

Student's Technology Literacy Skills and Level of Motivation in Relation to their Online Learning Behavior

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Abstract

This research investigates the nexus of students' technology literacy skills, motivation levels, and online learning behavior at Misamis University, College of Education, during the 2020–2021 academic year. Employing a descriptive-correlational design, the study sampled 126 education students using a simple random sampling technique. Utilizing three adapted questionnaires, the research explored students' technology literacy skills, motivation levels, and online learning behavior. Data collection was facilitated through Google Forms, and statistical analysis involved the mean, standard deviation, and Pearson product-moment correlation coefficient. The findings revealed that education students exhibited remarkably high levels of technology literacy skills, motivation, and positive online learning behaviors. Additionally, students demonstrated elevated digital citizenship, participation, innovative skills, and a strong sense of self-determination. Noteworthy was their high technical proficiency, creativity, perceived values, and interest in online courses. Importantly, the study established a significant correlation between students' technology literacy skills, motivation levels, and their online learning behavior. Consequently, students' conduct and performance in the online learning environment were discernibly influenced by their technological competencies and motivational factors. The study recommends the sustained use of innovative teaching strategies, the creation of effective learning environments, and the integration of technology in developing online learning materials. These recommendations aim to further amplify students' online learning behavior, underscoring the pivotal roles of technology literacy skills and motivation in shaping the dynamics of the online educational landscape.

Keywords: behavior, motivation, online learning, technology, technology literacy skills

Introduction

Amid the COVID-19 pandemic, the shift to online learning prompted an exploration of students' technology literacy skills, motivation levels, and behaviors in online education. The pandemic necessitated the rapid adoption of online and modular learning as primary curriculum delivery methods in the Philippines (Amir et al., 2020; Salangi et al., 2018). The integration of digital technology into education has fundamentally transformed learning approaches (Tang & Chaw, 2016), highlighting the need for individuals to evolve their competencies and skills (Misirli & Akbulut, 2019).

While digital natives may use technology daily, there's a call for enhanced technology literacy skills for learning purposes (Waycott et al., 2010; Gurung and Rutledge, 2019). Estes (2015) defines technology literacy skills as the ability to effectively use technology to access, evaluate, integrate, create, and communicate information for enhanced learning. Investigating students' technology literacy skills is crucial for keeping pace with technological advancements in online learning.

Motivation levels in online learning have become a critical concern, with the sudden shift to digital education (Adnan & Anwar, 2020). The pandemic-induced online education growth requires understanding how students' motivation affects learning outcomes (Harandi, 2015; Bonito, 2013). Avila and Genio (2020) emphasize the importance of motivation, suggesting that motivated learners engage more actively and achieve enhanced performance.

Studies indicate that technology experience influences online course behavior (Smart and Cappel, 2016; Smidt et al., 2018), and the ease of online learning courses impacts student behavior (Carlson, 2020). Misirli and Akbulut's (2019) factor analysis identified technical proficiency, creativity, digital citizenship and participation, and innovativeness as key aspects of technology literacy skills.

Motivation in online learning, linked to perceived values, interest, and self-determination (Shin, 2010), plays a pivotal role in students' engagement and achievement (Avila and Genio, 2020; Kim and Frick, 2011). Positive attitudes and behaviors are essential for the acceptance of online learning (Selim, 2017).

The study aims to explore the relationship between technology literacy skills, motivation, and online learning behavior in the context of Misamis University College of Education. It responds to the urgency of understanding students' experiences during the ongoing global crisis and provides valuable insights for effective online education.

Objectives of the Study

This study examined technology literacy skills and level of motivation in relation to online learning behavior among students in the College of Education during the school year 2020-2021. The specific objectives of the study were:

1. Determine the students' level of technology literacy skills in terms of technical proficiency, creativity, digital citizenship and participation, and innovativeness;
2. Determine students' level of motivation in terms of perceived values, interests, and self-determination;
3. Determine students' demonstration of online learning behavior;
4. Explore the relationship between students' technology literacy skills and their online learning behavior; and
5. Explore the relationship between students' level of motivation and their online learning behavior.

Materials and Methods

Research Design

The research design used in this undertaking and achieving its objectives was descriptive-correlational. Descriptive-correlational is a quantitative method of research in which it sets out to identify and describe relationships between naturally occurring events and variables (Creswell, 2003). This design is primarily used in describing relationships among variables without seeking to establish a causal connection and without any active intervention on the researcher's part (Pokit & Hungle, 2013). This method was utilized to investigate students' technology literacy skills and level of motivation concerning their online learning behavior.

