What Now: Online Learning Competence of Pre-Service Teachers After COVID-19

Original Research Article

Abstract

Flexible Learning (FL) has become the norm in the Philippines after it experienced a medical health crisis along with other countries in the world. The Philippine chairman for Commission on Higher Education made it clear that FL will continue as the country, through the state universities and colleges, has invested in technology infrastructure such as learning management systems and internet connectivity, teacher trainings, and facilities designed for online classes. While teachers received trainings for FL, the question, however, is whether the students have achieved some level of online learning competence after the abrupt implementation of FL in 2020. This study, therefore, aimed to determine the online learning competence of pre-service teachers in all levels and specialization as to the type of device used, type of connectivity, and exposure to online engagements. Using a descriptive-inferential design in research, this study covered a total of 254 pre-service teachers at a teacher training institution in the Philippines. Data was gathered using the Online Learning Competence Questionnaire, a survey instrument designed by the researcher. Study results indicate that pre-service teachers have a high level of online learning competence in terms of computer and technology, independent learning, and online communication competencies. When classified by year level, specialization, type of device used, type of connectivity, and exposure to online engagements, their online learning competence for the aforementioned characteristics is also high. Interestingly, there is a significant difference in their online learning competence in terms of computer and technology, independent learning, and online communication when classified according to type of device used, type of connectivity, and exposure to online engagements; however, there is no significant difference when classified according to year level and specialization. Although the online learning competence of the students who participated in this study is High, their overall skills in the competencies is average. This study, thus, provides an insight to the actual status of the online learning competence of students when FL is employed; and this further makes a basis for policy-making in terms of FL implementation ensuring that it is equitable and impactful to all students regardless of their learning environments and conditions.

Keywords: *flexible learning, online learning, teacher education, online learning competence, pre-service teachers*

# INTRODUCTION

The modality of learning in the Philippines did not fully revert to face-to-face (f2f) instruction after a sudden shift to flexible learning in 2020. Flexible learning remains an option when met with certain restrictions for f2f meetings. This marks a clear departure from the pre-pandemic era, where face-to-face instruction was the standard. As the Philippine Commission on Higher Education chair stated, the “flexible learning” system will be a continuing norm in higher education, emphasizing that reverting to old practices would squander investments in technology, teacher training, and facility upgrades (ABS-CBN News, 2024).

This investment in teacher training during the pandemic underscores its crucial role in successful online learning. Strengthening teachers' "smart teaching competencies" through training can demonstrably improve teaching efficiency and quality, as Chen and Zhang (2024) point out. These competencies often involve digital skills essential for navigating the flexible learning environment.

Flexible learning, as defined by Cassidy et al. (2016), is a pedagogical approach offering flexibility in time, place, and audience, often leveraging technology. However, the reliance on online tools within flexible learning has exposed a significant digital divide. Not all students have the financial resources to acquire the necessary devices and internet access for online learning, whether synchronous or asynchronous (Matildo & Dagondon, 2022). Online learning, defined by Dabbagh and Bannan-Ritland (2005) as "instruction mediated via the internet," can be a powerful tool for self-paced learning, allowing students to learn "in their own time and according to their own schedules" (DMI, 2018). This aligns with the constructivist’s point of view which emphasizes the individual's role in constructing knowledge through experience and reflection (Fosnot, 1996; Steffe & Gale, 1995). Studies even suggest that learners with higher language proficiency are amore autonomous in online learning conditions and they are more engaged in self-directed learning as their previous knowledge base allows them to browse and use online resources more efficiently (Sanz, 2013).

Although the teacher’s role shifts towards facilitating and the designing learning experiences that allow learner autonomy, students however, do not always have a high level of autonomy.

Technology readiness, as Geng et al. (2019) argue, is a critical factor in successful self-directed online learning. To provide students with the necessary skills and competencies for online learning success, specific online learning competencies must be identified and prioritized. Bigatel, et al. (2012) identified the use of computer and technology as one of the competencies in online learning. Dhahri et al. (2021) suggested the use of problem-based learning and team-based learning to improve the effectiveness of online teaching. In another study by Kuama and Intharaksa (2016) it was revealed that students with limited English proficiency often struggle with essential online learning skills and self-directed learning experiences. These students may find online English learning challenging, highlighting the necessity for extra support and personalized teaching strategies to improve their online learning competence. Similarly, Casillas-Martín et al. (2024) agreed that there is, in fact, a bidirectional relationship between English proficiency and online learning competence specifically in the aspect of digital competence.

