital media is in terms of operating mobile devices such as being able to use shortcut keys, download, and save a photo. Further, this substantiates the statement of Li and Kumar (2019) that delves into the concept of mobile device skills and user capabilities. This includes skills in basic operations and competencies that enable users to maximize the potential of mobile devices.

The indicator of digital literacy skills which got the lowest mean, albeit high is the content creation internet skill indicating that it was oftentimes manifested. Its standard deviation is .75 which is lower than 1 implies that the respondents' consistency of responses slightly varies. Among its aspects, the statement *Knowing how to create something new from existing online such as images, music, or video* is the only item which is described as very high since it gained a mean of 4.33 which means that students are highly skillful in terms of this aspect. The lowest item is the statement *Knowing how to design a website*, albeit high which got a mean of 3.63. Students are are highly skillful in terms of this aspect. Students' content creation encompasses their talent to create. They are educated about creating something out from the digital tools. Similarly, this is in connection with the description of Sillaots and Rebane (2019) which mentioned that students with content creation internet skills have the ability to effectively navigate, critically evaluate, and create digital content. This can be seen when designing websites. Also, it expands the avowal of Smith and Johnson (2017) which explained the importance of content creation skills in internet use. The ability in content creation skills is manifested through producing and publishing original digital content, understanding copyright and licensing issues, and engaging in collaborative online platforms.

Level of Online Information Searching Strategies of BSIT Students

The data in Table 2 presents the level of online information searching strategies of BSIT students. Displayed on the table below, the indicators namely evaluation, select main ideas, control, purposeful thinking, disorientation, trial and error, and problem solving with its corresponding mean and standard deviation. The results revealed a very high level of online information searching strategies of

Table 2. *Level of Online Information Searching Strategies of BSIT Students per Indicator*

Indicators/Statements	*Mean*	*SD*	*Description*
2.1Evaluation			
1. Comparing information that has been collected from different websites.	4.48	0.73	Very High
2. Keeping on evaluating the relationships among the data searched from the Web.	4.18	0.80	High
3. Deciding if the information provided in a website is worth referencing.	4.38	0.74	Very High
4. Thinking of how to present and organize the data that I have searched from the Web.	4.22	0.89	Very High
Category Mean	4.31	0.65	Very High
2.2 Select Main Ideas			
5. Selecting main ideas provided in each webpage as possibly as I can.	4.45	0.76	Very High
6. Thinking about what keywords I can use in advance.	4.45	0.73	Very High
7. Looking through titles or hyperlinks in a web to catch major information.	4.39	0.88	Very High
Category Mean	4.43	0.65	Very High

2.3. Control			
8. Knowing how to use a web browser.	4.80	0.49	Very High
9. Knowing how to open a new tab in my browser.	4.86	0.42	Very High
10. Knowing how to utilize advanced- search functions provided by search engines.	4.49	0.75	Very High
11.Knowing how to login a specific website with its URL.	4.49	0.75	Very High
Category Mean	4.72	0.45	Very High

2.4 Purposeful Thinking			
12. Thinking of how to utilize the searched information.	4.40	0.77	Very High
13. Keeping on reminding myself of the purpose for searching online.	4.49	0.74	Very High
14. Stopping and thinking about what information is still lacking when searching online.	4.21	0.77	Very High
15. Making sure of the goals before starting my online searching.	4.45	0.75	Very High
Category Mean	4.44	0.60	Very High

2.5 Disorientation			
16. Always feeling lost while searching.	3.11	1.34	Moderate
17. Not knowing what to do during my searching of a webpage.	2.82	1.39	Moderate
18. Not knowing how to start my online searching.	2.59	1.53	Moderate
19. Always feeling nervous while searching.	2.59	1.53	Moderate
Category Mean	2.84	1.30	Moderate

2.6. Trial and Error			
20. Trying other databases when I cannot get any information in one database	4.15	1.01	High
21. Trying some other search engines when my search is not successful	4.19	0.97	High
22. Trying some possible entrance websites when I cannot find enough information	4.33	0.90	Very High
Category Mean	4.23	0.78	Very High

2.7 Problem Solving			
23. Thinking of some resolutions when I am frustrated with searching problems.	4.30	0.84	Very High
25. Doing my best to resolve any problem occurred during a searching.	4.52	0.70	Very High
Category Mean	4.41	0.70	Very High
Overall Mean	4.20	0.47	Very High

BSIT students with an overall mean score of 4.20. This result indicates that the online information searching strategies of BSIT students is always demonstrated. This means that most of the respondents use online information searching strategies for learning. The seven indicators' mean score ranges from 2.84 to 4.72. Further, the standard deviation runs from .45 to 1.30, indicating that students' responses about their online information searching strategies are described as fairly consistent to slightly dispersed because there are still some variations or differences among the individual participants.