Research Setting

This study was conducted in the College of Education, Misamis University, Ozamiz City. The Education program is one of the first courses offered by the University. The program was awarded Level I and II Accredited Status in 1988 and 1990, respectively. In 2011, the Philippine

Association of Colleges and Universities Commission on Accreditation (PACUCOA) awarded the Bachelor of Elementary Education (BEEd) and Bachelor of Secondary Education (BSEd) Programs Level III Reaccredited Status, valid until November 2014. In 2012, during the 23rd Annual General Assembly of PACUCOA, the university president accepted the award as having the first Bachelor of Secondary Education Program in Region 10 to have been granted Level III reaccredited status. The College of Education is the region's leading center of teacher education. It produced regional and national topnotchers in the Licensure Examination for Teachers. The college has 186 enrolled students for the 2nd semester of the school year 2020-2021.

Research Respondents

The respondents of the study were Education students of Misamis University. The number of respondents was determined using the Survey Monkey sample size online calculator. A total of 126 student-respondents were considered as samples from the population of 186. They were selected through a simple random sampling technique.

Research Instruments

The following instruments were used in this study:

A. Technology Literacy Skills Questionnaire.

This research instrument was adapted from Zeynel A. Misirli and Yavuz Akbulut (2013) with four identified constructs, namely: technical proficiency with ten (10) statements, creativity with five (5) statements, digital citizenship, and participation with five (5) statements, and innovativeness with five (5) statements. Though this instrument was adapted from a previous research study, the current researchers modified some of the statements, so the instrument was subjected to validity through expert validation and a pilot test to establish its reliability using Cronbach's alpha. The result of the reliability tests was as follows: Technical Proficiency, Cronbach $\alpha = 0.874$; Creativity, Cronbach $\alpha = 0.866$; Digital Citizenship and Participation, Cronbach $\alpha = 0.818$; and Innovativeness, Cronbach $\alpha = 0.883$. Cronbach's alpha of all constructs exceeds 0.7, which makes it acceptable and passes the reliability test. This instrument, measuring students' technology literacy skills, used a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) as the response.

| Responses | Continuum | Interpretation |
|-----------------------|-----------|----------------|
| 5 – Strongly Agree | 4.20-5.00 | Very High |
| 4 – Agree | 3.40-4.19 | High |
| 3 – Neutral | 2.60-3.39 | Average |
| 2 – Disagree | 1.80-2.59 | Low |
| 1 – Strongly Disagree | 1.00-1.79 | Very Low |

B. Level of Motivation Questionnaire.

This research instrument was adapted from Tae Seob Shin (2010). The research questionnaire has three constructs, namely: *perceived values* consisted of six (6) statements, *interest* consisted of five (5) statements, and *self-determination* consisted of nine (9) statements. The researchers modified some of the statements, which is why the instrument was also subjected to validity through expert validation and a pilot test to establish its reliability using Cronbach's alpha. The result of the reliability tests was as follows: Perceived Values, Cronbach $\alpha = 0.883$; Interest, Cronbach $\alpha = 0.876$; and Self-Determination, Cronbach $\alpha = 0.870$. Cronbach's alpha of all constructs exceeds 0.7, which makes it acceptable and passes the reliability test. This instrument, measuring students' level of motivation, used a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) as the response.

| Responses | Continuum | Interpretation |
|-----------------------|-----------|----------------|
| 5 – Strongly Agree | 4.20-5.00 | Very High |
| 4 – Agree | 3.40-4.19 | High |
| 3 – Neutral | 2.60-3.39 | Average |
| 2 – Disagree | 1.80-2.59 | Low |
| 1 – Strongly Disagree | 1.00-1.79 | Very Low |

C. Online Learning Behavior Questionnaire.

This research instrument was adapted from Muhammad Safdar, Khalid Mahmood, and Saima Qutab (2010). The instrument consisted of twenty (20) statements that describe students' online learning behavior. The instrument was subjected to validity through expert validation and a pilot test to establish its reliability using Cronbach's alpha. Cronbach's alpha of all statements exceeds 0.7 and with an overall value of 0.923, which makes it acceptable and passes the reliability test. This instrument, measuring students' online learning behavior, used a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) as the response.

| Responses | Continuum | Interpretation |
|-----------------------|-----------|----------------|
| 5 – Strongly Agree | 4.20-5.00 | Very Positive |
| 4 – Agree | 3.40-4.19 | Positive |
| 3 – Neutral | 2.60-3.39 | Neutral |
| 2 – Disagree | 1.80-2.59 | Negative |
| 1 – Strongly Disagree | 1.00-1.79 | Very Negative |

Data Collection

In gathering the pertinent data for this study, specific procedures were followed:

1. The college dean sought permission to conduct the study.
2. Informed consent was sent to possible respondents.
3. An online survey link (using google forms) was sent individually to the research participants after receiving their consent.
4. The gathered data were tallied for statistical analysis; the data were classified, organized, and interpreted based on the purpose of the study.