As the Philippines, a nation that is still “highly proficient” in English (EF EPI, 2024), continues to integrate flexible learning, it is essential to consider several factors first. Joaquin et al. (2020) highlight the importance of teacher capacity, learner context, and the efficiency of the learning environment. But more importantly, we must consider as well the most evident issues of internetspeed, cost of materials, and mode of delivery. Kuama and Intharaksa (2016) rightly suggest assessing students' readiness for online learning before the course begins.

With the foregoing in mind, the author conducted this study to explore the online learning competence of pre-service teachers to gauge their readiness for flexible learning as they enter their professional careers. The findings could offer valuable insights for teacher training institutions, administrators, and policymakers, informing the implementation of flexible learning in both basic and higher education, not only in the Philippines but also in other countries with similar educational systems.

## **Problem Statement**

This study aimed to determine the online learning competence of pre-service teachers as to their year level, specialization, type of device used, type of connectivity, and exposure to online engagements.

It sought to answer the following specific questions:

* + 1. What is the online learning competence of pre-service teachers in terms of computer and technology, independent learning, and online communication competencies when taken as an entire group and when classified according to year level, specialization, type of device used, type of connectivity, and exposure to online engagements?
		2. Is there a significant difference in the online learning competence of pre-service teachers in terms of computer and technology, independent learning, and online communication competencies when classified according to year level, specialization, type of device used, type of connectivity, and exposure to online engagements?

## **Hypothesis**

Based on the above stated problems, the hypothesis below was considered.

* + 1. There is no significant difference in the level of online learning competence of pre- service teachers when classified according to year level, specialization, type of device used, type of connectivity, and exposure to online engagements.

# METHODOLOGY OF THE STUDY

## **Research** **design**

This study utilized the descriptive-inferential research design to investigate relationships between variables without the researcher controlling or manipulating any of them.

* 1. **Locale and Respondents of the Study**

This study was conducted at a teacher training department in a state university at the middle region of the Philippines. The sample population of the respondents was chosen through stratified random sampling technique.Table 1. Distribution of Respondents as to Variables

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | f |  | % |
| 1. Entire group
 | 245 |  | 100 |
| 1. Year Level
 |  |  |  |
|  First Year  | 62 |  | 25 |
|  Second Year | 95 |  | 39 |
|  Third Year | 68 |  | 28 |
|  Fourth Year | 20 |  | 8 |
| 1. Specialization
 |  |  |  |
|  English | 59 |  | 24 |
|  Filipino | 54 |  | 22 |
|  Mathematics | 32 |  | 13 |
|  Social Science | 56 |  | 23 |
|  Science  | 44 |  | 18 |
| 1. Type of Device Used
 |  |  |  |
| 1. Android/iOS Phone/Tablet
 | 124 |  | 51 |
| 1. Windows/Mac laptop/desktop
 | 34 |  | 14 |
| 1. Others, neither A&B
 | 87 |  | 35 |
| E. Type of connectivity |  |  |  |
|  Type 1 - without connection | 32 |  | 13 |
|  Type 2 - with limited connection | 173 |  | 71 |
|  Type 3 - with stable connection | 40 |  | 16 |
| F. Exposure to online engagements |  |  |  |
| Virtual class | 58 |  | 24 |
| Modular Learning | 148 |  | 60 |
| Blended Learning | 39 |  | 16 |

Table 1 shows that this study covered a total of 245 Bachelor of Secondary Education students (termed in this study as pre-service teachers).

## **Instrumentation**

Using an Online Learning Competence Questionnaire, data regarding the respondents’ competencies in computer and technology, independent learning, and online communication was used to determine their online learning competence. The instrument consists of two parts: Part one gathered data on their year level and specialization, device type and internet connectivity type, and exposure to online engagements used by the respondents while Part two consists of a four-point Likert scale type of items that require the respondents to indicate their agreement on competencies that determines their online learning competence. Each statement in the instrument can be answered using these options: 4 – Strongly Agree, 3 – Agree, 2 – Disagree, 1- Strongly Disagree.

The instrument was submitted for face and content validation by a jury composed of five (5) members, one of whom was an external validator or someone who is not affiliated with the institution where the study was conducted. This jury validated the items in the questionnaire by writing before each item the options: Accept, Modify, or Reject. The inter-rater reliability was treated using Cronbach’s alpha with 80 percent agreement ratio. Prior to the gathering of data for the study, the instrument was pilot-tested to a total of 30 pre-service teachers enrolled at a private institution.

* 1. **Data Gathering Procedure**

As protocol before gathering the data, the researcher secured permits from relevant key officials of the university such as the dean and program heads. After approval was obtained, letters were sent to respondents informing them of the intention of the study. Consequently, the Online Learning Competence Questionnaire was administered to the 245 Bachelor of Secondary Education students. The scores of each respondent in the said questionnaire were determined by adding the numerical equivalents of the option selected to which the computation of mean would be derived. The mean was converted into numerical scale with the corresponding verbal descriptions and interpretations as shown below.