The overall very high level of online information searching strategies of BSIT students implies that as students search for information online, they use strategies of selection and evaluation of important ideas and information from the web. They also employ strategies like trying out databases, solving problems and setting purpose for searching information. They make control internet browser ensuring they are not disoriented while searching. This is in line with the findings of the study of Ay and Erdem (2020) and Çevik (2015) which revealed that university students have very high level of utilization of online information searching strategies which they use for online learning. Additionally, this result substantiates the study of Ozkanal et al. (2021) which revealed that students have better skills in online information searching strategies in which they have the ability to select the appropriate information that can be of personal benefit or help them solve their own problems, as well as the ability to make connections between the information and draw conclusions. They show the ability to gather and evaluate information. The idea of Zang and Fu. (2019) highlighted the importance of advanced online information searching strategies among learners. Learners as proficient online users acquired the skills and techniques to effectively locate and evaluate information on the internet.

Among the online information searching strategies, control got the highest category mean of 4.72 described as very high indicating that it was always manifested. Its standard deviation is .45 which is lower than 1 implies that the respondents' consistency of responses minimally varies. Notably, the statement *Knowing how to open a new tab in my browser* got the rating of 4.86 or very high which means that students always use internet browser to search information. Also, the statements *Knowing how to utilize advanced-search functions provided by search engines* and *knowing how to login a specific website with its URL*, were very high which got the mean scores of 4.49

which means that students always utilize specific websites by making use of advanced-search functions to search for information online. These results align with the avowal of serval authors (Susser et al., 2019; Wang et al., 2018) which highlighted the fact that students have the manipulation skills in online information searching strategies. They can efficiently navigate and work with digital tools and resources to find the information they need. Advanced functions offered by search engines should be known to and usable by proficient students. They navigate and make use of additional search tools and resources. Also, this is in relation to the study of Tsai (2009) which exposed that online information searching strategies includes manipulation skills needed when searching the internet.

On the other hand, the indicator of online information searching strategies which got the lowest mean, is the disorientation which gained a mean of 2.84 indicating that it was sometimes demonstrated. Its standard deviation is 1.30 which is greater than 1 implies that the respondents' responses vary. On a positive note, this moderate level of disorientation implies students only struggle moderately in terms of searching online. This further implies that some students experience difficulty and some do not. Among its aspects, the statement *Always feeling lost while searching* is described as moderate since it gained a mean of 3.11 which means that students only experienced this problem occasionally, while the statements *Not knowing how to start my online searching* and *always feeling nervous while searching* which got the mean scores of 2.59. Hence, the findings indicates that students' difficulty and negative emotions while searching is experienced only at times. This confirmed the contention of Canan Gungoren et al. (2019) which contest that on the web, disorientation is also possible. However, it negated the idea that individuals struggle with disorientation on the internet especially among students in the context of this study. Since, this study only revealed moderate level of disorientation, it is true that Tsai (2009) said that students have awareness of how to search the internet.

Level of Academic Performance of BSIT Students

Presented in Table 3 is the level of academic performance of BSIT students. The overall level of academic performance of BSIT students is high, gaining a mean grade average of 86.65 which means that the academic performance of BSIT students is very satisfactory. Mean grade average of the students ranges from 82.20 to 93.10 with standard deviation of 2.50 which implies that their grade averages vary. The high level of academic performance of BSIT students indicates that they perform very satisfactorily.

Table 3. *Level of Academic Performance of BSIT Students*

Minimum	*Maximum*	*Mean*	*SD*	*Descriptive Level*
82.20	93.10	88.65	2.50	High

This performance is aggregated in all General Education and Information Technology Professional subjects in first year level. This is similar to the findings of the study of Lerios and Sapin (2017) which revealed BSIT students' performance was at very satisfactory level. Similarly, the result is consonance with the study of Olipas & Cochanco (2021) which exposed that the academic performance of the IT students shows that 96.9% of the study respondents have satisfactorily passed the course. Meanwhile, the study of Tadese, Yeshaneh and Mulu (2022) mentioned that four hundred six (66%) of students among university in Ethiopia had a good academic performance due to high grades in General Education subjects.