Ethical Considerations

In this research, the ten principles of ethical considerations by Bryman and Bell (2007) were complied with. Respondents of the study were not harmed, for their approvals were sought first, and their names were privately assured. The researchers made sure that the respondents were not forced nor given any threats to participate in this undertaking, and the gathering of data was conducted based on the respondents' available time. The gathered data about the Education students' responses were handled with appropriate confidentiality, along with the anonymity of the respondents and entities engaged in the research. Every deception or exaggeration about the research's objectives and priorities was avoided. There was no association in any way, as well as any conflicts of interest. Any form of correspondence was conducted with fairness and integrity in connection with the study. Any deceptive evidence, as well as the skewed portrayal of primary data results, was highly avoided.

Data Analysis

The data that were gathered from the students' technology literacy skills and level of motivation about their online learning behavior were subjected to statistical treatment using the following:

Mean and standard deviation were used in determining students' technological literacy skills, level of motivation, and online learning behavior.

Pearson (r) Product Moment Correlation Coefficient was used in exploring the relationship between students' technology literacy skills and their online learning behavior and the relationship between students' level of motivation and their online learning behavior.

Results and Discussions

Students' Technology Literacy Skills

Table 1 presents students' technology literacy skills. It shows that Education students had very high technology literacy skills, as evidenced by the overall mean of 4.23 and a standard deviation of 0.65. Findings revealed that students had high digital citizenship and participation, with a mean of 4.50, and very high innovative skills, with a mean of 4.21. Students showed high technical proficiency ($M = 4.19$) and high creativity ($M = 4.00$). These indicate that students can use information and communication technologies to find, evaluate, create, and communicate information, requiring cognitive and technical skills.

The results further reveal that Education students have adapted to new technologies. Their competencies and skills have evolved as they are now required to know better how to achieve essential information, use their knowledge, and build new knowledge by reconfiguring their existing skills. Moreover, today's students can use technology to analyze, learn, and explore because they know that these skills are vital for working, living, and contributing to their communities social and civic fabric. These results mean that the more students are engaged and empowered to use and learn through digital tools, the more they develop their skills and become technologically literate.

Students in the 21st century are familiar with digital technology and generally know how to access, create, and share digital information (Ting, 2015). Students know how, why, and when to use digital tools. Individuals with technology literacy skills can spot opportunities to take advantage of and add a new level of creative expression to a project (Churches, 2017). When students use powerful content-creation tools for their assignments and projects, they engage more deeply with the content, which helps them better understand information and communicate their knowledge visually and digitally compellingly (Andrews, 2018). And when students use tools to create presentations, infographics, animations, videos, or ePortfolios for their assignments, they understand it more deeply and retain it longer (Adobe Gen, 2017). These allow students to communicate their ideas, discoveries, and arguments more innovatively, often exceeding expectations in classes across all disciplines.

As the online teaching and learning processes used computer technology, it increased the enthusiasm of students to participate, which, in turn, increased their computer skills too. The research found that students are ready for a pedagogy of learning tools, course materials, and resources, as well as their access to digital works. Education students saw the significance of working hard on classes conducted online because they were informed of their relevance and usefulness in developing the key skills they need to advance their careers. They have developed the ability to work independently and collaborate with others effectively, responsibly, and precisely by using technological instruments to obtain, manage, then integrate, evaluate, create, and communicate information. Students' involvement with digital resources and global technologies must be increased to develop their skills and make them feel relatively secure in technology usage. And the nation's educational system must recognize the importance of developing students' technological literacy skills in this digital world.

Table 1. Students' Technology Literacy Skills (n=126)

| Variable | Mean | SD | Remark |
|---------------------------------------|-------------|-------------|------------------|
| Technical Proficiency | 4.19 | 0.63 | High |
| Creativity | 4.00 | 0.76 | High |
| Digital Citizenship and Participation | 4.50 | 0.55 | Very High |
| Innovativeness | 4.21 | 0.69 | Very High |
| Overall Mean | 4.23 | 0.65 | Very High |

Note. Technology Literacy Skills Scale: 4.20-5.00 (Very High); 3.40-4.19 (High); 2.60-3.39 (Average); 1.80-2.59 (Low); 1.00-1.79 (Very Low)

Students' Level of Motivation

Table 2 shows students' level of motivation in an online learning setting. Results revealed that Education students have a high level of motivation, with an overall mean of 4.06 and a standard deviation of 0.65. The students demonstrated high perceived values ($M = 4.04$) and interest in their online courses. Students also showed a high level of self-determination, with a mean of 4.24. These indicate that students are motivated to participate in difficult tasks, engage effectively, appreciate and follow a deep learning approach, and display increased performance in an online learning setting.

