

Article

Assessing Multiliteracies in English Language Teacher Education: The Perceived Levels of Multiliteracies and the Impact of Demographic Factors

Salim Nabhan ^{1,2,*}  and Anita Habók ³ ¹ Doctoral School of Educational Sciences, University of Szeged, 6722 Szeged, Hungary² Department of English Language Education, Universitas PGRI Adi Buana Surabaya, Surabaya 60234, Indonesia³ Digital Learning Technologies Incubation Research Group, MTA-SZTE Digital Learning Technologies Research Group, Institute of Education, University of Szeged, 6722 Szeged, Hungary; habok@edpsy.u-szeged.hu

* Correspondence: salim.nabhan@edu.u-szeged.hu or salimnabhan@unipasby.ac.id

Abstract

The growing emphasis on 21st-century skills underscores the importance of multiliteracies for pre-service English language teachers in navigating diverse, digital, and multimodal classrooms. However, research on their perceived multiliteracies and associations with demographic factors remains limited. Thus, this study bridges this gap by determining how pre-service English language teachers perceived their multiliteracies using Teacher Multiliteracies Scale (TMS) encompassing four key dimensions: multimodal literacy (ML), digital literacy (DL), critical literacy (CL), socio-cultural literacy (SCL), and analyzing the variations based on demographic characteristics involving a total of 393 pre-service English language teachers. The result showed that the participants generally perceived themselves as moderately competent across all the dimensions, with DL dimension scoring the highest, followed by SCL, ML, and CL dimensions. Interestingly, no significant differences were found for gender, age, or academic level. Further regression analysis confirmed that teaching experience was modestly associated with ML, CL, and SCL dimensions, whereas DL showed no significant variations across the demographic variables among pre-service English language teachers. These findings suggest that teacher education programs may consider providing more authentic teaching experiences and practice-based learning opportunities to support multiliteracies development.

Keywords: multiliteracies; demographic factors; English language teacher education; pre-service teachers; teaching experience



Academic Editor: Grace Oakley

Received: 3 June 2026

Revised: 3 July 2026

Accepted: 8 July 2026

Published: 10 July 2026

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1. Introduction

Literacy has evolved from a narrow conception of reading and writing to a broader understanding of meaning-making practices across diverse social and cultural contexts (Pilgrim & Martinez, 2013). Building upon this perspective, the concept of multiliteracies, introduced by The New London Group (1996), recognizes that communication in contemporary society is increasingly multimodal and culturally diverse, requiring individuals to engage with multiple modes of meaning-making. The concept of multiliteracies has become an important framework for preparing pre-service teachers to navigate diverse and multimodal teaching environments (Cope & Kalantzis, 2009; Kalantzis & Cope, 2023).

Specifically, it goes beyond traditional literacy skills and encompasses a wide range of competencies, including multimodal, digital, and socio-cultural perspectives, all of which are essential for effective instruction in the 21st century (The New London Group, 1996). In addition, multiliteracies theory has been used as an umbrella concept and integrated into English language teacher education and curriculum development worldwide (Fernandes, 2023; Lim et al., 2022; Palsa & Mertala, 2019). Meanwhile, as literacy practices in English language education continue to evolve, pre-service teachers must develop these competencies to effectively engage with diverse classrooms and address the complexities of this increasingly globalized world. Thus, a comprehensive understanding of multiliteracies can enable them to integrate various modes of representation, criticality, and inclusive learning that represent the dynamic nature of contemporary education.

According to Jewitt (2003), multiliteracies plays a vital role in English language education by providing teachers with multimodal literacy to effectively integrate visual, auditory, and digital media into enhanced learning. Given its emphasis on technology, digital literacy can allow both educators and learners to use digital platforms, with digital storytelling as a practical application (Lam & Putri, 2024; Yap & Gurney, 2023). In this regard, critical literacy further strengthens this framework by empowering learners to evaluate societal structures and create digital content for global competitiveness (Kohnen & Lacy, 2018; Mirra et al., 2018). Moreover, multiliteracies-based curricula can enhance analytical thinking, foster a growth mindset, and increase community engagement (Amgott, 2023). As for the socio-cultural perspective, it can ensure inclusive language education (Dawson & Siemens, 2014; Rajendram, 2020), highlighting socio-cultural awareness as a key component of English language teacher education (Rowse et al., 2008).

