

Exploring Digital Fluency: A Study of First-Year Students' ICT Proficiency



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ABSTRACT: Determining students' level of ICT proficiency is essential for efficient teaching and learning in the modern higher education setting. This study examines the Bachelor of Science in Information Technology first-year students' digital ability while taking into account the variety of experiences that have shaped their technology aptitude. A survey approach was used to collect data including observations, in order to fully investigate students' technology skills and learning preferences. The results shed light on the range of digital fluency among first-year students, taking into account individual interests, educational backgrounds, and socioeconomic background. Additionally, this study explores the digital learning materials that students prefer, offering insights into their attitudes and practices around the use of technology in the classroom. This study adds to the current conversation on promoting digital fluency in higher education by using qualitative data.

I. INTRODUCTION

The basic ICT knowledge and skills that an ICT literate person should have are constantly being improved. Due to the rapid development of information and computer technologies, we are more and more frequently faced with the term ICT literacy and the broader meaning of the concept of information literacy, which constitute the fundament for modern society development. ICT literacy becomes an important precondition for socialization and professional career. The progression of digital technologies has fundamentally altered the educational terrain, presenting a range of opportunities and difficulties for educators and students alike. The idea of digital fluency is becoming more and more important as technology is incorporated into educational settings and plays a bigger role in students' academic performance and future employment opportunities. The increasing demand for computer skills not only comes from many IT-producing jobs, such as computer hardware engineers and software programmers but also from the IT-using jobs, which encompass virtually every other job (Peng, 2017). Far from being digital natives, many students have considerable trouble using ICT beyond the ubiquitous Facebook. While some students are computer literate, a substantial proportion lack the skills to prosper under their own devices in an online tertiary education environment (Gray, 2013). The Bachelor of Science in Information Technology first-year university students of ISAT U Miagao Campus are a varied bunch with differing exposure and skill levels in digital technology. Although many students might be somewhat conversant with digital tools and platforms, there might be large differences in the students' levels of digital fluency. The differences in digital competency among first-year students can be attributed to various factors, including personal interests, educational experiences, and socioeconomic background.

Objectives

The aim of the study is to assess the ICT literacy skills among the Information Technology First year students at the Iloilo Science and Technology Miagao Campus.

Specifically, this study sought answers to the following questions:

- 1.) What is the level of ICT Competency of the BSIT students as a whole and in terms of age and gender?
- 2.) Is there a significant difference in the level of ICT Competency of the BSIT students when classified according to age and gender?

In addition to being able to use digital technologies, digital fluency includes the ability to critically assess information, work well in collaborative settings, and adjust to rapidly changing technology platforms.

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Ethical Considerations

The ethical guidelines established by the Iloilo Science and Technology University - Miagao Campus were followed in the conduct of this study. The purpose of the research was explained to the participants. Their participation was entirely voluntary, and participants were free to withdraw at any time without consequence. Participants were treated with outmost respect and given their right of privacy and confidentiality of their information. The researchers obtained permission from ISAT U administration and collaborated with Research Department to conduct the study. The researchers adhered to legal and ethical obligations to safeguard participants' privacy and confidentiality.

II. METHODOLOGY

This study was conducted using a qualitative, survey-based methodology. We adopted a non-experimental design in which no variables are treated for application or alteration, but only for information gathering, observation, and selection required to address the research inquiries. To accomplish the goals of the study, we additionally carried out an inferential, descriptive data analysis. Respondents of the study are fully informed about the nature of the research.

The sample

Thirty (30) first year students were selected randomly from a population of Bachelor of Science in Information Technology of ISAT U Miagao Campus for academic year 2023-2024 in order to guarantee representation.

The Instrument

A structured questionnaire was developed to assess various aspects of ICT proficiency, including skills, competencies, usage patterns, and perceptions. The questionnaire was pre-tested with a small sample of participants to ensure clarity, validity, and reliability of the survey items.

The Method

The survey will be administered in a classroom setting to facilitate, monitor and observe the participants efficiently. Participants are provided with clear instructions on how to complete the survey and were given adequate time to respond. Using measures of central tendency and variability, survey data will be descriptively evaluated to provide a summary of participants' ICT competence levels and related characteristics. In order to investigate the correlations between demographic characteristics and ICT proficiency levels as well as other pertinent elements found in the study, inferential statistical tests (such as t-tests, and correlation analysis) will be performed.