Students' level of motivation has to do with their desire to participate in the learning process, their expectations for success, and subjective task value in particular domains. Students' perception that a task will be useful for meeting future goals can also increase their motivation to perform and do well (Roy, 2020). The findings show that students who value what they learn in their classes tend to show higher motivation, engagement in the class activities, and level of interest. If students are motivated, they will learn the new content taught in class, value its complexity, and want to learn more about it. The findings discovered that students have a high level of motivation because they value the learning process, are interested in a topic and the learning setting, have prior perceived success in a specific subject, and have a desire to please parents or teachers or simply by their drive to succeed.

When students control their learning, they become more motivated and invested in the outcome. Students' motivation in this study has been shown to play an important role in determining whether students persist in a course, the level of engagement they will show, the quality of work they produce, and the level of achievement attained. Motivation can impact how students view their learning, how they react to their teachers and classmate, how much time and commitment they expend on doing tasks, how much help is needed when they fail, how they do on exams, and many other facets of schooling (Dan, 2015). Motivation in learning is especially important among distance education students since they usually study in isolation, physically far from their teacher and classmates (Hulleman, 2016). Feelings of isolation, frustrations with technology, and time constraints due to other responsibilities will no longer hinder online learning if students are motivated.

Motivated learners are more willing to undertake challenging activities, be actively engaged, appreciate and adopt a deep approach to learning and exhibit enhanced performance, persistence, and creativity. Since Education students are highly motivated, they enjoy working hard in online classes because the content is intriguing and the activities are fun. Students' participation in online learning resulted from their perceived values, self-determination, personal interest, belief, and ambition to continue their academic endeavors despite being conducted in an online learning environment. Moreover, their excitement and feelings to experience and learn new technological distance-

integrated learning was associated with situational interest. They passively participated in online learning as they took it only as an obligation instead of a necessity. Nevertheless, sufficient supporting learning facilities have led to a self-determined form of motivation for the students. Students' level of motivation is an essential consideration in online teaching and learning contexts, enabling learners to exert maximum effort into their learning.

Table 2. Students' Level of Motivation (n=126)

| Variable | Mean | SD | Remark |
|---------------------|-------------|-------------|-------------|
| Perceived Values | 4.04 | 0.65 | High |
| Interest | 3.92 | 0.72 | High |
| Self-Determination | 4.24 | 0.58 | Very High |
| Overall Mean | 4.06 | 0.65 | High |

Note. Extent of Use Scale: 4.20-5.00 (Very High); 3.40-4.19 (High); 2.60-3.39 (Moderate); 1.80-2.59 (Low); 1.00-1.79 (Very Low)

Students' Online Learning Behavior

Table 3 presents students' online learning behavior. It shows that Education students have a very positive online learning behavior with a mean of 4.39 and a standard deviation of 0.56. From analyzed data, students have developed a positive attitude, and appropriate and constructive online relationships with their teachers and peers in various mediums, follow and uphold basic rules of netiquette, which addresses problematic usage and unethical behavior.

Students' positive behaviors regarding online learning are important and necessary for accepting and adopting online learning (Selim, 2017). The findings indicate that students have improved their online behavior, which prevents miscommunications, helps students better understand what is socially acceptable when working and collaborating online in different environments, and ensure that the teaching and learning process is not deterred. Students promote and embody appropriate standards of behavior in the online environment. Moreover, they have already developed the knowledge that encourages harmonious social interactions, community building, and participant trust. Students having positive behavior in online learning promote a safe, engaging, respectful, and collaborative group where diversity of opinion is valued. The results discovered that students with positive online learning behavior have productive habits that enable them to engage effectively in learning, make good academic progress, and attain and sustain good relationships with online participants.

Students with positive online learning behaviors participate more in online discussions, which prompts them to communicate, improve their performance, and reduce their isolation (Chan, 2017). Positive behavior for online learning reduced problem behavior, increased time focused on instruction and learning, improved social-emotional well-being, created positive and respectful relationships among online participants, and modeled and responded effectively to one's learning needs (Lowe et al., 2015). Students who lack appropriate online behavior need to adapt to new-generation technologies important in forming new learning habits, which leads them to face disparity and thus leads to a digital gap (Chiu, 2017). Individuals in this digital and information age have become participative and active individuals who gather, process, and produce information (Royle et al., 2015). The findings revealed that Education students behave positively and productively according to what is expected, effectively reach information sources, read-write and comment efficiently, make reasonable choices, and make the right decisions.