Table 2: 4-Point Likert Scale and Descriptions and Interpretations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Weight | Response | Scale | Description | Interpretation |
| 4 | Strongly Agree | 3.26-4.00 | Very High | Excellent skills in computer and technology, has learning autonomy, and able to express ideas using L2 fluently.  |
| 3 | Agree | 2.51-3.25 | High | Average skills in computer and technology, develops personal learning strategy, and able to express ideas using L2 but with difficulty in expressing all their thoughts. |
| 2 | Disagree | 1.76-2.50 | Low | Has limited skills in computer and technology, able to learn but requires teacher’s guidance, and can communicate using L2 but with limited information. |
| 1 | Strongly Disagree | 1.00-1.75 | Very Low | Very little to no knowledge in computer and technology, no autonomy in learning, and has difficulty expressing ideas using L2. |

**2.5 Data Analysis Tools and Techniques**

This study utilized quantitative data analysis using statistical tools such as frequency, mean, percentage, standard deviation, ANOVA, and Least Significant Difference test. Inferential statistics was set at 0.05 level of significance at two-tailed test.

Specifically, the following describes how the statistical tools were used to compute the data in this study.

1. Frequency was used to determine the number of respondents who participated belonging to each category of variables.
2. Percentage was used to find out the proportion of respondents who belong to each category of variables.
3. Mean was used to determine the online learning competence of the respondents.
4. Standard deviation was used to determine the homogeneity and heterogeneity of the data gathered.
5. One-way ANOVA was used to determine the significant difference in the online learning competence when the respondents were categorized as to year level, specialization, type of device used, type of connectivity, and exposure to online engagements.
6. Least Significant Difference Test was used to identify which specific pairs of means exhibit significant differences when ANOVA indicated a significant difference among groups of means.

Data generated from the study were electronically processed using the Statistical Packages for Social Sciences (SPSS) software, version 22.0.

# RESULTS AND DISCUSSION

**Online Learning Competence of Pre-service Teachers**

The online learning competence of pre-service teachers was assessed using mean scores, both for the entire group and for subgroups based on year level, specialization, type of device used, type of connectivity, and exposure to online engagements.

Table 3. Level of Online Learning Competence as an Entire Group

|  |  |  |  |
| --- | --- | --- | --- |
| Online Learning Competencies | Mean | SD | Description |
| A. Computer and Technology Competencies | 3.14 | 0.47 | High |
| B. Independent Learning Competencies | 2.89 | 0.46 | High |
| C. Online Communication Competencies | 2.88 | 0.43 | High |
| Overall Mean | 2.97 | 0.37 | High |

*Entire Group*

Table 3 presents the results of the online learning competence assessment. Pre-service teachers, as a whole, exhibited high competence (M = 2.97). This high competence was evident across all three areas: computer and technology skills (M = 3.14), independent learning (M = 2.89), and online communication (M = 2.88).

By description, it suggests that the pre-service teachers have average skills and competence in computer and technology, but they may develop personal learning strategies, and may be able to express ideas using L2 but with difficulty expressing all their thoughts.

Moreover, it suggests that they can easily manipulate programs installed in their computer. In addition, they can finish their learning tasks at their own pace and time because of a developed personal learning strategy. Apparently, they can engage, express, and collaborate ideas with confidence in virtual classes.

These results provide further evidence for the viability of online learning, as suggested by DMI (2018). The data underscore the benefits of self-paced learning, confirming DMI's claim that students can learn at their own speed and convenience.

Table 4. Level of Online Learning Competence as to Year Level

First Year Second Year Third Year Fourth Year

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Online LearningCompetencies | Mean | SD | Desc. | Mean | SD | Desc. | Mea n | SD | Desc. | Mea n | SD | Desc. |
| A. Computer and | 3.11 | 0.37 | High | 3.09 | 0.50 | High | 3.25 | 0.49 | High | 3.07 | 0.52 | High |
| Technology |  |  |  |  |  |  |  |  |  |  |  |  |
| Competencies |  |  |  |  |  |  |  |  |  |  |  |  |
| B. Independent | 2.97 | 0.53 | High | 2.81 | 0.43 | High | 2.94 | 0.46 | High | 2.99 | 0.26 | High |
| Learning |  |  |  |  |  |  |  |  |  |  |  |  |
| Competencies |  |  |  |  |  |  |  |  |  |  |  |  |
| C. Online | 2.93 | 0.45 | High | 2.80 | 0.37 | High | 2.98 | 0.51 | High | 2.89 | 0.29 | High |

Communication Competencies

*Year Level*

Table 4 shows that pre-service teachers at all year levels demonstrated high competence in all areas of online learning. First-Year students scored highly in computer and technology skills (M = 3.11, SD = 0.37), independent learning (M = 2.97, SD = 0.53), and online communication (M = 2.93, SD = 0.45). Second-Year students showed similar high competence: computer and technology skills (M = 3.09, SD = 0.50), independent learning (M = 2.81, SD = 0.43), and online communication (M = 2.80, SD = 0.37). Third- and Fourth-Year students also demonstrated high competence across all three areas (see Table 4 for specific means and standard deviations).