Table 1. Likert Scale Weighted Mean Interpretation for the level of ICT competency of First Year Students

Scale	Mean Score	Interpretation
5	4.21 - 5.00	Expert/Outstanding
4	3.41 - 4.20	Proficient/Very Satisfactory
3	2.61 - 3.40	Demonstrating/Satisfactory
2	1.81 - 2.60	Basic/Poor
1	1.00 - 1.80	Low level/Needs Improvement

Data Collection and Analysis

The survey questionnaires were used to determine the (1) level of ICT Competency of the BSIT students as a whole in terms of age and gender and (2) if there is significant difference in the level of ICT Competency of the BSIT students when classified according to age and gender. The survey questionnaires were personally administered by the researchers in a classroom setting. None of participants received any kind of compensation for their participation in this study. The questionnaires consisted of 2 major sections, including (1) participants' profile which includes age, gender, (2) level of ICT knowledge which includes their knowledge about ICT basics, word processing, spreadsheet application, presentation software, internet and computer ethics.

The data were analyzed statistically in order to interpret the mean score of level of ICT Competency of the BSIT students in terms of age and gender, and the significant difference in the level of ICT Competency when classified according to age and gender. Table 1 is used for the analysis of items of each construct. The responses of the participants referred to five groups. The level construct that has a mean score from 4.21 - 5.00 fall into the Expert/ Outstanding level. The mean score from 3.41 to 4.20 is Proficient/Very Satisfactory level. The mean score between 2.61 - 3.40 is Demonstrating/Satisfactory level. Meanwhile, if the mean score is between 1.81 - 2.60, the level of competency is Basic/Poor. If the mean score reaches 1.00 - 1.80, the level of

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competency is Low level/Needs Improvement.

III. RESULTS AND DISCUSSION

Participant's Demographics

Table 2. Participants' Age

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid ages 18 - 20	27	90.0	90.0	90.0
ages 21 - 25	3	10.0	10.0	100.0
Total	30	100.0	100.0	

Table 3. Participants' Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	17	56.7	56.7	56.7
Female	13	43.3	43.3	100.0
Total	30	100.0	100.0	

The result shows that 90% of the respondents are ages 18-20 years old and only 10% are ages 21-25 (Table 2.) This result also shows 56% are male and 13% are female (Table 3).

First year students' perception of their ICT competencies (55 items) will be presented According to the following competency areas: Understanding Basic ICT terms (10 items); Word processing (9 items); Spreadsheet Application (9 items); Presentation Software (11 items); Internet Literacy (9 items); Computer Ethics and Security (7 items). To avoid bias, participant responded on a Likert-type scale of 1 to 5, as stated above.

This part of the study presents the knowledge of BSIT students with the basics of Information Technology. It demonstrates the respondents' perceptions of their level of ICT knowledge as a whole.

Table 4. Level of ICT as a whole (Overall and different dimensions/areas)

Competencies	Mean	SD	Interpretation
Basic ICT	3.43	0.49	Proficient/Very Satisfactory
Word	3.82	0.72	Proficient/Very Satisfactory
Spreadsheet	3.23	0.76	Demonstrating/Satisfactory
Presentation	3.36	0.90	Proficient/Very Satisfactory
Internet	3.36	0.68	Proficient/Very Satisfactory
Ethics and Security	3.68	0.75	Proficient/Very Satisfactory
Overall	3.48	0.59	Proficient/Very Satisfactory

Legend: Expert/Outstanding (4.21-5.00); Proficient/Very Satisfactory (3.41-4.20); Demonstrating/Satisfactory (2.61-3.40); Basic/Poor (1.81-2.60); Low level/Needs Improvement (1.00-1.80)