Students' positive online learning behavior indicates they are committed to performing their tasks effectively and have the skills and learning strategies to succeed. They behave properly and ethically during classes by showing respect and compassion towards their instructors and classmates; they can work independently and collaboratively with others, are actively engaged in the content and learning activities, and take full responsibility for their learning. Online learning developed students' e-learning style and e-learning preparation so that Education students can now manage their time, maximize their effort to perform well and organize their learning by using innovative technology to accomplish different tasks.

Table 3. Students' Online Learning Behavior (n=126)

| Variable | Mean | SD | Remark |
|--------------------------|------|------|---------------|
| Online Learning Behavior | 4.39 | 0.56 | Very Positive |

Note. Technology Literacy Skills Scale: 4.20-5.00 (Very Positive); 3.40-4.19 (Positive); 2.60-3.39 (Neutral); 1.80-2.59 (Negative); 1.00-1.79 (Very Negative)

Relationship between Students' Technology Literacy Skills and Their Online Learning Behavior

Table 4 tests the relationship between students' technology literacy skills and their online learning behavior. The p values are all less than 0.01 level of significance. Therefore, there is a highly significant relationship between students' technology literacy skills and their online learning behavior in terms of technical proficiency ($r=0.533$; $p=0.000$), creativity ($r=0.494$, $p=0.000$), digital citizenship and participation ($r=0.673$, $p=0.000$), and innovativeness ($r=0.628$, $p=0.000$). It shows that students' online learning behavior is directly related to students' technology literacy skills. Students' online behavior depends on their skills to use information and communication technology literately.

In the present situation, it is significant to recognize that certain behaviors are expected from students to accept and adapt to online learning. One factor affecting students' online course behavior is their experience with technology. Students who lack experience and skills cannot interact well with the existence of technological problems that heighten their dissatisfaction and inappropriate behavior. While students who obtain competence with technology are motivated to participate in online discussions, prompted to communicate effectively, improve their performance, and reduce their feeling of isolation (Chan, 2017). Students' behaviors are affected by their excellence and competence in using online learning platforms, creativity, innovativeness in utilizing digital tools, and technical level and technology skills. The results suggest that students with very high technology literacy skills likely have positive online learning behavior. In this global pandemic, some factors influence students' behavior online. Negative behavior in online learning is related to students' low level of computer skills, technological anxiety, computer hardware problems, poor study skills, low motivation, and an inability to work independently (Smith, Caputi, & Rawstorne 2018). Students having difficulties in using technologies and adapting to new digital tools showed negative behaviors in online learning. Smart and Cappel, (2016) mentioned that students with more technological experience would be more likely to take an online class seriously than those who did not have experience. The results revealed that students equipped with technology literacy skills perform well and have a positive online learning behavior.

As times change, the educational sector is arguably experiencing the biggest explosion of curricular innovation in the history of the world. Teachers should plan and develop a course plan

and set goals for everyone to achieve. Students should demonstrate their understanding of the content and heighten their engagement with it throughout any course.

Instructors can incorporate authentic activities that connect real-world relevance and content knowledge, increasing collaboration between students. Teachers can conduct these activities using online learning platforms/teaching tools such as Flip Grid, Yoteachapp, Canva, Padlet, Menti Meter, and Kahoot. Educators will model for the students what the community asks from them: resilience and creative thinking. Teachers can take a highly scaffolded approach with assignments, beginning with a review of the syllabus and course policies and practice assignments that show students how to attach a file and upload an assignment (Everson, 2019). Teachers must work together to provide electronic materials as much as possible so that students will know how to navigate and learn in an online learning environment.

Table 4. Relationship between Students' Technology Literacy Skills and Their Online Learning Behavior

| Variables | r-value | p-value | Remarks |
|--|---------|---------|--------------------|
| Technical Proficiency and Online Learning Behavior | .533 | 0.000 | Highly Significant |
| Creativity and Online Learning Behavior | .494 | 0.000 | Highly Significant |
| Digital Citizenship and Participation and Online Learning Behavior | .673 | 0.000 | Highly Significant |
| Innovativeness and Online Learning Behavior | .628 | 0.000 | Highly Significant |

Note: * $p < 0.05$ (significant); ** $p < 0.01$ (highly significant)

Relationship between Students' Level of Motivation and Their Online Learning Behavior

Table 5 tests the relationship between students' level of motivation and their online learning behavior. The p values are all less than 0.01 level of significance. Hence, there is a highly significant relationship between students' level of motivation and their online learning behavior in terms of perceived values ($r=0.606$; $p=0.000$), interest ($r=0.638$, $p=0.000$), and self-determination ($r=0.628$, $SD=0.000$). It shows that students' online learning behavior is directly related to students' level of motivation. When students have a high level of motivation, they are more likely to have positive online learning behavior.