Despite the increasing recognition of the importance of multiliteracies in contemporary education, empirical evidence regarding how these competencies are perceived and developed among pre-service English language teachers remains limited. Previous research has explored the aspects of multiliteracies, such as multimodal (C. Chan et al., 2017; Dessen-Hammouda & Wigham, 2022; Hung et al., 2013), digital (Yap & Gurney, 2023), critical (Kohnen & Lacy, 2018), and socio-cultural literacy (Garcés, 2021). However, these dimensions have largely been examined independently, and little is known about how they collectively shape the perceived multiliteracies of pre-service English language teachers. There is a need for a more integrated approach that considers the relevant aspects of this concept (Jacobs, 2013). Furthermore, although the Teacher Multiliteracies Scale (TMS) has recently been developed and validated (Nabhan & Habók, 2025), empirical evidence regarding pre-service teachers' perceived levels across the four dimensions and the extent to which demographic characteristics explain variations in these perceptions remains limited. Existing studies have primarily focused on instrument development or individual literacy dimensions rather than examining how demographic factors are associated with multidimensional multiliteracies. Demographic variables may shape pre-service teachers' opportunities to develop multiliteracies. Examining these demographic characteristics is therefore important because pre-service English language teachers are expected to integrate digital technologies, multimodal resources, and culturally responsive pedagogies into their future classrooms. Furthermore, examining demographic differences may provide insights into how they shape multiliteracies development and inform targeted interventions in teacher education programs.

In the Indonesian context, teacher education has undergone substantial reforms to prepare future educators for the demands of the twenty-first century. Recent policies emphasize the integration of digital literacy, critical thinking, creativity, communication, and collaboration within higher education curricula (Herlinawati et al., 2024; Mukminin et al., 2019). Consequently, examining the multiliteracies of pre-service English language teachers in Indonesia is

particularly important because these competencies are essential for preparing future educators to teach in increasingly digital, multilingual, and multicultural contexts.

To address this research gap, the present study examines the perceived levels of multiliteracies among a sample of pre-service English language teachers as well as the extent to which demographic variables are associated with their perceptions. Specifically, it investigates four key dimensions of multiliteracies, i.e., multimodal, digital, critical, and socio-cultural literacy, and determines whether significant differences exist based on gender, age, academic level, and teaching experience. The research questions are as follows:

RQ1: What are the perceived levels of multiliteracies, i.e., multimodal, digital, critical, and socio-cultural literacy, among pre-service English language teachers?

RQ2: Are there significant differences in the perceived levels of multiliteracies among pre-service English language teachers based on demographic variables such as gender, age, academic level, and teaching experience?

RQ3: To what extent are the demographic variables associated with the perceived levels of multiliteracies among pre-service English language teachers across different dimensions?

This study is significant for both theory and practice in English language teacher education. It provides empirical insights into pre-service teachers' perceived multiliteracies, highlighting strengths and gaps in current programs. The findings can guide curriculum development and help integrate multiliteracies more effectively. By examining demographic associations, the study supports the design of targeted interventions. Overall, it contributes to the discourse on 21st-century teacher education by emphasizing the need for pedagogies that equip educators for multimodal and culturally diverse classrooms.

2. Literature Review

2.1. Conceptualizing Multiliteracies

Multiliteracies theory, introduced by the New London Group in 1996, provides a pedagogical framework that enables learners to engage with various text forms, while considering language, culture, context, and social impact. Specifically, multiliteracies represents an inclusive approach that goes beyond traditional print-based literacy, comprising diverse modes of communication such as linguistic, visual, aural, gestural, and special elements (Cope & Kalantzis, 2009; Kalantzis & Cope, 2023). This approach also integrates digital technologies and new literacies into classroom practices, with emphasis on four key pedagogical dimensions: situated practice, overt instruction, critical framing, and transformed practice (The New London Group, 1996). In subsequent research, these dimensions were reframed into the “knowledge processes” of experiencing, conceptualizing, analyzing, and applying (Cope & Kalantzis, 2009; Kalantzis & Cope, 2023).