Findings in table 4 showed that the participants' knowledge of basic ICT is Proficient/Very Satisfactory ($x=3.43$, $sd=0.49$). It shows that their knowledge Microsoft Word is also Proficient/Very Satisfactory ($x = 3.82$, $sd = 0.72$). It's good to know that their competency about Spreadsheet application which is Microsoft Excel is Demonstrating/Satisfactory ($x = 3.23$, $sd = 0.76$). Their knowledge about presentation software like Microsoft PowerPoint ($x=3.36$, $sd=0.90$) and Internet ($x= 3.36$, $sd=0.68$) are Proficient/Very Satisfactory. Their understanding about ICT ethics and security ($x=3.48$, $sd= 0.59$) is also Proficient/Very Satisfactory. This shows that BSIT students are familiar with using MS word compared with MS Excel. Information Communication Technology (ICT) competency describes more than awareness or driving license level of using computing facilities and networking services to carry out different tasks. Undergraduates of a university will become knowledge workers in the society and they should acquire the knowledge, skills and attitudes using the modern ICT technology to carry out their job tasks effectively. If they fail to achieve this level of competency in ICT, it becomes a key factor for the under or unemployment of graduates irrespective of academic qualification. (Hewagamage and Hewagamage,2015)

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Table 5. Level of ICT in terms of age (overall and different dimensions/areas)

Competencies	Age	Mean	SD	Interpretation
Basic ICT	18-20 Years old	3.40	0.47	Demonstrating/Satisfactory
Basic ICT	21 and above	3.70	0.75	Proficient/Very Satisfactory
Word	18-20 Years old	3.78	0.67	Proficient/Very Satisfactory
Word	21 and above	4.22	1.25	Expert/Outstanding
Spreadsheet	18-20 Years old	3.15	0.66	Demonstrating/Satisfactory
Spreadsheet	21 and above	4.0	1.36	Proficient/Very Satisfactory
Presentation	18-20 Years old	3.28	0.88	Demonstrating/Satisfactory
Presentation	21 and above	4.0	0.91	Proficient/Very Satisfactory
Internet	18-20 Years old	3.37	0.69	Proficient/Very Satisfactory
Internet	21 and above	3.29	0.74	Demonstrating/Satisfactory
Ethics and Security	18-20 Years old	3.70	0.77	Proficient/Very Satisfactory
Ethics and Security	21 and above	3.52	0.70	Proficient/Very Satisfactory
Overall	18-20 Years old	3.45	0.56	Proficient/Very Satisfactory
Overall	21 and above	3.80	0.92	Proficient/Very Satisfactory

Legend: Expert/Outstanding (4.21-5.00); Proficient/Very Satisfactory (3.41-4.20); Demonstrating/Satisfactory (2.61-3.40); Basic/Poor (1.81-2.60); Low level/Needs Improvement (1.00-1.80).

Table 5 shows the level of respondents' competency in terms of age. This result shows that the respondents who age 18-20 years old has higher competency in internet ($x=3.37$, $sd=0.69$) and ethics and security ($x=3.70$, $sd=0.77$) but they have lower competency in basic ICT ($x=3.40$, $sd=0.74$), word ($x=3.78$, $sd=0.67$), spreadsheet ($x=3.15$, $sd=0.66$) and presentation software ($x=3.28$, $sd=0.88$). On the other hand, those who age 21 and above has higher competency in basic ICT ($x=3.70$, $sd=0.75$), word ($x=4.22$, $sd=1.25$), spreadsheet ($x=4.0$, $sd=1.36$), presentation ($x=4.0$, $sd=0.91$) but they have lower competency in internet ($x=3.29$, $sd=0.74$) and ethics and security ($x=3.52$, $sd=0.70$). The overall results shows that the level of competency of BSIT students who age 18-20 years old is the same with those who age 21 years old and above. Although it would not be appropriate to assume age-related differences as a basis for program planning, it would be important to recognize that such differences in access, related experience, and confidence do exist between and within age groups and to ensure that any teacher preparation program offers opportunities for access that will assist students to extend their experience of ICT and build their confidence with a wider range of applications. (Albion, P. R., Jamieson-Proctor, R., & Finger, G., 2011). This results confirms the study of Lim & Lee (2000) that found that students have some basic computing skills, adequate MS Word and Internet skills but their Excel and Access skills are not adequate for business students for qualification requirements or for their future employment (Zhao, 2002). It would seem that although the Millennial students have been brought up with technology, have access to computers and the latest operating systems, the students in this study have not been exposed to the application programs needed in the business environment (Sherry and Fielden, 2005).