Results suggest that regardless of the year level, the pre-service teachers are equipped with the necessary skills in operating and manipulating computer and technology, they can learn on their own using their developed personal learning strategy, and they are able to communicate with ease and confidence both in writing and speaking whether this is by sending an email or expressing opinions in a virtual class.

Table 5. Level of Online Learning Competence as to Specialization

Online Learning English Filipino Mathematics Social Science Science

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Competencies | Mean | SD | Desc | Mean | SD | Desc | Mean | SD | Desc | Mean | SD | Desc | Mean | SD | Desc |
| A. Computer and Technology Competencies | 3.28 | 0.50 | High | 3.01 | 0.43 | High | 3.28 | 0.48 | High | 3.04 | 0.50 | High | 3.19 | 0.38 | High |
| B. Independent Learning Competencies | 2.80 | 0.40 | High | 2.82 | 0.44 | High | 3.07 | 0.60 | High | 2.98 | 0.49 | High | 2.88 | 0.41 | High |
| C. Online CommunicationCompetencies | 2.91 | 0.43 | High | 2.79 | 0.39 | High | 3.12 | 0.49 | High | 2.86 | 0.43 | High | 2.87 | 0.41 | High |

*Specialization*

Table 5 reveals high online learning competence among pre-service teachers regardless of specialization. All majors—English, Filipino, Mathematics, Social Science, and Science—demonstrated strong skills in computer and technology (means ranging from 3.01 to 3.28), independent learning (means ranging from 2.80 to 3.07), and online communication (means ranging from 2.79 to 3.12). (See Table 5 for specific means and standard deviations for each specialization.)

This result suggests that regardless of specialization, the pre-service teachers have average skills in using their digital technology tools to share presentations on videoconferencing platforms, managing time for reading and doing module tasks, and acquiring quality knowledge via online learning.

Table 6. Level of Online Learning Competence as to Type of Device Used

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Device 1 |  |  | Device 2 |  |  | Device 3 |  |
| Online LearningCompetencies | Mean | SD | Desc. | Mean | SD | Desc. | Mean | SD | Desc. |
| A. Computer and | 2.96 | 0.43 | High | 3.21 | 0.52 | High | 3.45 | 0.36 | Very |
| Technology |  |  |  |  |  |  |  |  | High |
| Competencies |  |  |  |  |  |  |  |  |  |
| B. Independent | 2.85 | 0.46 | High | 3.09 | 0.62 | High | 2.92 | 0.44 | High |
| Learning |  |  |  |  |  |  |  |  |  |
| Competencies |  |  |  |  |  |  |  |  |  |

*Type of Device Used*

Table 6 shows the relationship between device type and online learning competence. While all groups demonstrated high competence in independent learning and online communication, competence in computer and technology skills varied. Students using other devices that are neither Type 1 or 2 (Device 3) had the highest competence in computer and technology (M = 3.45, SD = 0.36), followed by those using laptops/desktops (Device 2) (M = 3.21, SD = 0.52). Students using only phones/tablets (Device 1) had slightly lower competence in this area (M = 2.96, SD = 0.43). (See Table 6 for complete data.)

The type of device used for online learning appears to influence pre-service teachers' computer and technology competence. Those who utilize both phone/tablet and laptop/desktop devices exhibit more advanced skills in this area compared to those relying on a single device. This likely translates to greater proficiency in tasks such as software installation, configuration adjustments, efficient online searching, bookmark management, and versatile file downloading.