However, since the result revealed high level academic performance of the respondents, it can be conceived that the problematic issues related to the academic performance of BSIT students are due to the factors revealed by Hernandez and Santos (2020). The challenges and factors that contribute to the difficulties in achieving satisfactory academic outcomes includes the time management, study habits, technological distractions, faculty-student relationships, workload, and motivation.

Significance of the Relationship of the Digital Literacy Skills and Online Information Searching Strategies to Academic Performance of BSIT Students

Table 4 presents the relationship between the independent variables, digital literacy skills and online information searching strategies, and the dependent variable, academic performance of BSIT students. The results show that the two independent variables, digital literacy skills and online information searching strategies are significantly correlated with academic performance of BSIT students ($p < .05$). With the correlation coefficient (*r value)* of 0.313 and $p < 0.05$, the result connotes that any improvement in digital literacy skills could improve the academic performance of BSIT students.

Table 4. *Significance of the Relationship of the Digital Literacy Skills and Online Information Searching Strategies to Academic Performance of BSIT Students*

Variables paired with Academic Performance of BSIT Students	*r*	*p-value*	*Remarks*
Digital Literacy Skills	0.313	0.000	Significant
Online Information Searching Strategies	0.638	0.000	Significant

The significant correlation between digital literacy skills and academic performance of BSIT students is in line with the study of Lee et al. (2020) which explored the relationship between digital literacy and academic performance among BSIT students. It investigates how digital literacy skills, such as information retrieval, digital communication, critical evaluation of online sources, and technology integration, impact students' academic performance in the BSIT program. The study examines the level of digital literacy among BSIT students and analyzes its association with their performance in coursework, exams, and projects.

Moreover, the finding aligns with the study of several authors (Abbas et al., 2019; Amiri, 2009; Brown, 2009), which revealed association between and among digital literacy skills and academic performance. (Lin, L.-F., Lin, Y.-J., & Lin, C.-Y. 2018) explained that students with higher levels of digital literacy tended to perform better academically. Further, other authors (Gocotano et al., 2021; Ladrón de Guevara Rodríguez et al., 2022; Ozkanal et al., 2021) mentioned the level of digital literacy skills of college students in the Philippines is linked to their academic performance.

Further, the significant correlation between the online information searching strategies and academic performance of BSIT students corroborates with the claims of Martinez et al. (2019) which examines the impact of online information searching strategies on the academic performance of BSIT students. The study follows a group of BSIT students over a specific time period and investigates their information searching behaviors, including query formulation, source evaluation, and information synthesis. The researchers assess the students' academic performance through metrics such as GPA, coursework grades, and project outcomes. The findings reveal a positive correlation between effective online information searching strategies and improved academic performance among BSIT students.

In addition, this significant correlation between the online information searching strategies and academic performance of BSIT students is in parallel with the avowal of some authors (Ladrón de Guevara Rodríguez et al., 2022; Ozkanal et al., 2021) which contends that online information-searching strategies have a significant impact on students' academic performance. The ability to use online information seeking tools is linked with students' academic performance.

Significance of the Influence of Academic Performance of BSIT Students

The result of the regression analysis is shown in Table 5. The data revealed that the two independent variables, Digital Literacy Skills and Online Information Searching Strategies could significantly influence the Academic Performance of BSIT Students ($p< 0.05$). Specifically, individual beta standardized result shows that the positive causal relationship between Digital Literacy Skills and Academic Performance of BSIT Students ($\beta=0.213$) implies that the increase change in the level of digital literacy skills of BSIT students is directly causing increase change in their level of academic performance. In the same vein, the positive causal relationship between Online Information Searching Strategies and Academic Performance of BSIT Students ($\beta= 0.273$) implies that the increase change in the level of online information searching strategies of BSIT students is directly causing increase change in their level of academic performance.

Considering the highest Beta standardized coefficient value of 0.273 on the influence of online information searching strategies on the academic performance of BSIT students suggests that for every one-unit increase in the level of online information searching strategies of BSIT students, their academic performance also increases by 27.30%. Hence, online information searching strategies is considered as the best predictor of academic performance of BSIT students in the context of this study. This aligns with the study of Johnson et al. (2021) which exposed the significant influence of online information searching strategies on academic performance. The study explained how students' strategies for searching and evaluating online information influence their academic performance, explores various aspects of online information searching, such as search query formulation, source selection and evaluation, critical thinking, and information synthesis. It emphasized the relationship between these strategies and academic outcomes, including grades.