Multiliteracies also encompasses various competencies deemed essential for English language education. For example, Jing (2016) emphasized the need for visual, media, digital, critical, and post-modern literacy in English pedagogy, while Miller and Schulz (2014) noted the integration of traditional (reading, writing, and English proficiency) and contemporary literacy (digital, critical, and visual) within the multiliteracies framework. In addition, multiliteracies is closely related to multimodal literacy, which includes meaning-making through multiple communication modes such as images, sounds, gestures, and spatial design (Camiciottoli & Campoy-Cubillo, 2018; Kalantzis & Cope, 2023; The New London Group, 1996). As for digital literacy, it is particularly important, since it encompasses various skills such as online research, critical evaluation of digital sources, and ethical information use (Yap & Gurney, 2023; Z. Zhang & Li, 2021). Moreover, the post-COVID educational landscape has accelerated the adoption of hybrid and technology-mediated learning environments, requiring teachers to possess stronger digital literacy to design engaging learning experiences (Anggadwita et al., 2024). Regarding critical literacy, it

allows learners to evaluate texts and media (Kohnen & Lacy, 2018; Luke, 2012; Vasquez et al., 2019), while socio-cultural literacy views literacy as a social practice that is shaped by cultural contexts (Perry, 2012). In this regard, previous research has underscored the importance of incorporating socio-cultural perspectives in multiliteracies education to foster inclusivity (Barrette & Paesani, 2018; Garcés, 2021). Overall, by integrating these dimensions, multiliteracies can foster a more holistic and inclusive approach to teaching and learning, empowering learners to effectively navigate the complexities of contemporary education (Fernandes, 2023).

Although multiliteracies represents a broad pedagogical orientation that emphasizes meaning-making across multiple modes and socio-cultural contexts (The New London Group, 1996; Cope & Kalantzis, 2009), its implementation in teacher education requires the identification of specific competencies that can be developed and assessed. In the context of English language teacher education, these competencies are operationalized through four interrelated dimensions: multimodal, digital, critical, and socio-cultural literacy (Nabhan & Habók, 2025). Thus, while multiliteracies provides the overarching theoretical and pedagogical framework, the four dimensions represent measurable competencies through which the principles of multiliteracies can be enacted and examined in teacher education contexts.

2.2. Multiliteracies Framework in English Language Teacher Education

In English language teacher education, the multiliteracies of pre-service teachers are vital for their development as effective educators, as future English teachers are increasingly expected to teach in digitally mediated, multimodal, and culturally diverse classrooms shaped by rapid technological advancements (Cope & Kalantzis, 2009; Kalantzis & Cope, 2023). Consequently, pre-service English language teachers require competencies that extend beyond traditional print-based literacy and enable them to support communication and learning across multiple modes, technologies, and cultural contexts. Nabhan and Habók (2025) developed a multiliteracies framework in English language teacher education encompassing four key dimensions: (1) multimodal literacy, involving the use and teaching of multimodal texts; (2) digital literacy, covering skills like online safety, communication, content creation, and digital pedagogy; (3) critical literacy, focusing on analyzing texts and fostering reflection and action; and (4) socio-cultural literacy, emphasizing cultural awareness, social interaction, and culturally responsive teaching (Figure 1). The four dimensions reflect the New London Group's knowledge processes of experiencing, conceptualizing, analyzing, and applying by enabling pre-service teachers to engage with diverse texts and technologies, critically examine media and social issues, and implement culturally responsive practices in educational contexts (Cope & Kalantzis, 2009; Kalantzis & Cope, 2023). Together, these dimensions offer a comprehensive approach to equipping pre-service English language teachers for contemporary language education, where teachers are increasingly expected to integrate multimodal resources, facilitate digital learning, critically engage learners with texts and media, and create culturally responsive and inclusive classrooms (Cope & Kalantzis, 2009; Kalantzis & Cope, 2023; Rajendram, 2020).