Table 7. Level of Online Learning Competence as to Type of Connectivity

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Type 1 |  |  | Type 2 |  |  | Type 3 |  |
| Online LearningCompetencies | Mean | SD | Desc. | Mean | SD | Desc | Mean | SD | Desc |
| Computer and | 2.83 | 0.33 | High | 3.11 | 0.45 | High | 3.58 | 0.38 | Very |
| Technology |  |  |  |  |  |  |  |  | High |
| Competencies |  |  |  |  |  |  |  |  |  |
| Independent | 2.76 | 0.46 | High | 2.90 | 0.47 | High | 2.93 | 0.40 | High |
| Learning |  |  |  |  |  |  |  |  |  |
| Competencies |  |  |  |  |  |  |  |  |  |
| Online | 2.66 | 0.39 | High | 2.89 | 0.43 | High | 3.01 | 0.39 | High |
| Communication |  |  |  |  |  |  |  |  |  |
| Competencies |  |  |  |  |  |  |  |  |  |

*Type of Connectivity*

Table 7 presents the online learning competence of pre-service teachers based on internet connectivity. Type 1 users (intermittent connectivity) demonstrated high competence in computer and technology skills (M = 2.83, SD = 0.33), independent learning (M = 2.76, SD = 0.46), and online communication (M = 2.66, SD = 0.39). Type 2 users (limited connection) also showed high competence in computer and technology skills (M = 3.11, SD = 0.45), independent learning (M = 2.90, SD = 0.47), and online communication (M = 2.89, SD = 0.43). Type 3 users (stable connection) demonstrated very high competence in computer and technology skills (M = 3.58, SD = 0.38) and high competence in independent learning (M = 2.93, SD = 0.40) and online communication (M = 3.01, SD = 0.39).

These results show that students who have Type 3 connection have more efficiency in using their digital technology tools. With that type of connectivity, they can use either a phone or laptop for online class. They may have skills in setting up headphones or speakers and a microphone if their class has videoconferencing. In addition, they can learn from the things that they hear like mini- lecture videos, audio recordings, or podcasts. They can also speak with confidence as they have in f2f communication during online class.

Ghavifekr and Rosdy (2015) rightly assert that technology-based teaching and learning is effective because ICT tools create a more engaging and productive learning environment for both teachers and students.

Table 8. Level of Online Learning Competence as to Exposure to Online Engagements

Virtual Class Modular Learning Blended Learning

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Online LearningCompetence | Mean | SD | Desc. | Mean | SD | Desc. | Mean | SD | Desc. |
| D. Computer and | 3.08 | 0.47 | High | 3.31 | 0.42 | Very | 3.22 | 0.60 | High |
| Technology |  |  |  |  |  | High |  |  |  |
| Competencies |  |  |  |  |  |  |  |  |  |
| E. Independent | 2.82 | 0.44 | High | 3.11 | 0.47 | High | 3.08 | 0.34 | High |
| Learning |  |  |  |  |  |  |  |  |  |
| Competencies |  |  |  |  |  |  |  |  |  |
| F. Online | 2.82 | 0.41 | High | 3.10 | 0.44 | High | 2.92 | 0.29 | High |
| Communication |  |  |  |  |  |  |  |  |  |

 Competencies

*Exposure to online engagements*

Table 8 presents online learning competence based on preferred learning modality. Pre-service teachers who preferred modular learning demonstrated high competence in computer and technology skills (M = 3.08, SD = 0.47), independent learning (M = 2.82, SD = 0.44), and online communication (M = 2.22, SD = 0.41). Those who chose virtual classes showed very high competence in computer and technology skills (M = 3.31, SD = 0.42) and high competence in independent learning (M = 3.11, SD = 0.47) and online communication (M = 3.10, SD = 0.44). Pre-service teachers preferring blended learning demonstrated high competence in computer and technology skills (M = 3.22, SD = 0.60), independent learning (M = 3.08, SD = 0.34), and online communication (M = 2.92, SD = 0.29).

This result shows that students who prefer Virtual Class require more opportunities to utilize their computers and other digital technologies. Thus, they can do more tasks and content engagement as well as meaningful interactions with the teacher and other students. It also follows that they have excellent skills in making searches, setting bookmarks, and downloading any type of file that aid their personal learning strategies.

**Differences in the Online Learning Competence of Pre-service teachers when Classified According to Variables**

To investigate whether statistically significant differences existed in the online learning competence of pre-service teachers across various demographic and contextual variables, a one-way analysis of variance (ANOVA) was employed. This statistical test is particularly well-suited for comparing the means of three or more independent groups, allowing the researcher to determine if observed differences are likely due to chance or reflect genuine variations across the groups. For each one-way ANOVA conducted, the alpha level was set at 0.05.