Table 6. Level of ICT in terms of gender (overall and different dimensions/areas)

Competencies	Gender	Mean	SD	Interpretation
Basic ICT	Male	3.57	0.57	Proficient/Very Satisfactory
Basic ICT	Female	3.30	0.22	Demonstrating/Satisfactory
Word	Male	3.79	0.81	Proficient/Very Satisfactory
Word	Female	3.94	0.59	Proficient/Very Satisfactory
Spreadsheet	Male	3.52	0.85	Proficient/Very Satisfactory
Spreadsheet	Female	2.86	0.45	Demonstrating/Satisfactory
Presentation	Male	3.66	0.70	Proficient/Very Satisfactory
Presentation	Female	3.01	1.03	Demonstrating/Satisfactory
Internet	Male	3.57	0.71	Proficient/Very Satisfactory
Internet	Female	3.17	0.48	Demonstrating/Satisfactory
Ethics and Security	Male	3.83	0.73	Proficient/Very Satisfactory

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Ethics and Security	Female	3.61	0.65	Proficient/Very Satisfactory
Overall	Male	3.65	0.66	Proficient/Very Satisfactory
Overall	Female	3.21	0.33	Demonstrating/Satisfactory

Legend: Expert/Outstanding (4.21-5.00); Proficient/Very Satisfactory (3.41-4.20); Demonstrating/Satisfactory (2.61-3.40); Basic/Poor (1.81-2.60); Low level/Needs Improvement (1.00-1.80)

Table 6 shows the level of respondents' competencies in terms of gender. This shows that BSIT male respondents has higher competency in basic ICT ($x=3.57$, $sd=0.57$), spreadsheet ($x=3.52$, $sd=0.85$), presentation ($x=3.66$, $sd=0.70$), internet ($x=3.57$, $sd=0.71$) and ethics and security ($x=3.61$, $sd=0.65$) but has lower competency in word ($x=3.79$, $sd=0.81$). The BSIT female respondents only has high competency in word ($x=3.94$, $sd=0.59$) but has lower competency in all other areas. The overall results confirmed that male respondents have Proficient/Very Satisfactory level of competency ($x=3.65$, $sd=0.66$) and female respondents has Demonstrating/Satisfactory ($x=3.21$, $sd=0.33$). This proves that the BSIT male respondents have higher level of competency compared to BSIT female respondents. The gender difference in primary education is observed to be smaller than in secondary education. In secondary education, the computer attitude of girls seems to be less positive than that of boys. Girls and boys take on different tasks when working together on the computer and they tackle ICT tasks differently. The girl's behavior seems to a lesser degree positive towards computers than boys at secondary education (Volman et al., 2005). In another study, the authors argue that girls have an advantage in the more information-oriented dimensions that require sharing, evaluating, and reflecting processes. They also highlight the results where boys performed better when applying technical functionality (Punter et al., 2017).

Table 7. Difference in the Level of ICT when classified according to age (overall and different dimensions/areas)

Competencies	t	df	p
Basic ICT	-0.986	28	0.333
Word	-0.994	28	0.329
Spreadsheet	-1.899	28	0.068
Presentation	-1.422	28	0.166
Internet	0.184	28	0.855
Ethics and Security	0.383	28	0.704
Overall	-0.967	28	0.342

Brown-Forsythe test is significant ($p < .05$), suggesting a violation of the equal variance assumption.

Table 7 reveals no significant difference in the ICT competency level of BSIT students when classified according to age. This means that, regardless of age, they exhibited comparable level of competencies.

Table 8. Difference in the Level of ICT when classified according to gender (overall and different dimensions/areas)

Competencies	t	df	p
Basic ICT	1.504	27	0.144
Word	-0.551	27	0.586
Spreadsheet	2.446	27	0.021
Presentation	2.024	27	0.053
Internet	1.670	27	0.107
Ethics and Security	0.801	27	0.430
Overall	1.610	27	0.119

Table 8 shows no significant difference in the ICT competency level of

BSIT students when classified according to gender. This means that both male and female BSIT students of ISAT U MC has the same overall level of competencies.

IV. CONCLUSION

This study's result emphasizes how crucial it is to take age and gender into account while evaluating and treating first-year

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students' ICT skills. Through the identification of age-related variations in the acquisition and application of skills, educators can create focused interventions aimed at improving students' ICT competency and equipping them for success in the digital era. Subsequent studies could investigate the underlying variables influencing age-related differences in ICT ability and look at long-term patterns in students' technical growth. Educators can adapt instructional strategies and support systems to match the various needs of students across age groups by detecting age-related patterns in ICT abilities. It is essential to address these differences in proficiency levels in order to promote inclusive and successful ICT education practices.

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