Instructors have led online classes where students are engaged, motivated, and excited to learn. However, I have also managed classes where students are distracted, disinterested, and reluctant to engage. Motivated students can succeed in the assigned task because they are energized and feel empowered to meet the course's learning objectives (Yarborough, 2020). When highly motivated, students can perceive the importance of engaging in a particular task. It gives them meaning to the assignment or activity because they know why the task or behavior is valuable. When students engage in learning activities that catch their interest and challenge them to grow and learn and experience growth in their skills and performance improvements, they are more likely to behave positively in an online learning setting (Ryan & Deci, 2017).

Students perceived their behaviors or actions as effective and efficient when they felt competent and able to track their progress in developing skills or understanding course material. The findings indicate that when students are highly motivated to learn and attain educational objectives in

online courses, they are most likely having positive online learning behavior. The results suggest that to improve teaching, create effective learning, and enhance students' online learning behavior; instructors shall understand students' motivation levels in advance and then design appropriate teaching materials to encourage them to participate in online learning activities by drawing their attention. The study revealed that one factor critical to students' success and modeling appropriate behaviors during learning in an online learning environment is their motivation level.

Table 5. Test of Significant Relationship between Students' Level of Motivation and Their Online Learning Behavior

| Variables | <i>r</i> -value | <i>p</i> -value | Remarks |
|---|-----------------|-----------------|--------------------|
| Perceived Values and Online Learning Behavior | .606 | 0.000 | Highly Significant |
| Interest and Online Learning Behavior | .638 | 0.000 | Highly Significant |
| Self-Determination and Online Learning Behavior | .775 | 0.000 | Highly Significant |

Note: * $p < 0.05$ (significant); ** $p < 0.01$ (highly significant)

Conclusion

In light of the findings of this study, it is concluded that students have positive online learning behavior if they possess high technology literacy skills and have a high level of motivation in learning through an online setting. Students' online behavior depends on their skills to use information and communication technology literately. Students who lack experience and skills cannot interact well with the existence of technological problems that heighten their dissatisfaction and inappropriate behavior. While students who obtain competence with technology are motivated to participate in an online discussion, prompted to communicate effectively, improve their performance, and reduce their feeling of isolation. When students have a high level of motivation, they are more likely to have positive online learning behavior. The results suggest that to improve teaching, create effective learning, and enhance students' online learning behavior; instructors shall understand students' motivation levels in advance and then design appropriate teaching materials to encourage them to participate in online learning activities by drawing their attention. The study revealed that one factor critical to students' success and modeling appropriate behaviors during learning in an online learning environment is their motivation level.

Recommendations

This study may provide a clear insight into whether Filipino learners, especially in higher education institutions, are motivated to learn, technologically literate, and positively behaving online. However, this could also pave further to the idea that the teacher's teaching strategies can provide opportunities for the learners of the online classes to use their kind of learning strategy, especially during the COVID-19 pandemic. It is recommended that teachers continue using innovative teaching strategies to create effective learning and enhance students' online learning behavior by incorporating technology in creating online learning materials for students. Also, it should be emphasized that learners should be provided with opportunities to customize their learning using innovative approaches and other possible available communication platforms to build stronger connections to prevent dropping out of school using socio-technological changes by the internet. Careful application of online learning by analyzing students' inspiration and learning methods should also be

carried out to measure their preparation better and optimize the authentication process as a primary investment in the learning process. The data collection was conducted six to seven months after the opening of online classes. The data was also collected through the self-reporting and rating of the respondents. The information may need to be completed despite the best efforts since honesty and accuracy are affected by using an online survey (Google Forms). These were the items noted by the researcher as the study's limitations. Also, since most of the education students were female, no comparisons on the sex of the respondents were made. Future researchers may consider a bigger population because this study only focused on Education students.

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Appendix A**Questionnaire****On Students' Technology Literacy Skills***Adapted from: Zeynel A. Misirli and Yavuz Akbulut (2013)*

Directions: Below are statements regarding students' technology literacy skills prior to on-line learning. Please rate the following statements and indicate your response by encircling the number of the column based on the following scale:

