ICT Engagement and Digital Competence of Preservice English Teachers

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Article Info	ABSTRACT
	The study on ICT Engagement and Digital Competence of Preservice English Teachers was a descriptive correlational study conducted among 103 preservice English teachers at the University of Mindanao-Matina Campus, Davao City. This study aimed to identify the levels of ICT engagement and digital competence of preservice English teachers and examine the prevalent relationship between the variables. In gathering the data, this study adopted questionnaires and sampled the total population. The data collected were analyzed using mean, standard deviation, and Pearson's r correlation. Based on the findings, the preservice English teachers have a high level of ICT engagement and a very high level of digital competence. Moreover, the correlation between the variables is moderate, positive, and direct with r-value of 0.427, which suggests that ICT engagement is a construct of digital competence—the more regulated to engage in ICT a person is, the more competent they would become in using ICT. Moreover, the results specify that ICT-related training and support given to language teachers must revolve around troubleshooting digital issues and digital content creation. This study, as a whole, further explored, quantified, and discussed emerging interests in the role of technology in language education, addressing its empirical gap.

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1. INTRODUCTION

The growing importance of technology in education has spurred in recent years. Besides democratizing access to education and fostering more avenues of collaboration, it also allows teaching or learning processes to be more productive, strategic, engaging, and supportive to students. Language education also echoes this significance because it views technology as a means which improves or helps in language learning and is a momentous element with its role in elevating teaching practices and influencing the dynamic communication practices of today [1, 2]. However, despite its deemed importance, Urbani et al. [3] disclose that though digital natives, newly in-service teachers still face challenges in using technology.

Pozas [4] further iterates that teachers still encounter immense challenges in integrating information and communication technologies (ICT) into their teaching. To a great degree, the problems identified suggest that training and support should also attend to the attitudes and self-efficacy of the teachers. Additionally, it is recommend that preservice teachers must be provided with well-rounded and authentic experiences with ICT to equip them with related and necessary skills and knowledge to use ICT in their classroom practices. Likewise, , in language education, Flanagan and Shoffner [5] specify emerging challenges in using technology in teaching English—one of which affects the most is the lack of support and training for teachers. With this, [5] elaborates that teachers must have the necessary knowledge and experiences to maximize the potential of technologies in assisting language teaching and learning. Although [5] focused on in-service teachers, their implications emphasize that, if possible, training and support for preservice teachers must already include opportunities for them to adapt to the growing digital world.

However, enabling preservice teachers with arbitrary training and support does not guarantee effective teaching, even more so, satisfactory integration of ICT in teaching. For instance, recent studies [6, 7] reveal that despite being provided with support and training, teachers still encountered difficulties in employing ICT in their instruction. Creating digital content and troubleshooting or solving tech-related problems are few of the difficulties encountered by the teachers. Alfaidi and Elhassan [8] disclose that most teacher training programs are not continuous or diverse and do not contribute to the educational and personal needs of the teachers; hence teachers still encounter difficulties at times. With these issues in mind, they suggest that teacher training, whether for preservice or in-service teachers, should be varied, consistently sustained, and focused on the overall development of the teacher. As a whole, they call for more carefully-designed and needs-based training programs for teachers.

Since the K-12 curriculum emerged in the Philippines, along with the growing influences of the state's regional and global partnerships and persistent demands in the 21st century, teachers must now be beyond just being competent, efficient, and effective in pedagogy and their field of specialization [9]. Numerous standards, such as Philippine Professional Standards for Teachers and ICT Competency Standards, insinuate that preservice teachers must have a deep understanding of content and pedagogy while equipped with skills that enable them to integrate ICT in their instruction [10]. Meaning as the role of technology grows in education, more and more standards, policies, and expectations unfold, expecting teachers to bear the utmost digital competence.

Digital competence, at its core, reflects a person's ability to critically, collaboratively, and creatively use ICT. Asides from knowledge and skills, it also reflects one's knowledge, skills, and attitude toward ICT [11]. In Tzafilkou et al.'s [12] Student's Digital Competence Scale (SDiCoS), six skills are suggested as essential components of digital competence. These skill components are: (1) *Search, Find, Access*; (2) *Develop, Apply, Modify*; (3) *Communicate, Collaborate, Share*; (4) *Store, Manage, Delete*; (5) *Evaluate*; and (6) *Protect*. Compared to previous frameworks detailing the structure of digital competence, SDiCoS include the 'Protect' component, which is often ignored and disregarded by similar frameworks. This recent framework suggests that digital competence comprises multifaceted and interrelated skills, which are not limited to digital content creation but also go beyond the etiquette or means of ensuring and evaluating the safety and productivity of digital use.

