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Gender Difference in Digital Literacy Among Translation Trainees: Self-perceptions and Application Abilities

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Abstract

Driven by the advancement of Information and communication Technology (ICT), ability to apply state-of-the-art technology in translation has become a requirement for professional translators. In the context of translation education, the emphasis of digital literacy as a core competence for trainees were agreed-upon by stakeholders and curriculum developers. Accordingly, the development and inclusion of translation technology courses in a translation training program have pervasively reshaped translation pedagogy in a digital era. However, the investigation on trainees' level of digital literacy, especially from a gender perspective, was rarely practiced in existing literature. The present study embarked on filling the lacunae in our understanding of digital literacy by inquiring into their self-perceived abilities of general ICT and translation-specific technologies. Adopting a mixed-method research design, the research triangulated the findings from a survey of self-perceived level of digital literacy answered by 218 respondents (n=218) and focus group discussions with 28 participants (n=28). The findings rejected the stereotypical view that male students were endowed with greater potential in learning technology-centered knowledge. The gender differences in digital literacy among translation trainees were limited to only a few aspects: creativity in using modern technologies, involvement in online communities, and critical thinking, etc. The research would contribute to the expansion of our knowledge in defining translation learners' digital literacy and understanding the individual difference of trainees in a program.

Keywords: Digital Literacy, Translation Technology, Gender Differences, Undergraduate Translation Training, Educational Equitability

Introduction

Recent development of ICT has dramatically changed the way of knowledge acquisition and skills learning (Albion & Tondeur, 2018). For recent years, translation technology has grown from a marginal position to a significant component of translation curriculum in recent years (Jiménez-Crespo, 2015; Wang & Ji, 2022). Consequently, digital literacy is regarded as one of the core professional competences for translation learners (Mirzoyeva & Syurmen, 2016; Xiao & Wang, 2019). As early as 2003, Pym (2003) argued that the concepts of "translation competence" should be redefined in the "electronic age" (Pym, 2003, p. 481). The conceptualization of "digital competence for translators" was frequently discussed by follow-

up research (Cheng, 2021; Gavrilenko, 2020; Nitzke et al., 2019; Shvets et al., 2022). According to the competence framework of professional translators postulated by Şahin (2013), technological competence was one of the essential abilities for a professional translator, alongside with language competence, intercultural competence, etc. In regard to the development and implantation of new technology-centered courses in translation training programs, progresses were made globally, ranging from data science courses for translation trainees (Yan & Wang, 2022), post-editing (Guerberof Arenas & Moorkens, 2019), machine translation (Krüger, 2021), audiovisual translation (Bolaños-García-Escribano et al., 2021), etc.

Digital Literacy

The term "digital literacy" originated from Paul Gilster's book entitled *Digital Literacy* (Pangrazio et al., 2020). Digital Literacy was initially coined to describe the ability "to understand and use information in multiple formats from a wide variety of sources when it is presented via computers" (as cited in Pool, 1997, p. 6). However, the definition of "digital literacy" became diverse and divergent in subsequent research. Cordell (2013) argued that terms such as "information literacy" and "digital literacy" were not competing concepts but inter-related with each other. In many cases, "digital literacy" was used with similar terms such as "multimodal literacy", 'technology literacy", "information literacy" in a confusing manner (Jacobs, 2013). Additionally, the complex sources of digital sources and practices made a commonly agreed definition less possible. According to Eshet-Alkalai (2004, p. 93), digital literacy "involves more than the mere ability to use software or operate a digital device; it includes a large variety of complex cognitive, motor, sociological, and emotional skills, which users need in order to function effectively in digital environments".

However, there has been an impetus to unify the definition of "digital literacy", especially in educational settings. In a study on digital literacy of university students, the term was defined as "the ability to understand and use information in multiple formats with emphasis on critical thinking rather than information and communication technology skills" (Chan et al., 2017, p. 2). In UNESCO's *A Global Framework to Measure Digital Literacy* (2018), the term was defined as the ability "to define, access, manage, integrate, communicate, evaluate and create information safely and appropriately through digital technologies and networked devices for participation in economic and social life" (Law et al., 2018, p. 132).