Table 9. ANOVA Results in the Online Learning Competence of Pre-service teachers as to Year Level

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Online Learning Competence |  | Sum of squares | df | Mean square | F-ratio | Two-tailed probability |
|  | Between groups | .771 | 4 | .257 | 1.159 | .327 |
| Computer and | Within groups | 35.258 | 241 | .222 |  |  |
| TechnologyCompetencies | Total 36.029 245 |
| Independent | Between groups | .952 | 4 | .317 | 1.523 | .211 |
| Learning | Within groups | 33.135 | 241 | .208 |  |  |
| Competencies | Total | 34.087 | 245 |  |  |  |
| Online | Between groups | .975 | 4 | .325 | 1.811 | .147 |
| Communication | Within groups | 28.533 | 241 | .179 |  |  |
| Competencies | Total | 29.508 | 245 |  |  |  |

*Year Level*

The results presented in Table 9 demonstrate that year level is not a distinguishing factor in the online learning competence of pre-service secondary education teachers. The lack of significant differences across year levels for computer and technology skills (*P* = .33), independent learning (*P* = .21), and online communication (*P* = .15) indicates that students in different years of their program possess similar levels of online learning competence.

Table 10. ANOVA Results in the Online Learning Competence of Pre-service teachers as to Specialization

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Online LearningCompetence |  | Sum ofsquares | df | Meansquare | F-ratio | Two-tailedprobability |
|  | Between groups | 2.309 | 4 | .577 | 2.705 | 0.32 |
| Computer and | Within groups | 33.720 | 241 | .213 |  |  |
| TechnologyCompetencies | Total | 36.029 | 245 |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Independent | Between groups | 1.301 | 4 | .325 | 1.568 | . 185 |
| Learning | Within groups | 32.785 | 241 | .208 |  |  |
| Competencies | Total | 34.087 | 245 |  |  |  |
| Online | Between groups | 1.186 | 4 | .297 | 1.655 | .163 |
| Communication | Within groups | 28.322 | 241 | .132 |  |  |
| Competencies | Total | 29.508 | 245 |  |  |  |

*Specialization*

Consistent with the findings for year level, Table 10 shows no significant difference in online learning competence when pre-service teachers are grouped by specialization.  The lack of significant differences across all three competencies—computer and technology (*P* = .32), independent learning (*P* = .19), and online communication (*P* = .16)—reinforces the observation that academic background does not appear to influence online learning competence (Dinh & Phuong, 2025).

Table 11. ANOVA Results in the Online Learning Competence as to Type of Device Used

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Online LearningCompetence |  | Sum ofsquares | df | Meansquare | F-ratio | Two-tailedprobability |
|  | Between groups | 8.694 | 4 | 4.347 | 25.445\*\* | .000 |
| Computer and | Within groups | 27.335 | 241 | .171 |  |  |
| TechnologyCompetencies | Total 36.029 245 |
| Independent | Between groups | .631 | 4 | .315 | 1.508 | .225 |
| Learning | Within groups | 33.456 | 241 | .209 |  |  |
| Competencies | Total | 34.087 | 245 |  |  |  |
| Online | Between groups | .155 | 4 | .078 | .422 | .656 |
| Communication | Within groups | 29.353 | 241 | .183 |  |  |
| Competencies | Total | 29.508 | 245 |  |  |  |

*Type of Device Used*

As presented in Table 11, the online learning competence of pre-service teachers and their computer and technology competence have a highly significant difference (*P*=.000). This implies that their online learning competence level varies depending on what device they are using and what they use it for. Furthermore, it appears that those who use both a phone/tablet and laptop/desktop could do more complicated tasks with these tools compared to those who use only either of the devices mentioned.

On the other hand, there is no significant difference in the online learning competence of pre- service teachers in terms of independent learning and online communication.

Table 12. LSD Results in the Online Learning Competence as to Type of Device Used

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Online Learning Competence  | Position (I) | Position(J) | Mean Difference (I-J) | Sig. |
| Computer and Technology Competencies | Type A | Type C | .49785\*\* | .000 |

*Type A: Android/iOS Phone or Tablet*

*Type B: Laptop or Desktop Computer*

*Type C: Other devices, neither A or B*

Given the highly significant difference in computer and technology competence among pre-service teachers classified by device type (Table 11), a Least Significant Difference (LSD) post-hoc test was conducted. This was done simply because the ANOVA results in the type of device used reveals a significant difference among the group means however, it is not clear which means are different from each other.

As shown in Table 12, a highly significant difference appeared in the online learning competence of pre-service teachers in terms of computer and technology competencies with Type A (Android/iOS Phone or Tablet) and Type C (Other devices, neither Type A or B) devices (*P*=.000). This shows that students who use both phone/tablet and laptop/desktop in online learning have more advanced competence in computer and technology compared to those who use a phone/tablet only whose computer and technology competence is average.