Acquiring digital competence supports teachers in bettering their instruction and facilitates and improves students' acquisition of the same competence [13]. However, it was reported that a few of the deficiencies in the education system are due to the low levels of teacher digital competence [14]. Moreover, the digital experiences of teachers during their undergraduate education affect their ability to use their digital competence effectively and efficiently in their professional life. As the digital world gets even more pronounced and is assimilated into schools, teachers in service or preservice are highly expected to possess digital competence [15]. Though, in hindsight, digital competence characterizes a significant aspect of quality education in the 21st century, there is still an empirical gap as to what construct influences digital competence besides common socio-demographic factors like age, sex, and more [16, 17].

In response to the query raised, Zylka et al. [18] suggest and argue that ICT engagement, a metacognitive and motivational construct, is a factor that can improve ICT knowledge and skills

through self-regulation and motivation. ICT engagement assumes metacognition and intrinsic and extrinsic motivations as factors enabling engagement in ICT activities and furthering the development of ICT abilities. In an attempt to provide a structure or a framework of factors constituting ICT Engagement, [18] developed a scale. Out of it, three general and salient factors, namely, ICT-related interest, self-concept related to the use of ICT, and social exposure to ICT, went through varied factor analyses to specify specific constructs among them.

These three general factors became five specific factors. The self-concept yielded a positive self-concept factor and a negative self-concept factor. The positive ICT self-concept relates to the confidence or self-efficacy of an individual in dealing with ICT, whereas the negative ICT self-concept refers to the uncomfortable and unconfident self-evaluations of an individual when confronted with ICT-related problems. Moreover, social exposure to ICT remains as is. The items empirically define it as an individual desire to share and communicate ICT-related experiences and knowledge with others. The remaining two factors relate to interests in ICT. An interest in computers is a personal orientation toward computers (which explicitly means desktop computers). Meanwhile, the other is interest in mobile devices like smartphones or tablet computers. Ultimately, the factors which constitute the structure of ICT engagement are the following: *positive ICT self-concept, negative ICT self-concept, social exposure to ICT, interest in computers, and interest in mobile devices.*

Aside from the factor analyses, they also utilized the scale with other cognitive, behavioral, and emotional ICT constructs, which postulated its construct validity. ICT Engagement bears positive associations with computer knowledge, skills, and others. The scale indicates a relationship between one's ability to use ICT and their motivational and metacognitive ICT attributes. In dealing with ICT, an individual shall perceive their autonomy and activate their internal locus of causality to extend or sustain the effect of ICT Engagement. So, to keep up with the rapid development of ICT, people need to update their ICT knowledge and skills continuously. ICT engagement is a significant conditioning personal characteristic that affects the development and adaptation of ICT skills in a self-regulated way [18].

There are only a few studies that make use of Zylka et al.'s scale. One among the few is yet another validation study from Nikolopoulou & Gialamas [19], which explore the ICT engagement of secondary school (high school) students. They concluded that the presupposed factors of ICT engagement do not differ between adolescent populations of different countries, implying that the factor analyses of both studies [18, 19] concur. In [19], most students expressed a strong interest in computers and mobile devices, where they believe the internet is beneficial for finding practical information, that they can handle mobile phones confidently, and that they know how to download new applications for a mobile phone (from the Internet). It is also recommended in [19] that teachers must know their students' views on their ICT engagement. In this way, the teacher can increase their confidence to use ICT in learning. On top of that, they suggest the questionnaire be used in other contexts and other target populations (e.g., young University students) in other countries to reveal possible similarities and differences.