- 5 - Strongly Agree
 4 - Agree
 3 - Neutral
 2 - Disagree
 1 - Strongly Disagree

| Statements | Responses | | | | |
|--|-----------|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 |
| A. Technical Proficiency (<i>Cronbach's Alpha = .874</i>) | | | | | |
| 1. I can use and access effectively online learning platforms (Microsoft Teams, Google Classroom...). | 5 | 4 | 3 | 2 | 1 |
| 2. I can use my e-mail account effectively (like adding attachments and sending files). | 5 | 4 | 3 | 2 | 1 |
| 3. I can prepare an assignment by using word processing program. | 5 | 4 | 3 | 2 | 1 |
| 4. I can use search engines effectively (Google, Yahoo, Bing ...). | 5 | 4 | 3 | 2 | 1 |
| 5. I can access information I want using different ICT resources. | 5 | 4 | 3 | 2 | 1 |
| 6. I use up-to-date Internet resources while preparing my assignments. | 5 | 4 | 3 | 2 | 1 |
| 7. I can access Internet resources from mobile device and compare the information I find in different web pages. | 5 | 4 | 3 | 2 | 1 |
| 8. I can resolve commons errors while surfing the internet such as page not found or connection time out. | 5 | 4 | 3 | 2 | 1 |
| 9. I can use the advanced Internet skills, such as using a search engine, identifying, and downloading appropriate files, and installing or updating software. | 5 | 4 | 3 | 2 | 1 |
| 10. I can use technology effectively. | 5 | 4 | 3 | 2 | 1 |
| B. Creativity (<i>Cronbach's Alpha = .866</i>) | | | | | |
| 11. I can prepare a PowerPoint presentation. | 5 | 4 | 3 | 2 | 1 |
| 12. I can draw a picture by using graphic editing software. | 5 | 4 | 3 | 2 | 1 |
| 13. I can use audio, graphics, and animation in my presentations. | 5 | 4 | 3 | 2 | 1 |
| 14. I can make educational video presentations. | 5 | 4 | 3 | 2 | 1 |
| 15. I can use different software and application for editing. | 5 | 4 | 3 | 2 | 1 |
| C. Digital Citizenship and Participation (<i>Cronbach's Alpha = .818</i>) | | | | | |
| 16. I use technology for learning and communicating. | 5 | 4 | 3 | 2 | 1 |
| 17. I participate in online discussions. | 5 | 4 | 3 | 2 | 1 |
| 18. I can communicate effectively with other students using online | 5 | 4 | 3 | 2 | 1 |

| Statements | Responses | | | | |
|--|-----------|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 |
| technologies. | | | | | |
| 19. I express my thoughts constructively and respect others opinion. | 5 | 4 | 3 | 2 | 1 |
| 20. I keep my identity secured and respect others privacy. | 5 | 4 | 3 | 2 | 1 |
| D. Innovativeness (<i>Cronbach's Alpha = .883</i>) | | | | | |
| 21. I can learn new technologies; I do not put it off or avoid it. | 5 | 4 | 3 | 2 | 1 |
| 22. I share my knowledge on new technologies to others. | 5 | 4 | 3 | 2 | 1 |
| 23. I follow developments about technological innovations. | 5 | 4 | 3 | 2 | 1 |
| 24. I explore using new software and applications. | 5 | 4 | 3 | 2 | 1 |
| 25. I can adapt to technological innovations. | 5 | 4 | 3 | 2 | 1 |

Appendix B

Questionnaire On Students' Level of Motivation *Adapted from: Tae Seob Shin (2010)*

Directions: Below are statements that measure students' level of motivation in online learning. Please rate the following statements and indicate your response by encircling the number of the column based on the following scale:

- 5 - Strongly Agree
4 - Agree
3 - Neutral
2 - Disagree
1 - Strongly Disagree

| Statements | Responses | | | | |
|--|-----------|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 |
| A. Perceived Values (<i>Cronbach's Alpha = .883</i>) | | | | | |
| 1. What I am learning online is relevant to my life. | 5 | 4 | 3 | 2 | 1 |
| 2. Studying online allows me to do more work in less time. | 5 | 4 | 3 | 2 | 1 |
| 3. I enjoy working hard on classes conducted online because the content is intriguing, and the activities are fun to do. | 5 | 4 | 3 | 2 | 1 |
| 4. I take my online studies as a personal responsibility. | 5 | 4 | 3 | 2 | 1 |
| 5. I think that taking an online class is useful for developing the key skills I need to advance my career. | 5 | 4 | 3 | 2 | 1 |
| 6. Getting a good grade from an online class is the most satisfying thing for me. | 5 | 4 | 3 | 2 | 1 |
| B. Interest (<i>Cronbach's Alpha = .876</i>) | | | | | |
| 7. I prefer online interaction with my instructors and classmates. | 5 | 4 | 3 | 2 | 1 |
| 8. The technology/platform involved in online learning is interesting and not | 5 | 4 | 3 | 2 | 1 |