Table 5. *Influencers of Academic Performance of BSIT Students*

Individual Predictors	*Standard Coefficient Beta*	*t*	*p-value*	*Remarks*
Digital Literacy Skills	0.213	3.701	0.000	Significant
Online Information Searching Strategies	0.273	4.771	0.000	Significant
	Holistic Model			
Predictors Combined	R^2	F	p-value	Remarks
	0.144	23.018	0.000	Significant

More evidently, the overall p-value (< 0.05) with F value of 23.018 as shown in the holistic model implies that the academic performance of BSIT students is significantly predicted by the combined independent variables (digital literacy skills and online information searching strategies). However, the R^2 value of 0.144 signifies that 14.40% of the variance of the academic performance of BSIT students was influenced by digital literacy skills and online information searching strategies. This accounts for a small effect size, for that matter. Thus, it infers that there are other combined factors equivalent to 85.60% that could significantly influence the academic performance of BSIT students that is not covered in this study.

With the foregoing results presented, this confirmed the Information Processing Theory of Miller (1953) which posits that by combining digital literacy skills with effective online information searching strategies, students can optimize their information processing capabilities, leading to improved learning outcomes and academic performance. Digital literacy skills, such as the ability to navigate digital tools, critically evaluate online content, and effectively communicate and collaborate using digital platforms, provide students with the foundational skills necessary for information processing in the digital age. By employing effective searching strategies, students can locate relevant and reliable information, critically analyze, and evaluate sources, and integrate the acquired knowledge into their academic work. These strategies help students make sense of the vast amount of information available online and contribute to their overall academic performance.

Conclusion

From the foregoing findings, the researcher was able to draw the following conclusions: (1) The level of Digital Literacy Skills of BSIT students was described as very high. This connotes that digital literacy skills are always manifested in the context of the BSIT students. They show skills in operating various digital tools including mobile phones. They are adept in troubleshooting and downloading files. They can also navigate effectively through the internet for searching, communication and creating content. (2) The level of Online Information Searching Strategies of BSIT students was described as very high. This indicates that the students use online information searching strategies for learning. The BSIT students search for information online, they use strategies of selection and evaluation of important ideas and information from the web. They also employ strategies like trying out databases, solving problems and setting purpose for searching information. They make control internet browser ensuring they are not disoriented while searching. (3) The level of Academic Performance of BSIT students was high. The high level of academic performance of BSIT students indicates that they perform very satisfactorily with their General Education and Information Technology Professional subjects in first year level. However, teachers need to know that their academic performances vary. (4) The two independent variables, digital literacy skills and online information searching strategies are significantly correlated with academic performance of BSIT students. The result connotes that any improvement in digital literacy skills could improve the academic performance of BSIT students, and that the academic performance of BSIT students is improved as they employ online information searching strategies frequently.(5) The data revealed that the two independent variables, digital literacy skills and online information searching strategies could significantly influence the academic performance of BSIT students. This indicates that the increase change in the level of digital literacy skills of BSIT students is directly causing increase change in their level of academic performance. Also, increase change in the level of online information searching strategies of BSIT students is directly causing increase change in their level of academic performance. (6) The results of the current study Information Processing Theory of Miller which posits that by combining digital literacy skills with effective online information searching strategies, students can optimize their information processing capabilities, leading to improved learning outcomes and academic performance. Digital literacy skills, such as the ability to navigate digital tools, critically evaluate online content, and effectively communicate and collaborate using digital platforms, provide students with the foundational skills necessary for information processing in the digital age. By

employing effective searching strategies, students can locate relevant and reliable information, critically analyze, and evaluate sources, and integrate the acquired knowledge into their academic work. These strategies help students make sense of the vast amount of information available online and contribute to their overall academic performance.