Efforts have been made by researchers to provide comprehensive and hierarchical views of digital literacy. A six-skill holistic conceptual model was proposed by Eshet-Alkalai (2012), arguing that the model included most of the cognitive skilled used by users within a digital environment: a) Photo-visual Digital Skills; b) Reproduction Digital Skills; c) Branching Digital Skills; d) Information Digital Skills; e) Socio-emotional Digital Skills and f) Real-time Digital Skills. Martin (2009) proposed a three-level framework for the development of digital literacy, with digital skills as the basis, professional application of digital technology as an basic level, and creativity with digital resources as an advanced level of digital literacy (see **Figure 1**). Most importantly, Martin tried to separate the concepts of "digital literacy" and "digital competence" by claiming that the "digital competence" was a precursor or foundation of "digital literacy" but should never be identified as a level of digital literacy.

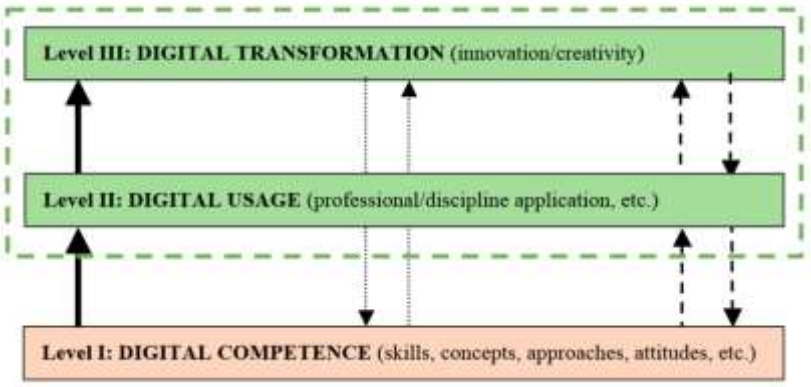

Figure 1: Level of Digital Literacy
Source: Digital Literacy for the Third Age: Sustaining Identity in an Uncertain World (Martin, 2009, p. 8).

The flourishing development of technology related courses in the curriculum of translation education called for higher level of digital literacy of trainee students. However, according to existing literatures, the evaluation of translation learner's digital literacy was rarely practiced. Discussions of digital literacy within the translation training setting primarily focused on its significance for translation pedagogy or training program development (Mirzoyeva & Syurmen, 2016; Shvets et al., 2022). Additionally, digital literary was believed to have a positive effect on students' performance within a digital learning environment (Mohammadyari & Singh, 2015). Nonetheless, our limited knowledge juxtaposed with the asserted significance of digital literacy to enhance leaners' learning achievement (Yu, 2022). The significance of digital literacy for translation training from a learner-oriented perspective remain generally unknown to us, let alone the measurement and understanding of students' current level, expectation, challenges, and shortage in digital literacy.

Gender Differences in Digital Literacy

Differences in digital literacy between different groups could be regarded as a subordinate issue of digital divide. The term "digital divide" was used to describe the gap between "those with ready access to the tools of information and communication technologies, and the knowledge that they provide access to, and those without such access or skills" (Cullen, 2001). Chetty et al. (2018, p. 2) pointed out two representative problems in addressing digital divide: "limited and costly infrastructure" and "limited digital literacy in low/middle income communities". In line with social, economic, political and geographical factors (Cullen, 2003; Guillen & Suarez, 2005; Milner, 2006; Wilson et al., 2003), gender was regarded as one of the main deciding factors for digital divide across the globe (Acilar & Sæbø, 2021). Cooper (2006, p. 320) argued that gender digital divide is basically a problem of computer anxiety which originated from the stereotype "of computers as toys for boys". The claim that men were more technologically privileged was supported by research in gender digital divide in a regional or national setting (Abu-Shanab & Al-Jamal, 2015; Antonio & Tuffley, 2014; Gray et al., 2017).