| Statements | Responses | | | | |
|---|-----------|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 |
| confusing for me. | | | | | |
| 8. I prefer material that really challenges me and arouses my curiosity, so I can learn new things. | 5 | 4 | 3 | 2 | 1 |
| 10. I keep a record of what my assignments are and when they are due. | 5 | 4 | 3 | 2 | 1 |
| 11. I just aim to complete homework posted by my instructors online. | 5 | 4 | 3 | 2 | 1 |
| C. Self-Determination (<i>Cronbach's Alpha = .870</i>) | | | | | |
| 12. I pay attention and participate in online discussions. | 5 | 4 | 3 | 2 | 1 |
| 13. I am willing to use e-mail and other online tools to ask my classmates and instructors questions. | 5 | 4 | 3 | 2 | 1 |
| 14. I would be able to complete my study even when there are online distractions. | 5 | 4 | 3 | 2 | 1 |
| 15. I set realistic and challenging academic (study) goals while learning online. | 5 | 4 | 3 | 2 | 1 |
| 16. I do not quit just because things get difficult during online learning. | 5 | 4 | 3 | 2 | 1 |
| 17. Even when I do poorly on a test I try to learn from my mistakes. | 5 | 4 | 3 | 2 | 1 |
| 18. I plan my work in advance so that I can turn in my assignments ahead of time. | 5 | 4 | 3 | 2 | 1 |
| 19. I check my work/output carefully before submitting it. | 5 | 4 | 3 | 2 | 1 |
| 20. I set for myself high scores which I believe I can achieve. | 5 | 4 | 3 | 2 | 1 |

Appendix C

Questionnaire On Students' Online Learning Behavior

Adapted from: Muhammad Safdar, Khalid Mahmood and Saima Qutab (2010)

Directions: Below are statements that describe students' online learning behavior. Please rate the following statements and indicate your response by encircling the number of the column based on the following scale:

- 5 - Strongly Agree
- 4 - Agree
- 3 - Neutral
- 2 - Disagree
- 1 - Strongly Disagree

| Statements (<i>Cronbach's Alpha = .923</i>) | Responses | | | | |
|--|-----------|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 |
| 1. I respect my instructors and classmates when communicating online. | 5 | 4 | 3 | 2 | 1 |
| 2. I listen carefully and participate in the discussion. | 5 | 4 | 3 | 2 | 1 |
| 3. When the teacher is talking, I stay focus on the discussion and avoid | 5 | 4 | 3 | 2 | 1 |

| Statements (<i>Cronbach's Alpha = .923</i>) | Responses | | | | |
|--|-----------|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 |
| opening many websites/apps not related to the class. | | | | | |
| 4. I use proper punctuation, spelling and grammar while communicating online; I am careful with humor and sarcasm. | 5 | 4 | 3 | 2 | 1 |
| 5. I attend my classes on time. | 5 | 4 | 3 | 2 | 1 |
| 6. I wear proper attire in a way that it is modest, clean, and avoids any unnecessary distraction. | 5 | 4 | 3 | 2 | 1 |
| 7. I set up my space by making sure it is quiet and uninterrupted. | 5 | 4 | 3 | 2 | 1 |
| 8. I respect others privacy. | 5 | 4 | 3 | 2 | 1 |
| 9. If I am experiencing some confusion with the topic or if I have questions, I ask help from my instructor politely. | 5 | 4 | 3 | 2 | 1 |
| 10. When there is a discussion happening, I do not interrupt my instructor unless permitted and it is crucial for me to stay on topic. | 5 | 4 | 3 | 2 | 1 |
| 11. I do not leave while the session is ongoing unless there is an emergency. | 5 | 4 | 3 | 2 | 1 |
| 12. I do not sleep in the middle of my online class just because the camera is turned off. | 5 | 4 | 3 | 2 | 1 |
| 13. Before posting my question to a discussion board, I check first if anyone has asked it already and received a reply. | 5 | 4 | 3 | 2 | 1 |
| 14. I browse and read in advance the uploaded learning materials. | 5 | 4 | 3 | 2 | 1 |
| 15. If I am experiencing troubles with my internet connection, I find ways to get back to the class. | 5 | 4 | 3 | 2 | 1 |
| 16. Whenever there is a power interruption, I notify my instructor and review the recorded session later. | 5 | 4 | 3 | 2 | 1 |
| 17. I accomplish the assigned task/s on or before the due time; I follow deadlines. | 5 | 4 | 3 | 2 | 1 |
| 18. I refrain from cheating and copying answers from the Internet. | 5 | 4 | 3 | 2 | 1 |
| 19. I keep up with all the assignments by managing my time wisely. | 5 | 4 | 3 | 2 | 1 |
| 20. I apologize for any accidental breach of etiquette. | 5 | 4 | 3 | 2 | 1 |