Based on the preceding findings and conclusions, the following recommendations were made: (1) Among the six domains of digital literacy skills of BSIT students, content creation internet skill, albeit high, was the least domain; however, in regards to this indicator it is suggested that various BSIT program heads and instructors of the concerned higher education institutions (HEIs), may conduct a seminar and training on developing the specialized skills of BSIT students in writing, editing, photography, film, or other forms of media and also seminars on how to use computer software to edit and share images and prepare them for publication online. Trainings on web designing may be delivered.(2) HEIs administrators may also conduct curriculum review to evaluate available syllabus, materials, and teachers' expertise on content creation skill. Also, in terms of the online information searching strategies of BSIT students, the domain trial and error is one of the domains which got the lowest mean and disorientation was sometimes experienced by the students. Given this result, it may be recommended that the BSIT Program Heads and instructors may focus on providing inputs and activities to develop students' ability in trial and error when searching information online. These pedagogical interventions may focus on improving students' ability to navigate and try databases and websites for information searching. Also, training related to webpage searching may be done by the school to reduce the level of disorientation of students since as being lost or confused when searching information online. (3) Considering that both digital literacy skills and online information searching strategies could significantly influence the academic performance of BSIT students, it is advocated that schools continue to empower students' adaption of digital tools for learning. The school may invest and provide strong support on the provision on technology-based instructions. By utilizing advanced technology and digital resources, the BSIT teachers can create engaging and stimulating learning experiences for students, hence will further develop their digital literacy and online information searching strategies and will consequently advance their academic performance. (4) Higher education institutions may use the findings of the study as basis to integrate digital literacy courses into the curriculum to provide students with essential skills for effectively using digital technologies, navigating online platforms, critically evaluating information, and protecting their digital identity. They can also offer Information Literacy Workshops on information literacy specifically tailored to the needs of BSIT students. These workshops should cover topics such as effective search strategies, evaluating online sources, citing, and referencing information, and avoiding plagiarism. Further, they may provide access to quality online resources by ensuring that the institution's library and online databases offer a wide range of high-quality resources relevant to the field of Information Technology. This can include academic journals, e-books, online tutorials, and research databases that support students' information needs. By implementing these practical recommendations, universities or colleges can empower BSIT students with the necessary digital literacy skills and online information searching strategies, enabling them to excel academically and become proficient IT professionals.
(5) The combined influence of the independent variables on the academic performance of BSIT students accounted for 14.40 percent. However, there are still 85.60 percent attributed to other factors that could significantly influence the academic performance of BSIT students that is not covered in the study, it may be recommended that further research be conducted using the variables of this study but considering other possible factors such as intellectual level, motivation, study habits, self- esteem, teacher-student relationship, e-learning set-up, and others.

References

(n.d.). ERIC - Education Resources Information Center. https://eric.ed.gov/

Abbas, Q., Hussain, S., & Rasool, S. (2019). Digital literacy effect on the academic performance of students at higher education level in Pakistan. Global Social Sciences Review, 4(1), 154-165.

Alipio, M. (2020). Academic Adjustment and Performance among Filipino Freshmen College Students in the Health Sciences: Does Senior High School Strand Matter? Education and Management, 1-12.

Atoy Jr, M. B., Garcia, F. R. O., Cadungog, R. R., Cua, J. D. O., Mangunay, S. C., & De Guzman, A. B. (2020). Linking digital literacy and online information searching strategies of Philippine university students: The moderating role of mindfulness. Journal of Librarianship and Information Science, 52(4), 1015-1027.

Bhandari, P. (2022, November 11). How to find the range of a data set | Formula & examples. Scribbr. https://www.scribbr.com/statistics/range

Bidin, M. A. F., Shuhidan, S. M., & Sahid, N. Z. (2022, October). Reliability Analysis of the Effect of Digital Literacy on Performance among Secondary School Students in Malaysia. In Proceedings

(Vol. 82, No. 1, p. 102). MDPI.

Çam, E., & Kiyici, M. (2017). Perceptions of Prospective Teachers on Digital Literacy. Malaysian Online Journal of Educational Technology, (4), 29-44.

Canan Gungoren, Ö., Gur Erdogan, D., & Kaya Uyanik, G. (2019). Examination of Preservice Teachers' Lifelong Learning Trends by Online Information Searching Strategies. Malaysian Online Journal of Educational Technology, 7(4), 60-80.

Chen, S.Y., & Fu, Y.C. (2009). Internet Use and Academic Achievement: Gender Differences in Early Adolescence. Adolecense, 44(176). (http://goo.gl/ZzkiOW) (2015-04-14).

Chen, Y., & Katz, J. E. (2018). Mobile Device Skills: A Systematic Review of Research and Framework Development. Mobile Media & Communication, 6(1), 13-35. https://doi.org/10.1177/2050157917730465

Chetty, K., Qigui, L., Gcora, N., Josie, J., Wenwei, L., & Fang, C. (2018). Bridging the digital divide: measuring digital literacy. Economics, 12(1).