Bearing this literature in mind and since there are only a few and limited studies that involve the variables in the Philippine and language education contexts, the researchers aim to examine the relationship between ICT engagement and digital competence. For this study, the researchers will investigate if the preservice English teachers engage with ICT and how this engagement influences their digital competence. This investigation, moreover, aligns with the constructivism theory as it assumes that one's collective previous experience, attitudes, beliefs, and other socio-cognitive factors, which in this case is ICT engagement, influence the development of skill, knowledge, or whatnot, which is digital competence specifically for this study [20]. Another supporting theory of this investigation is Richard Ryan's and Edward Deci's theory of self-determination as it argues that motivation facilitates the development of a skill, competence, and more. In this study, ICT engagement, which is the act of bearing self-concepts, social exposure, and interest in ICT, is being investigated as a construct of digital competence [21].

Investigating the relationship between the two variables is significant for several reasons. First, this study impacts language education research as it foregrounds the supposed potential of

technology integration in language teaching. This study also discusses the variables, which are often, or perhaps, not even contextualized in the Philippines, language education and the field of education itself. Exploring, quantifying, and discussing a few or some points in this study contributes to filling the empirical gaps and enriching the discussions relating to the role of ICT in language teaching. Second, this study is relevant in the University of Mindanao, especially the College of Teacher Education, as it provides specific bases of training or programs to capacitate its preservice English teachers with integrating ICT in their nearing in-service instructions. Third, this study also serves a purpose for the academic institutions where preservice teachers get deployed. It urges them to generate measures and allot resources for preservice teachers to utilize and maximize their digital competence in their preservice teaching. Lastly, this study can be a benchmark for more in the future. With this, a more substantial and interdisciplinary investigation of the variables would occur.

This study investigates, as a whole, the underlying relationship between ICT engagement and digital competence among preservice English teachers at the University of Mindanao; and hypothesizes that there is no significant relationship between the variables at a 0.05 significance level. Specifically, this study aims first to ascertain the level of ICT engagement of preservice English teachers in terms of *positive ICT self-concept; negative ICT self-concept; social exposure to ICT; interest in computers; and interest in mobile devices*. Second, this targets to describe the level of digital competence of preservice English teachers in terms of *search, find, access; develop, apply, modify; communicate, collaborate, share; store, manage, delete; evaluate; and protect*. Lastly, this intends to measure the significant relationship between the variables, or the lack thereof.

2.   METHOD

2.1 Research Respondents

Set in Davao City, the fourth-year BSED (Bachelor of Secondary Education) Major in English students at the University of Mindanao—enrolled in the 2022-2023 academic year—completed the surveys. They fit the criteria of a supposed preservice English teacher who must be in a preparatory teaching program; hence they were the chosen respondents for the study [22]. Moreover, the preservice teachers from other fields of specialization in the university were the exclusion from this study, whereas the target inclusion was the preservice teachers who majored in English.

The total population of the target respondents was 103. Since their population was relatively small, all were directly the respondents in this study. The sampling method observed was total population sampling, a type of purposive sampling that enables analytical discussions about the population. Using this sampling allowed the study to acquire more and deeper insights and reduced the risk of missing relevant insights regarding the problem investigated [23].

2.2 Research Instruments

The research instruments utilized for this study were adapted survey questionnaires. The survey had two parts: one for ICT engagement, while the other was for digital competence. The first part was a 36-item questionnaire developed by Zylka et al. [18]. This questionnaire had five sections: positive ICT self-concept, negative ICT self-concept, social exposure to ICT, interest in computers, and interest in mobile devices. Meanwhile, the scale used to measure digital competence was a 28-item questionnaire developed by Tzafilkou et al. [12], briefly referred to as SDiCoS. This questionnaire had six sections: search, find, access; develop, apply, modify; communicate, collaborate, share; store, manage, delete; evaluate, and protect.

With a sample of 30 preservice English teachers, a pilot test was done to measure the reliability of the instruments. Only 30 were pre-surveyed, given that the number is sufficient to derive a data set that can generate findings, as premised in the Central Limit Theorem [24]. Moreover, out of the pilot test, the questionnaire of Zylka et al. [18] earned a Cronbach Alpha

value of 0.860; meanwhile, the value for Tzafilkou et al.'s [12] SDiCoS was 0.950. These values mean that both questionnaires are reliable to use.