Research in digital literacy from gender perspectives showed varied findings. In a survey of student's challenges in digital literacy in a secondary school, the researchers argued that gender was not a prominent factor for the differences in digital attainment among participants (Argelagós & Pifarré, 2017). However, the study was limited by its number of

participants and research design in which digital behaviors were limited to online searches. In opposition, an Indonesian research on the gender differences of digital literacy among future physics teachers showed that male pre-service teachers were performing better in the digital literacy tests (Rizal et al., 2021). Similar results were shared by a Turkish study with 354 participants of prospective teachers (Çam & Kiyici, 2017). The dissensus in findings reflected our limited understanding of digital literacy from a gender perspective, especially in a specific setting.

Digital Literacy for Translators

Propelled by the development of ICT, proficient knowledge in using state-of-the-art tools to address issues encountered in fields such as translation quality assurance, terminology management, post-editing has become a new requirement for translators (Ivanova, 2016). With machine translation and computer-assisted translation consolidated as core competences for modern translators, translators were required to have better digital literacy to support the learning and practice of relevant technologies (Gavrilenko, 2020; Mirzoyeva & Syurmen, 2016). Specifically, translators of the digital era were expected to have sound knowledge in utilizing and manipulating data from different sources and for varied purposes: information-seeking (Mutta et al., 2014), translation in a digital communication environment (O'Hagan & Ashworth, 2002), fan translation for digital arts (Vazquez-Calvo et al., 2019).

For translation education, we are in dire need to understand and enhance students' digital literacy in order to satisfy to need from advancement in translation training curriculum development (Man et al., 2020), called for talents with higher digital capabilities from job market (Nitzke et al., 2019). In reality, professional translators were believed to be of generally poor mastery of digital tools and abilities (Djafri & Wahidati, 2022). Above factors jointly spurred the need of prioritizing technology education (H. Wang, 2019) and emphasizing digital literacy as a core competence (Malyuga et al., 2018) in translator education curricula.

Contrary to the fruitful findings in research related to digital literacy in other domains of education (Baterna et al., 2020; Bekker et al., 2015; Borthwick & Hansen, 2017; Lotherington & Jenson, 2011), the practices to assess, promote and evaluate digital literacy among translation learners were nearly non-existent in available sources of literatures. Consequently, we are now facing a dearth for research in understanding digital literacy within the translation education context, especially from a gender perspective.

In line with the agenda adopted by the United Nations to attain Sustainable Development Goals (SDG) by 2030, efforts had been made to achieve educational equity between different gender groups (Chisamya et al., 2012; Spencer et al., 2003). However, existing research revealed that gender difference in education was still impactful on many aspects of learning and teaching (Pekkarinen, 2012; Permanyer & Boertien, 2019; Steegh et al., 2019). Specifically, contrary findings regarding the level of self-perceived digital literacy between gender groups were reported from previous studies in various educational settings (Katsarou, 2021; Syamiya et al., 2022). As students' level of digital literary in translation training programs were insufficient studied, documented cases of the comparison of digital literary between different gender groups of translation trainees were consequently hardly accessible. In translation training programs, in which the number of female trainees generally outrun their counterparts, the absence of relevant knowledge pertaining to the gender differences of digital literacy among trainees would impede the ongoing progress in the development of translation technology education.

The paucity of understanding in translation learners' digital literacy was further accentuated amid the Covid-19. As the impact from the pandemic on education continues, the ability to utilize information technology to support learning turned critical for students with no access to conventional face-to-face instructions (Inan Karagul et al., 2021). Hence, higher level of digital literacy are eagerly needed for future translators in an era full of changes and innovations (Dabis, 2020). Nevertheless, translation students' level of digital literacy was not satisfactory to ensure smooth transition to online learning environment (Hubscher-Davidson & Devaux, 2021). Existing research shed little light on the understanding of students' digital literacy during the pandemic. Knowledge of digital literacy in detail would be pivotal for innovations and adjustment of translation education during and after the pandemic.