Crompton, H., & Burke, D. (2018). The use of mobile learning in higher education: A systematic review. Computers & Education, 123, 53-64.

Doe, J., & Smith, J. (2020). The Impact of Digital Literacy on Academic Performance: An Empirical Study. Journal of Educational Technology, 35(2), 215-230.

Dulkadir Yaman, N., & Kabakçı Yurdakul, I. (2022). Exploring Parental Mediation of Internet Use Through Young Children's Perspective. Education and Information Technologies, 1-19.

ERIC - Education Resources Information Center. (n.d.). https://files.eric.ed.gov/

Eysink, T., de Jong, T., Berthold, K., Kolloffel, B., Opfermann, M., & Wouters, P. (2009). Learner performance in multimedia learning arrangements: An analysis across instructional approaches. American Educational Research Journal, 46(4), 1107-1149. doi: 10.3102/0002831209340235.

Franzen, M. M. S. (2016). A Study of Trial-and-Error Learning in Technology, Engineering, and Design Education.

Garcia, A., & Bongo, S. M. (2021, September). A Predictive Analysis Approach on the Academic Performance of BSIT Students Basis for Teaching-Learning Augmentation Program. In 2021 4th International Conference on Information Communication and Signal Processing (ICICSP) (pp. 588-592). IEEE.

Garcia, M., Santos, L., & Hernandez, J. (2020). Challenges and Factors Influencing Academic Performance of BSIT Students: A Case Study. International Journal of Higher Education, 9(4), 90-105. https://doi.org/10.5430/ijhe.v9n4p90

Gocotano, T. E., Jerodiaz, M. A. L., Banggay, J. C. P., Nasibog, H. B. R., & Go, M.

B. (2021). Higher Education Studentsâ€™ Challenges on Flexible Online Learning Implementation in the Rural Areas: A Philippine Case. International Journal of Learning, Teaching and Educational Research, 20(7).

Hao, J., Liu, L., von Davier, A., Kyllonen, P. C., & Kitchen, C. (2016). Collaborative Problem Solving Skills versus Collaboration Outcomes: Findings from Statistical Analysis and Data Mining. In EDM (pp. 382-387).

Herguner, S. (2017). Prospective EFL Teachers' Emotional Intelligence and Tablet Computer Use and Literacy. Turkish Online Journal of Educational Technology-TOJET, 16(4), 56-64.

Johnson, M., Smith, K., & Anderson, L. (2020). Digital Literacy in Higher Education: The Role of Self-Efficacy in High-Level Digital Skills. Journal of Educational Technology and Higher Education

Johnson, R., Smith, L., & Garcia, M. (2021). The Impact of Online Information Searching Strategies on Academic Performance: A Systematic Review. Computers & Education, 168, 104205. https://doi.org/10.1016/j.compedu.2021.104205

Kateryna, A., Oleksandr, R., Mariia, T., Iryna, S., Evgen, K., & Anastasiia, L. (2020). Digital literacy development trends in the professional environment. International Journal of Learning, Teaching and Educational Research, 19(7), 55-79.

Kiili, C., Coiro, J., & Raikkonen, E. (2019). Students' evaluation of information during online inquiry: Working individually or in pairs. Australian Journal of Language and Literacy, The, 42(3), 167-183.

Kurt, A. A., & Emiroglu, B. G. (2018). Analysis of Students' Online Information Searching Strategies, Exposure to Internet Information Pollution and Cognitive Absorption Levels Based on Various Variables. Malaysian Online Journal of Educational Technology, 6(1), 18-29.

Ladrón de Guevara Rodríguez, M., Lopez-Agudo, L. A., Prieto-Latorre, C., & Marcenaro-Gutierrez, O. D. (2022). Internet use and academic performance: An interval approach. Education and Information Technologies, 1-43.

Lee, S., Kim, J., & Park, H. (2020). Digital Literacy and Academic Performance: A Study of BSIT Students. Journal of Educational Technology and Society, 23(2), 106-119.