Both questionnaires used a five-point Likert scale, from one for strongly disagree to five for strongly agree. Moreover, the following were the range of means and their correspondent descriptive levels and interpretations: 4.20 – 5.00 is a very high level, which means a statement is almost always true or only very few times not true to the respondents; 3.40 – 4.19 is high level, which means that a statement is usually true or more than half the time true to the respondents; 2.60 – 3.39 is moderate level, which means that a statement is sometimes true or half the time true to the respondents; 1.80 – 2.59 is low level, which means that a statement is not often true or less than half the time true to the respondents; and lastly, 1.00 – 1.79 is very low level, which means that statement is always never true or only a very times true to the respondents.

Furthermore, this study used a weighted mean and standard deviation to describe the participants' ICT engagement and digital competence levels. Meanwhile, the statistical tool used to identify the relationship between the variables linked was the Pearson correlation coefficient (Pearson r). With it, the study got to determine the influence of engagement in ICT on digital competence. Lastly, SPSS 19.0, a statistical software, was used for all the statistical calculations and analyses.

2.3 Research Design and Procedures

The employed research design for this study was descriptive-correlational, a quantitative and non-experimental methodology that describes the variables and determines the prevalent relationship between the investigated variables. This design allowed the study to explore one or more variables, utilize various approaches, and link them [25]. For this study, the descriptive research design described the levels of ICT engagement and digital competence; meanwhile, the hinged correlation was to identify the existing relationship between the variables.

For the steps followed, the researchers collated questionnaires to answer the inquiry at first. To test the reliability of the adopted questionnaires, the researchers conducted a pilot test using the pre-validated questionnaires by the panel members. The final data gathering commenced as soon as the questionnaires emerged reliable. Informed consent forms and the survey questionnaires were also attached to notify the respondents of the purpose of the study, a declaration of their anonymity in the study's discussion, and a choice to withdraw from the study. After collecting data, the researchers tallied, analyzed, and interpreted the responses with the statistician's help. Conclusions and recommendations were devised thereafter.

3. RESULTS AND DISCUSSION

Level of ICT Engagement

Table 1. Level of ICT Engagement of Preservice English Teachers, n = 103

Indicator	Mean	SD
Positive ICT Self-concept	3.94	.665
Negative ICT Self-concept	3.10	.799
Social Exposure to ICT	3.45	.736
Interest in Computers	4.19	.613
Interest in Mobile Devices	4.22	.566
Overall	**3.78**	**.676**

Table 1 shows the level of ICT engagement of preservice English teachers in terms of the following indicators: positive ICT self-concept; negative ICT self-concept; social exposure to ICT; interest in computers; and interest in mobile devices. As shown in the table, the preservice English teachers garner an overall mean of 3.78 (SD = 0.676), indicating a *high level* of ICT engagement.

This mean score implies that usually or more than half the time, preservice English teachers motivate (intrinsically and extrinsically) and regulate (metacognition) themselves to engage with ICT. The table further shows that *interest in mobile devices* earns a very high level and the highest mean score (M = 4.22; SD = 0.566) among the other indicators, which implies that participants are almost always (or only very few times not) interested or engaged with mobile devices, such as new releases, durability, ease of access, and more of the digital device.

Meanwhile, *negative ICT self-concept* nets a moderate level yet is the lowest mean (M = 3.10; SD = 0.799) as well, which means that sometimes (or half a time), the participants bear a negative self-concept towards ICT when they are in situations requiring them to troubleshoot issues relating to technology use. *Positive ICT self-concept (*M = 3.94; SD = 0.665), *social exposure to ICT* (M = 3.45; SD = 0.736), *and interest in computers* (M = 4.19; SD = 0.613) obtain mean scores which fall within the range of scores denoting a high level of ICT engagement. So, these mean scores suggest that preservice teachers usually or more than half the time have a positive self-concept, social exposure to ICT, and interest in computers.

The high regard towards mobile devices concurs with the earlier investigation of O'Bannon et al. [26], who conclude that both in-service teachers and students support the role of mobile devices in instruction. Brown [27] finds that teachers view mobile devices as helpful in learning as they provide accurate transmission of knowledge in learning activities, increase students' motivation, and foster interaction in class. However, Mohammadi et al. [28] also point out the challenges and limitations that undermine the efficient use of mobile phones in education, such as cheating, the risk of data privacy violations, and lack of access to the devices.