The Study

Against the above backdrops, the problem of inadequate understanding in digital literacy of translation trainees from a gender perspective needed to be urgently addressed. The present research investigated the level of self-perceived digital literary between male and female translation trainees at a Chinese university. By adopting a mixed-method design, the research inquired into the gender variances in self-perceived level of digital literacy and abilities to apply domain-specific technologies in learning translation. Specifically, the following research questions would be answered

RQ1: *How do translation trainees of different genders perceive their level of digital literacy?*
RQ2: *How do translation trainees of different genders understand their abilities to apply digital technology in learning?*

Methods

The study adopted a convergent parallel mixed-method design by bringing together the results from independently executed qualitative and quantitative strands of research into overall interpretation (Schoonenboom & Johnson, 2017). Specifically, a survey on student's self-perceived level of digital competence was administered for quantitative evaluation of gender differences in digital literacy among translation trainees; focus groups discussions on students understanding of their abilities in applying translation-specific technologies were performed simultaneously.

Design

Context and Participants

The present study took place in a university in China. In the accredited Bachelor of Arts in Translation and Interpreting (BTI) program. The objectives of the BTI program were to cultivate talents with prominent abilities in translation and interpreting, fluency in both English and Chinese, outstanding mastery of up-to-date technologies required by language service industry (Zhong & Zhao, 2015).

The population for the study is the BTI candidates at the university(N=480) with a male-to-female gender ratio of 0.16 (N_f=414, N_m=66, N_t=480)[1]. Based on a 95% confidence level and 5% confidence interval, 214 participants were recruited voluntarily. The same gender ratio was retained with185 female and 29 male students (n_f=185, n_m=29, n_t=214). For the

[1] Hereinafter, the subscript f, m, and t stands for female, male and total, respectively.

qualitative investigation, an intact class of 28 students participated in the focus group discussions (n_f=23, n_m=5, n_t=28).

Procedures

For the quantitative strand, a survey adapted from the Digital Literacy Scale (DLS) developed by Amin et al (2021) was administered. The survey consisted of 36 items in 9 dimensions (communication, copyright, critical thinking, character, citizenship, curation, connectedness, creativity, and collaboration). The items were measured on a 7-point likert scale with 1 indicating "remarkably poor" of digital literacy and 7 indicating "remarkably strong". Obtained responses to the survey were processed and analyzed with R software version 4.2.1 (R Core Team, 2022). Descriptive statistics provided a glimpse at the self-perceived level of digital literacy among participants. The Mann-Whitney U test was used to compare the self-perceived level of digital literacy between male and female students from the BTI program.

For the qualitative strand, participants were divided into seven groups for focus group discussion, each of four respondents. The focus group discussion strictly followed a pre-determined protocol as shown in **Appendix 3**. Two lecturers not involved in the study served as the moderators of the focus group, with Lecturer A leading the discussion and Lecturer B taking field notes and providing assistance. All procedures and discussions of the focus group discussions were audio recorded and transcribed verbatim. The six-step procedure proposed by Braun and Clarke (2006) were followed for thematic analysis. Lecturer A and B assisted the authors in coding, theme identification and refinement, and handling disagreements. Additionally, document analysis of students' learning artifacts was used to support findings from the focus group discussions.

Ethics

This study was approved by the Ethics Committee of School of Foreign Languages, Xinyang Agriculture and Forestry University. Written consents were obtained from all participants of the study prior to data collection. All collected data were processed and used in anonymity and confidentiality solely for the purpose of the study.

Findings

In the following sections, findings pertinent to the two research questions were presented and discussed.

RQ1: How do translation trainees of different genders perceive their level of digital literacy?

According to the responses to the survey, agreement in self-perceived level of digital literacy between male and female trainees were identified in most of the items. Specifically, concordance was found in 61.1% items (n=22), which belonged to three dimensions, namely, communications, citizenship and collaboration. Contrarily, in 38.9% items (n=14), significant differences between gender groups were found. The differences in self-perceived level of digital literacy scattered under the dimensions of copyright, critical thinking, character, curation, connectedness and creativity.