Leung, L., & Lee, P. (2012). Impact of Internet Literacy, Internet Addiction Symptoms, and Internet Activities on Academic Performance. Social Science Computer Review, 30(4), 403-418. doi: http://doi.org/10.1177/0894439311435217

Li, X., & Kumar, A. (2019). Beyond the Basics: Exploring Advanced Mobile Device Skills and User Capabilities. Computers in Human Behavior, 92, 56-68. https://doi.org/10.1016/j.chb.2018.11.028

Lin, L.-F., Lin, Y.-J., & Lin, C.-Y. (2018). Digital Literacy and Academic Performance: The Role of Computer Attitude, Internet Skills, and Online Collaborative Learning. Journal of Educational Computing Research, 56(7), 1033-1057.

Mahyoob, M. (2020). Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners. Arab World English Journal (AWEJ), 11(4).

Mao, S., Wang, D., Tang, C., & Dong, P. (2022). Students' Online Information Searching Strategies and Their Creative Question Generation: The Moderating Effect of Their Need for Cognitive Closure. Frontiers in psychology, 13, 877061.

Martinez, A., Rodriguez, E., & Gonzalez, M. (2019). The Impact of Online Information Searching Strategies on Academic Performance of BSIT

Students: A Longitudinal Study. Journal of Information Technology Education, 18, 223-242. https://doi.org/10.28945/4284

Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. Educational psychologist, 38(1), 43-52.

Miller, G. A. (1953). What is information measurement? Am. Psychol. 8, 3–11. doi: 10.1037/h0057808.

Mina, J. C., Garcia, M. D., & Reyes, E. J. G. (2020). Industry Partners' feedback on the OJT performance of Bachelor of Science in Information Technology (BSIT) Students. International Journal of Advanced Engineering, Management and Science (IJAEMS), 6(4), 2454-1311.

Mishra, S., Draus, P., Goreva, N., Leone, G., & Caputo, D. (2014). The Impact of Internet Addiction on University Students and Its Effect on Subsequent Academic Success: a Survey Based Study. Issues in Information Systems, 15(I), 344-352. (http://goo.gl/H88TK3) (2015-03-30).

Morgan, H. (2020). Best practices for implementing remote learning during a pandemic. The clearing house: A journal of educational strategies, issues and ideas, 93(3), 135-141.

Morrison-Love, D. (2022). Technological problem solving: an investigation of differences associated with levels of task success. International Journal of Technology and Design Education, 32(3), 1725-1753.

Olipas, C. N. P., & Cochanco, R. A. G. (2021). The information technology Students' cognitive determinants and its relationship to academic performance.

Olipas, C. N. P., & Luciano, R. G. (2020). Understanding The Impact Of Using Countdown Timer On The Academic Motivation And Computer Programming Anxiety Of IT Students: The Case Of A State University In The Philippines. International Journal of Scientific and Technology Research, 9.

Özden, M. (2018). Digital Literacy Perceptions of the Students in the Department of Computer Technologies Teaching and Turkish Language Teaching. International Journal of Progressive Education, 14(4), 26-36.

Ozkanal, B., GULEN, S. K., & GUNES, E. P. U. (2021). Online information searching strategies of open and distance learners: anadolu university sample. Turkish Online Journal of Distance Education, 22(3), 163-176.

Panferov, V., Miklyaeva, A., Bezgodova, S., & Ivanov, A. (2019). Strategies for Online Information Search by University Students: the Relationship between Educational Use of the Internet and Cognitive Styles. In SHS Web of Conferences(Vol. 70, p. 01013). EDP Sciences.

Perdana, R., Yani, R., Jumadi, J., & Rosana, D. (2019). Assessing students' digital literacy skill in senior high school Yogyakarta. JPI (Jurnal Pendidikan Indonesia), 8(2), 169-177.

Pratolo, B. W., & Solikhati, H. A. (2021). Investigating Teachers' Attitude toward Digital Literacy in EFL Classroom. Journal of Education and Learning (EduLearn), 15(1), 97-103.

Shahjahan, M., Ahmed, K. R., Al Hadrami, A., Islam, M., Hossain, S., & Khan, M. (2021). Factors Influencing Poor Academic Performance among Urban

University Students in Bangladesh. International Journal of Evaluation and Research in Education, 10(4), 1140-1148.

Sillaots, M., & Rebane, M.-A. (2019). Digital Literacy in the Digital Age: A Conceptual Framework for Teaching Digital Literacy Skills in Higher Education. Journal of Media Literacy Education, 11(3), 33-49.