Table 13. ANOVA Results in the Online Learning Competence as to Type of Connectivity

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Online LearningCompetence |  | Sum ofsquares | df | Meansquare | F-ratio | Two-tailedprobability |
| Computer and | Between groups | 5.578 | 4 | 2.789 | 14.655\*\* | .000 |
| Technology | Within groups | 30.451 | 241 | .190 |  |  |
| Competencies | Total | 36.029 | 245 |  |  |  |
| Independent | Between groups | .328 | 4 | .164 | .777 | .462 |
| Learning | Within groups | 33.759 | 241 | .211 |  |  |
| Competencies | Total | 34.087 | 245 |  |  |  |
| Online | Between groups | 1.106 | 4 | .553 | 3.116\* | 0.047 |
| Communication | Within groups | 28.401 | 241 | .178 |  |  |
| Competencies | Total | 29.508 | 245 |  |  |  |

*Type of Connectivity*

The One-way ANOVA result (see table 13) revealed that when classified according to type of connectivity, a highly significant difference existed in the online learning competence of pre-service teachers in terms of computer and technology competencies (*P*=.000) and a significant difference in online communication competencies (*P*=.05) but there is no significant difference in terms of independent learning competencies.

This indicates that their level of online learning competence differs as to which type of connectivity they have at home when engaging in online learning. The type of connectivity, thus, influences their competence in using digital technologies. Furthermore, the type of connectivity also impacts the opportunities they have in order to interact and express ideas in the virtual classroom. However, their type of connectivity does not affect their learner autonomy. This means that whether they are able to engage or not with teachers and classmates for knowledge creation, they still have the ability to develop their personal learning strategies. This resonates with Rhim and Han's (2020) core principles of online learning, highlighting the self-regulated nature of independent learners who are able to develop personalized learning paths, locate appropriate study materials, and monitor their own academic progress.

Table 14. LSD Results the Online Learning Competence as to Type of Connectivity

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Online Learning Competence  | Position (I) | Position(J) | Mean Difference (I-J) | Sig. |
| Computer and Technology Competencies  | Type 1 | Type 2 | .27296\* | .020 |
|  | Type 1  | Type 3 | .74994\*\* | .000 |
| Online Communication Competencies | Type 1 | Type 2 | .22472\* | .046 |
|  | Type 1 | Type 3 | .34844\* | .015 |

*Type 1: without connection (no internet-ready device, no signal, no data/wifi connection)*

*Type 2:* *with limited connection (with internet-ready device but no stable signal, data/wifi connection)*

*Type 3: with connection (with internet-ready device and stable signal, data/wifi connection)*

Given the highly significant difference in computer and technology competence, and the significant difference in online communication competence, among pre-service teachers classified by connectivity type (Table 13), a Least Significant Difference (LSD) post-hoc test was conducted to identify specific group mean differences.

As shown in Table 14, a significant difference existed between type of connectivity and online learning competence in terms of: (1) computer and technology competencies with Type 1 and Type 2 connectivity (*P*=.02) and a highly significant difference in Type 1 and Type 3 connectivity (*P*=.000); (2) a significant difference in online communication competencies with Type 1 and Type 2 connectivity (*P*=0.05) and Type 1 and Type 3 connectivity (*P*=.02).

It appears that those who have stable connectivity have perceived themselves to have better competence in the area of computer and technology than those who have limited or no connectivity. Apparently, the latter has restrictions in what they are able to do during online class because of their internet connection. Similarly, those who have limited connectivity and stable connectivity have better competence in the area of online communication than those who have no connectivity. It follows that if a student has poor internet connection, he/she may lose the teaching and social presences and thereby will not be able to possess cognitive presence during the discussion in the virtual classroom. In this situation, they have a limited chance to have dialogues and meaningful interactions with the teacher and other students in the process of knowledge creation. In fact, Rhim and Han’s (2020) core concepts of online learning and the community of inquiry model of Garrison et al (1999) argued that effective and successful online learning requires each member to achieve and accommodate the three types of presences.

Table 15. ANOVA Results in the Online Learning Competence as to Exposure to Online Engagements

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Online LearningCompetence |  | Sum ofsquares | df | Meansquare | F-ratio | Two-tailedprobability |
|  | Between groups | 8.694 | 4 | 4.347 | 25.445\*\* | .000 |
| Computer and | Within groups | 27.335 | 241 | .171 |  |  |
| TechnologyCompetencies | Total 36.029 245 |
| Independent | Between groups | .631 | 4 | .315 | 1.508 | .225 |
| Learning | Within groups | 33.456 | 241 | .209 |  |  |
| Competencies | Total | 34.087 | 245 |  |  |  |
| Online | Between groups | .155 | 4 | .078 | 0.422 | .656 |
| Communication | Within groups | 29.353 | 241 | .183 |  |  |
| Competencies | Total | 29.508 | 245 |  |  |  |

*Exposure to Online Engagements*

The One-way ANOVA results (see table 15) showed that when classified according to exposure to online engagements, a highly significant difference appeared in the online learning competence of pre-service teachers in terms of computer and technology competencies (*P*=.000). The null hypothesis was therefore rejected.