Giving an overall glimpse of the results, we could reject the stereotypical view that male students were dominantly stronger than their female peers in learning and applying digital tools and resources. The equality in the self-perception of digital literacy by participants of different gender groups was contrary to conclusion from previous studies that male students demonstrated superior skills in digital technology (Umar & Jalil, 2012), significant difference

could be identified between students of different gender groups (Baterna et al., 2020) and male students had better technological knowledge and skills than their female peers (Nguyen & Habók, 2022). See **Appendix 2** for descriptive statistics of the responses to survey items of the two gender groups.

The result of the Mann-Whitney U test disclosed higher level of abilities or awareness of female participants in responses to items related to copyright protection and neutrality in online activities. Specifically, female participants tended to be more aware of the significance of academic ethics ($p < .001$, effect size $r=0.76$), avoiding plagiarism by using digital resources ($p < .001$, $r=0.47$), following code of conduct in online communication ($p < .001$, $r=0.84$) and maintaining neutrality online ($p < .001$, $r=0.89$). Conversely, male students were more confident in their abilities to curate data, creatively apply digital resources, be critical in acquiring knowledge and information, and get involved in online communities. For instance, in responding to the first four items under the dimension of creativity for example, male students showed higher level of self-perceived abilities in the following aspects: being content creator ($p<.001$, $r=0.79$), using social media to post new information ($p<.001$, $r=0.80$), creating and publishing original video creations ($p<.001$, $r=0.75$), and acquaintance with online communities for various purposes ($p<.001$, $r=0.77$). See **Appendix 2** for result of the Mann-Whitney U Test of the means of the responses to survey items between two gender groups. The visualization of survey items with significant differences between gender groups was shown in **Figure 2**.