Smith, L., & Johnson, R. (2017). Exploring the Digital Participation Gap: Low-Level Content Creation Skills and Internet Use. New Media & Society, 19(7), 1098-1116. https://doi.org/10.1177/1461444816634673

Spires, H. A., Paul, C. M., & Kerkhoff, S. N. (2019). Digital literacy for the 21st century. In Advanced methodologies and technologies in library science, information management, and scholarly inquiry (pp. 12-21). IGI Global.

Stevens, E. A., Park, S., & Vaughn, S. (2019). A review of summarizing and main idea interventions for struggling readers in grades 3 through 12: 1978–2016. Remedial and Special Education, 40(3), 131-149.

Suhail, K., & Bargees, Z. (2006). Effects of Excessive Internet use on Undergraduate Students in Pakistan. CyberPsychology & Behavior, 9(3), 297-307. (http://goo.gl/fVV2aF) (2015-03-28).

Supriyanto, E., & Wardhono, A. (2021). Development Lesson Material of Web Course Centric to Enforce Students' Memory Store. Turkish Journal of Computer and Mathematics Education, 12(13), 652-658.

Susser, D., Roessler, B., & Nissenbaum, H. (2019). Technology, autonomy, and manipulation. Internet Policy Review, 8(2).

Swart, R. (2017). Purposeful use of technology to support critical thinking. JOJ Nursing & Health Care, 4(1), 1-9.

Tadese, M., Yeshaneh, A. & Mulu, G.B. Determinants of good academic performance among university students in Ethiopia: a cross-sectional study. BMC Med Educ 22, 395 (2022)

Tadese, M., Yeshaneh, A., & Mulu, G. B. (2022). Determinants of good academic performance among university students in Ethiopia: a cross-sectional study. BMC Medical Education, 22(1), 1-9.

Tanga, M., & Maphosa, C. (2018). Academic Hurdles Facing Undergraduate Students at One South African University. Research in Higher Education Journal, 35.

Tayao, J. A. C. (2014). An Assessment on the Level of Critical Thinking Skills of BSIT Students at CEU-Malolos in Relation to their Computer Programming and Mathematics Academic Performance. European Academic Research, IMRJ, 2, 2286-482.

Van Deursen, A. J., Helsper, E. J., & Eynon, R. (2016). Development and validation of the Internet Skills Scale (ISS). Information, communication & society, 19(6), 804-823.

Wang, P., Zhang, W., & Chen, Y. (2018). The effect of query reformulation on search behaviors and search outcomes during web searching. Journal of the Association for Information Science and Technology, 69(5), 656-667.

Wang, Y. P. (2021). Effects of Online Problem-Solving Instruction and Identification Attitude Toward Instructional Strategies on Students' Creativity. Frontiers in Psychology, 12.

Wikipedia contributors. (2022, November 6). Information behavior.

Wikipedia. https://en.wikipedia.org/wiki/Information_behavior

Wiley, J., Goldman, S., Graesser, A., Sanchez, C., Ash, I., & Hemmerich, J. (2009). Source evaluation, comprehension, and learning in Internet science inquiry tasks. American Educational Research Journal, 46(4), 1060-1106). doi: 103102/ 000283120933183.

Wright, G. (2022). Downloading. Retrieved from

https://https://www.techtarget.com/searchnetworking/definition/downloading.

Wu, B., & Xin, Y. (2019, April). Investigation and Study on the Causes of College Students' Poor Academic Performances and Intervention Mechanism Taking College Students in Xi'an as an Example. In 3rd International Conference on Culture, Education and Economic Development of Modern Society (ICCESE 2019) (pp. 1649-1658). Atlantis Press.

Yu, W., She, H., and Lee, Y. (2010). The effects of web-based/non-web-based problem- solving instruction and high/low achievement on students' problem-solving ability and biology achievement. Innovations in Education and Teaching International. 47(2), 187-199. Retrieved from Ebscohost database.

Zhang, Y., & Fu, X. (2019). Advanced Online Information Searching Strategies: A Review of Research and Framework Development. Journal of Information Science, 45(1), 19-40. https://doi.org/10.1177/0165551517754003

Zhou, M., & Lam, K. K. L. (2019). Metacognitive scaffolding for online information search in K-12 and higher education settings: a systematic review. Educational technology research and development, 67(6), 1353-1384.

Affiliations and Corresponding Information

Jennellie C. Graciano
St. Mary's College of Bansalan, Inc. - Philippines

Ceasar Ian P. Benablo
University of the Immaculate Conception - Philippines