This indicates that the level of online learning competence of pre-service teachers varies as to which online engagements they prefer. Those who opted for Virtual Classes have better competence in the area of computer and technology simply because they have compelling opportunities to utilize their devices during online class.

On the other hand, there is no significant difference noted in terms of independent learning competencies and online communication competencies. This implies that whether the students attend Virtual Classes, or choose Modular Learning, or Blended Learning, their competence in independent learning and online communication is not affected. This is supported by Rhim and Han’s (2020) core concepts of online learning wherein it stated that a higher transactional distance means that teaching requires more autonomous learners. Hence, if the students have autonomy in learning, they are active, capable and independent individuals who may have their own learning processes to explore their environments in knowledge construction. This is also affirmed by the constructivist theory of learning.

Table 16. LSD Results in the Online Learning Competence as to Exposure to Online Engagements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Online Learning Competence | Position (I) | Position(J) | Mean Difference (I-J) | Sig. |
| Computer and | Virtual Class | Modular Learning | .22493\* | .013 |
| technology |  |  |  |  |
| competencies |  |  |  |  |
| Independent learning | Virtual Class | Modular Learning | .29309\* | .001 |
| competencies |  |  |  |  |
| Online | Virtual Class |  |  |  |
| communication |  | Modular Learning | .28697\*\* | .000 |
| competencies |  |  |  |  |

As the ANOVA results shown in table 15 reveals a highly and significant differences in the online learning competence of pre-service teachers when classified as to exposure to online engagements, Least Significant Difference test was used to identify which specific pairs of means manifest the significant differences.

As Table 16 shows, there is a significant difference in the online learning competence of pre- service teachers in terms of computer and technology competencies with virtual class and modular learning (*P*=.01), independent learning competencies with virtual class and modular learning (*P*=.001)), and a highly significant difference in online communication competencies with virtual class and modular learning (*P*=.000).

This implies that in these areas, the students who preferred Virtual Classes over Modular Learning have higher competence. This goes to show that being able to engage with teachers and other students gives them opportunity to make collaborations that draw them to a shared experience space to construct and confirm meaning in the presence of everyone involved in the teaching and learning process and, thus, achieve meaningful educational outcomes as stated by Garrison et al. (1999).

# 4. CONCLUSIONS

Based on the results, the following conclusions were drawn by the researcher.

1. The pre-service teachers have average skills in manipulating and operating digital technologies such as computers or mobile phones used in online learning. They may have developed their personal learning strategy to cope with the demands of their online courses. Moreover, they possess the ability to express ideas using L2 however, they may have difficulty in expressing everything they have in mind.
2. The type of device used by the pre-service teachers influences their online learning competence as those who use both a phone/tablet and a laptop/desktop have advanced competence in manipulating digital technologies such as computers and mobile phones used in online learning. Those who have Type 3 or stable internet connection have advanced competence in manipulating digital technologies such as computers and mobile phones used in online learning as well and those who prefer synchronous classes as their exposure to online engagements also have advanced competence level in independent learning. Furthermore, regardless of their year level and specialization, their online learning competence does not vary.

# RECOMMENDATIONS

Based on the findings and conclusions made, the researcher recommends the following.

* 1. While the respondents demonstrated strong online learning competence, their overall skills across all competencies were only average.  Therefore, it is recommended that online learning readiness be assessed at the start of each semester. This assessment will enable faculty and administrators to tailor course content to students' individual learning styles and preferences, computer and technology proficiency, self-directed learning abilities, and comfort levels with virtual classroom interaction.
	2. It appears that the more obvious issues in online learning such as internet connection, availability of digital technology tools, and learner autonomy are pervading in all facets of this learning modality. The researcher suggests that in designing course contents, the faculty, program heads, dean, and instructional development committee sit together to plan out the course structure and the method with which the learning materials are provided to the students. Online learning should not be the sole option but rather be just one among other options. Flexible learning may be considered so that course contents can be accessed by students even without the use of internet or a digital device.
	3. Future studies may be conducted in relation to online learning competence with correlations to other necessary skills such as the English language proficiency of learners, socioeconomic status, and the like.

# CONFLICT OF INTEREST

# This study was conducted with permission from both relevant officials of the institution and the respondents. No conflict of interest exists about the publication of this paper.

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# Disclaimer (Artificial intelligence)

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# Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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# Details of the AI usage are given below:

# 1.

# 2.

# 3.

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