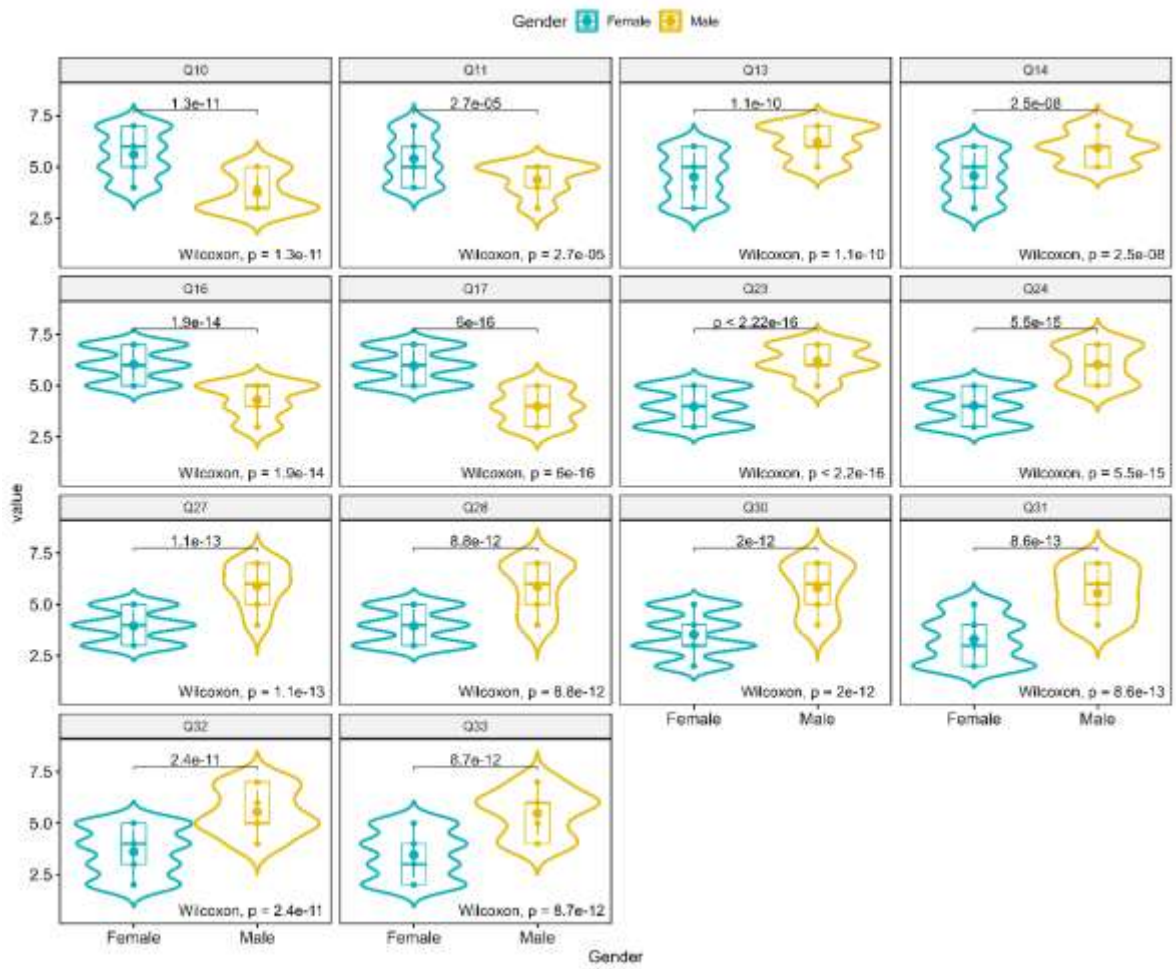

Figure 2: Violin plot showing survey items with significant differences between gender groups

RQ2: How do translation trainees of different genders understand their abilities to apply digital technology in learning?

Regarding gender differences in the abilities to apply technologies in learning, male students and female students responded differently. The following themes were extracted from the student's responses during the focus group discussion: a) learning general technological knowledge; b) applying technologies applicable to translation; and c) applying technologies to enhance learning.

Learning general technological knowledge

When asked about the attitude towards the stereotypical view that male students were significantly endowed and apt in using and understanding digital tools and resources, male and female respondents expressed their opinions dramatically differently. Female students generally challenged the alleged advantage of their male counterparts. In a discussion related the topic in a Wechat group, three female students commented that

Student A: I think the time that "males are better with computer" is long gone.
Student B: I agree, we are just learning how to use software and web applications, instead of learning how to create them.
Student A: I think we are on a very similar ground nowadays. We are quite good at it, and the boys are not that good in many fields.
Student C: The learning itself is important. I don't know many of them who is very

good at these things before the course started.
Student A: Same for me.
Student B: Especially for translation technology. That's something we have never touched before, for us and for them.
Student A: Yes, these tools are just like those professional tools. We are all newbies.
Student C: Next time when some boys say this again, maybe we should ask him to show us.

However, some male respondents claimed that males were better with *computational thinking*. The male students argued that when students need to collect and manipulate data from scratch or coding is needed for specific tasks, male student were at advantage. As a student commented

"I agree that girls are picking up rapidly… [but when we face challenging tasks] … boys are more likely to be the problem solvers."

Applying technologies applicable to translation

Students agreed that they were satisfied with their own abilities in understanding and learning translation-specific technologies. The finding was in line with the fact that most participants reported their satisfaction towards the attained knowledge in learning and using state-of-the-art technologies in both conventional translation training courses and translation technology courses. Additionally, most participants expressed their engagement and interest in learning technologies and new tools. As a female student reflected

"I am very happy that I am doing better than I have expected in learning technology. When I graduate from the university, I am confident enough to say that I am competent in technologies like parallel corpus and computer-assisted translation".

However, male students were generally more enthusiastic in learning new tools emerging on the internet. During the focus group discussions, quite a few new software or web applications were mentioned by male participants. For example, student showed their interest in using the visualization and text mining tools support academic writing tasks in many courses. **Figure 3** showed the wordcloud and co-occurrence plots in their learning artifacts.