Meanwhile, the identified negative ICT self-concept of preservice teachers coincides with the results of Çebi and Reisoğlu [7], where teachers appeared challenged with solving technology-related problems. De Wever et al. [29] further illustrate this issue by implying that teachers' weak problem-solving skills are due to socio-demographic factors and work-related factors. They argue that it is because of less ICT skill use at work than socio-demographic factors, such as gender and age.

Level of Digital Competence
Table 2 displays the level of digital competence among preservice English teachers in terms of the following skill components: search, find, access; develop, apply, modify; communicate, collaborate, share; store, manage, delete; evaluate; and protect.

Table 2. Level of Digital Competence of Preservice English Teachers, n= 103

Indicator	Mean	SD
Search, Find, Access	4.45	.508
Develop, Apply, Modify	4.15	.555
Communicate, Collaborate, Share	4.29	.623
Store, Manage, Delete	4.54	.493
Evaluate	4.25	.528
Protect	4.29	.734
Overall	**4.33**	**.574**

The table above displays that the preservice English teachers accumulate a mean score of 4.33 (SD = 0.574). The overall mean score denotes a very *high level* of digital competence, which suggests that the preservice English teachers are almost always or very few times not competent with the skills components mentioned. On the one hand, *store, manage, and delete*, among all the indicators, had a very high level and the highest mean score of 4.54 (SD = 0.493). This mean score suggests that the participants are almost always (or very few times not) competent with storing, managing, and deleting digital media, information, and devices.

On the other hand, with a mean of 4.15 (SD = 0.555), *develop, apply, modify* attains a high threshold and the lowest among all the indicators, which insinuates that the participants usually (or

more than half the time) are competent with developing, applying, and modifying digital media, devices, and among others. Moreover, *search, find, access* (M = 4.45; SD = 0.508), *communicate, collaborate, share* (M = 4.29; SD = 0.623), *evaluate* (M = 4.25; SD = 0.528), and *protect* (M = 4.29; SD = 0.734) have very high levels of mean scores. In short, these four mean scores indicate that the participants are almost always (or only very few times not) competent in searching, finding, accessing, communicating, collaborating, sharing, evaluating, and protecting digital media, devices, and information.

Centeno [30] hashes out that teachers are digitally competent and know what digital tools to use in their instruction but not when or how to use them. Torrato [31] seconds this with its results showcasing the high proficiency levels in using hardware and software and varied digital platforms, applications, & teleconferencing tools. Vidal et al. [32], on the other hand, enumerate that the teachers are highly literate in terms of operational skills, information navigation, social use, creative use, mobile and computer navigation, and digital awareness, complementing the result that preservice teachers are almost always competent with storing, managing, and deleting media, devices, and more. Moreover, the results of Çebi and Reisoğlu [7] imply that digital content creation is one of the challenges faced by teachers, which is the same as the results discussed above that the preservice teachers are less than half the time troubled with developing, applying, and modifying media, devices, and more.

Correlation between ICT Engagement and Digital Competence
Table 3 presents the prevalent relationship between ICT engagement and the digital competence of preservice English teachers.

Table 3. Relationship between ICT Engagement and Digital Competence of Preservice English Teachers

Correlation		
Variables		**Digital Competence**
Pearson Correlation	0.427**	
Sig. (2 tailed)	0.01	
ICT Engagement		

**. *Correlation is significant at the 0.01 level (2-tailed).*
n= 103

As shown in the table, the variables grossed an r-value of 0.427, which implies that both have a moderate correlation. Given also that the r value was positive, so this means that the relationship between the two is direct: the higher the ICT engagement, the higher the digital competence, and vis-à-vis. In addition, the correlated variables yielded a p-value of 0.01 which signifies the rejection of the hypothesis. The table summarized that ICT engagement and digital competence are significantly, positively, and moderately correlated.

Centeno [30] corroborates the finding as they imply that the longer the teaching experience, the higher the capacity for technology integration in the classroom. Vidal et al. [32] recommend further engagement in using advanced digital classroom tools to further the competence of teachers. Lastly, Wu et al. [33] purport that it is of best interest to consider teachers' ICT motivation (external support and intrinsic motivation), educational ICT use (ICT use for professional development, ICT use for teaching practices, and ICT use for collaboration with colleagues), teachers' attitude toward ICT to not only improve student's ICT literacy but as well as the teachers' competence too.