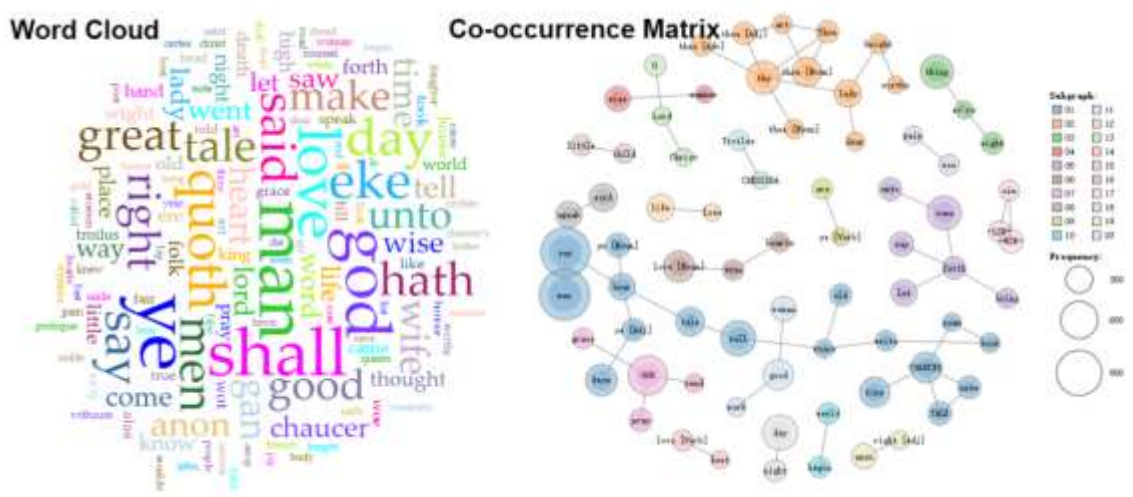

Figure 3. Word cloud and Co-occurrence Matrix Plots from Students' Learning Artifacts

As two male students commented in a presentation of his own work using text mining technique in writing semester paper for the course *advanced literary translatio*n

> *"Student A: After the 'modern translation technology' course I've become really interested in text mining. I found it a highly effective way for me to extract the essence from large volume of text, and present in a very visually appealing manner…*
> *Student B: I have been using the so-called 'co-occurrence network analyses for text analysis in this semester. I have found it very interesting. Though I am only using the very superficial features, but I take it as a productivity booster"*

Contrarily, female students were less attracted by the emergence of new technology or tools. According to a female student, the *conservative* attitude could sufficiently satisfy her need to learn new tools and technologies: *"I found the tools introduced in classrooms and my own exploration enough for my need. To me, I think proficiency to exploit the full potential of the tool matters most".*

Applying Technologies to Enhance Learning

Success in enhancing learning were reported by both male students and female students in the study. It could be inferred that the abilities to use tools and technologies to support learning by students from both gender groups were generally similar. In the current era, most student were already in good grasp of the abilities to search, retrieve, modify and share information on the internet with various devices.

In one focus group discussion session (2022), an accompanying survey on tools used for notetaking were administered. According to the results of the survey: 35% of the respondents were using dedicated digital devices such as iPad or alternatives; 24% of the respondents were using laptops (both in-class and out-of-class) to take down notes; 17% of them were using audio/video recording devices (most are mobile phones) for notetaking; only less than 25% of the respondents solely used paper-and-pen for notetaking. Noticeably, in the cohort using digital devices to take down notes, a significant majority of 65% were female students.

Comparing to their male peers, female students showed better awareness in storing and arranging attained knowledge in digital formats. As a female students argued in the focus group discussion

> *"I have the habit of rearranging my notes and my learning outcomes in digital formats. I have a 'digital garden of knowledge' of my own. I use the application Notion. It's super versatile and quite popular. If you search for it, you may find many tutorials … a large proportion of [the users of Notion] are girls".*

Discussions

The study delved into gender differences in translation trainees' abilities of applying technology in learning translation and the attitudes thereof. As Gnambs (2021) argued, the observed effect of the differences in digital literacy between male and female students were small. Dissonance and unison were heard after comparing the findings of the present study with existing literature. For example, Rizal and his colleagues (2021) argued that males were potentially better at digital content creation. The findings of the present study also revealed confidence of male participants in perceiving their abilities to contribute textual and multimedia contents to the internet. However, regarding students' abilities for online collaboration, the agreement between male and female participants of the present study was contrary to previous studies, in which female students outrun their counterparts (Rizal et al., 2021; Song et al., 2015).

Comparing the synthesized findings from the qualitative strands of the study with the results of the survey, we identified the significance of individual differences in learning habit and learning strategies on translation training. Additionally, the findings were in tandem with the claim from previous studies that the seemingly small size of difference in students' digital abilities didn't guarantee equality in teaching and learning technology (Gnambs, 2021).

The contradictory expectations and attitudes towards the application of technology in translation education was valuable for trainers and curriculum developers. For example, trainers in translation technology courses should consider the variance in acceptance of emerging technologies. In studies bringing in innovations to translation technology education, the balance between innovation and the acceptance of learners were frequently neglected (Krüger, 2021; Yan & Wang, 2022). The findings from the present study could be beneficial in the evaluation of new courses and contents for the pedagogy of translation technology.

The findings were in tandem with those of Richter & Zelenkauskaite (2014), in which gender differences were believed to be a significant factor determining the effects of technology-enhanced learning. Contrary to the findings of relevant research that confirmed different level of stress caused by the exposure to digitalized environment (Marchiori et al., 2019; X. Wang et al., 2020a, 2020b), translation trainees in the context of the present study showed confidence in learning and using modern technologies.

The primary limitations the present study faced included: a) the lack of research instrument to measure student's perceived level of translation technology literacy; and b) the absence of investigation of student's behavior in utilizing digital resources and tools in translation training.

On the one hand, the researchers used exiting research instrument developed for a general educational setting instead of developing their own instrument to measure translation technology literacy. By using a domain general scale to measure students' self-perceived level of digital literacy, the researchers achieved the research objective to identify the differences

between male students and female students in digital literacy. However, given the uniqueness of translation technology and translation training, many underlying and latent aspects regarding translation technology literacy among translation trainees were overlooked. On the other hand, the foci of the present study were student's perceptions of their own level of digital literacy and the understanding of their abilities to apply digital technologies in learning. Consequently, the investigation of student's behaviors and preference in exploiting digital technologies to assist translation learning was not included in the present study. However, the study in the habitual behaviors of translation trainees in utilizing technologies in translation learning and practice would contribute to expand our knowledge in understanding "what to teach" and "how to teach" in translation technology education.

The two limitations would limit the theoretical and practical value of the present study. To offset the negative effects of the two limitations, the researchers used a mix-method research approach to broaden the channel of data collection to support the study. Through carefully designed focus group discussion protocols, many aspects related to the habit and preferences in digital technologies among male students and female student were uncovered through synthesis and analysis of student's reflection and sharing.

For follow-up research in assessing and understanding digital literacy and translation technology literacy among translation learners, the following directions could be considered: a) constructing and validation of research instrument for the measurement of translation technology literacy; b) implementing student-based learning approaches in translation technology education; and c) conceptualization of translation trainee's technology competence under the umbrella of existing translation competence frameworks.

Conclusion

With growing emphasis of translation technology competence in translation training in the contemporary era, the significance of digital literacy became prominent. The findings of the present study confirmed that male and female translation trainees were similar in most aspects of their perception and application of digital literacy. However, attentions should be given to understand and balance the differences in learning habits and expectations in acquiring and using technologies among translation trainees. The present study also pointed out directions for future researchers to continue the investigation of the role and impact of digital literacy within the context of translation training.

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