3.   CONCLUSION
This study investigates the influence of ICT engagement on the digital competence of preservice English teachers. Given that the results entail rejection of the hypothesized zero association, so this means that bearing self-concepts, social exposure, and interest in ICT, i.e., regulated by motivation and metacognition, improve digital competence, especially for prospective

language teachers. Ultimately, this implies that stimulating the motivation or metacognition of the preservice English teachers to engage with ICT helps capacitate them in utilizing various technologies in their instruction.

However, as shown and discussed, ICT engagement earns only a high level in contrast to digital competence which grosses a very high level. This difference suggests that ICT engagement is not only the construct of digital competence. ICT engagement influences, but it does not necessarily mean it is the only influence of digital competence. In [17], it is argued that there is still an empirical gap as to what construct influences digital competence besides common socio-demographic factors. Meaning the yielded high levels of digital competence of preservice English teachers underlie more or other constructs besides ICT engagement, and this gap, in short, calls for further exploration of other plausible constructs of digital competence.

The findings, moreover, uncover those preservice English teachers are usually (or half the time) interested in mobile devices. Specifically, they know how to download new apps for a mobile phone from the internet. Meanwhile, they sometimes (or half the time) bear a negative self-concept towards ICT when put in situations requiring them to troubleshoot technology-related problems. For instance, when their computers do not work, they quickly get tired of dealing with it, leaving them unattended.

Furthermore, the preservice teachers are almost always (or very few times not) competent with digital media, devices, and information. On the one hand, they are almost always (or very few times not) competent with storing, managing, and deleting, especially when copying and saving screenshots from various smart devices. However, they are only usually (or more than half the time) competent in developing, applying, and modifying, especially when applying Creative Commons licenses to the content or software they created.

These specific instances where ICT engagement and digital competence are the most and least manifested provide topics of interest for training and programs for the preservice English teachers. The preservice teachers appeared to need to be more engaged (equipped) with troubleshooting technical issues and developing, applying, and modifying Creative Commons licenses, or in general, access to their digital media and information. Grounding the training or programs on the identified lacking indicators, more so the identified specific instances, will enable the preservice teachers to improve their ICT engagement and digital competence. These needs-based training and programs also sustain their motivation and metacognition to engage in ICT and digital competence.

In light of the derived conclusions, the researchers recommend that the College of Teacher Education of the University of Mindanao shall provide training, conduct seminars, or offer courses that will continue to further their engagement with ICT and strengthen the digital competence of its prospective language teachers. As discussed, the subjected preservice English teachers sometimes (or half the time) bear negative self-concepts towards ICT when asked to solve tech-related problems; hence, this identified issue shall be the basis of whatever initiative the department implements to equip its student-teachers. Meanwhile, among all the indicators of digital competence, develop, apply, and modify received the lowest mean. Therefore, this implication calls for more avenues of digital content creation for the preservice English teachers; so they get to practice and further their capacities in that matter.

For academic institutions where preservice teachers get deployed, this study urges them to generate measures and allot resources for preservice teachers to utilize and maximize their digital competence in their preservice teaching. Academic institutions, either public or private, shall allow the preservice language teachers to make use of the ICT rooms or Audio-Visual rooms for the preservice teaching. Another, the academic institutions may require preservice teachers to include digital media, devices, and information at least twice in their teaching demonstrations, which would elicit a practice for technology integration.

For future researchers, the proponents urge further exploration of what other constructs influence digital competence. Future studies may also utilize proficiency tests or standardized tests to measure digital competence holistically instead of a self-reported questionnaire. Moreover, future studies may also investigate the variables using a different design. The proponents highly encourage qualitative or mixed-method research designs to further the discussions regarding the

identified relationship of the variables. Through these other research designs, more substantive and descriptive information will get shown—decreasing the empirical gap of the investigation. Lastly, speaking of the gap, more TPACK (Technological Pedagogical and Content Knowledge) related studies must take place in the Philippines and language education contexts so that Filipino prospective language teachers become more engaged and competent with the growing demands of the sector today.

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