As for multimodal literacy, it is vital in teacher education because it allows pre-service teachers to engage with diverse forms of meaning-making through visual, auditory, and digital tools. This competency also enhances instructional effectiveness by integrating multiple modes of communication in teaching. For example, Nabhan (2019) highlighted the incorporation of a multiliteracies framework within the process writing approach. In this case, the pre-service teachers developed and presented texts by using multimodal techniques, thereby strengthening their writing and pedagogical skills. Similarly, multimodal approaches can enrich teacher education by fostering literacy practices that bridge the theoretical foundations with practical applications (Yunus et al., 2022). Regarding

digital literacy, it is equally critical in a technology-driven educational environment, since it involves the ability to effectively navigate, evaluate, and create information by using digital technologies (Pilgrim & Martinez, 2013). Although many pre-service teachers employ technology in classroom settings, Miki (2020) emphasized that a deeper understanding of digital multimodal literacy is important. This is in line with the findings of Deiniatur et al. (2024), who asserted that developing digital literacy is fundamental for pre-service teachers to become effective facilitators in contemporary education environments.

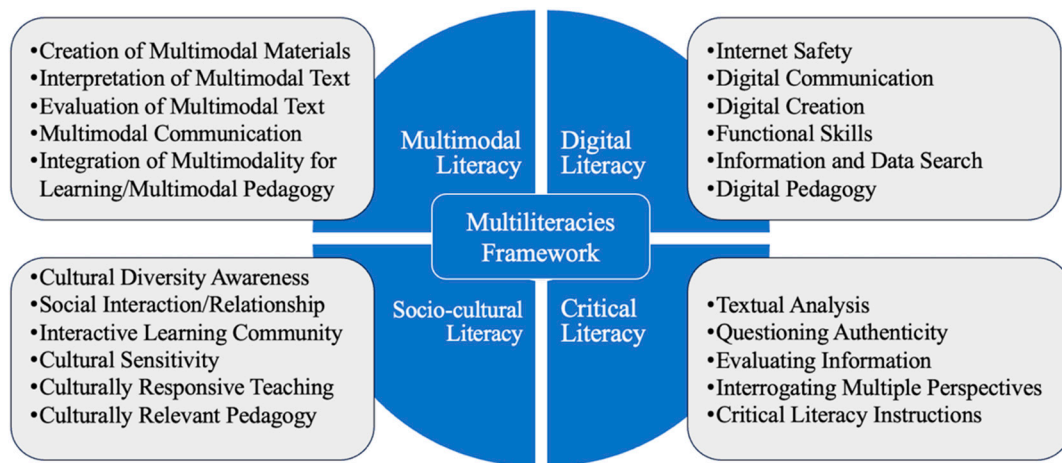


Figure 1. Multiliteracies framework in English language teacher education. Note. The multiliteracies framework in English language education, outlining four key dimensions of multiliteracies. From (Nabhan & Habók, 2025), Copyright 2025 The Authors. Published by Elsevier Ltd. CC BY-NC-ND 4.0.

Moreover, both critical and socio-cultural literacy play vital roles in preparing pre-service teachers for diverse educational contexts. Specifically, critical literacy provides educators with the ability to analyze texts and societal narratives, fostering student engagement with real-world issues. In this regard, Ángel and Rodrigues (2024) underscored the importance of critical awareness in digital media consumption and advocated for integrating critical pedagogy into teacher education in order to address social inequities. As for socio-cultural literacy, it supports educators in navigating cultural and linguistic diversity in classroom settings. For instance, Li (2017) highlighted the importance of teacher education programs that cultivate awareness and positive attitudes toward linguistic diversity, while Smith et al. (2020) emphasized the collaborative role of pre- and in-service teachers in developing culturally responsive pedagogical strategies that integrate cultural diversity in literacy education.

Although the TMS was developed to measure teachers' multiliteracies competencies, the instrument relies on self-reported Likert-scale responses. Consequently, the present study conceptualizes the resulting scores as participants' self-perceived multiliteracies competencies rather than objectively assessed competencies. Therefore, the four dimensions in the present study represent pre-service teachers' perceptions of their competencies in enacting the broader principles of multiliteracies in educational settings.

2.3. Demographic Variables and Perceived Levels of Multiliteracies

Multiliteracies is a multidimensional construct encompassing multimodal, digital, critical, and socio-cultural literacy, each of which may develop differently depending on learners' educational and experiential backgrounds (Jing, 2016; Kalantzis & Cope, 2023; Marzal, 2020; Miller & Schulz, 2014; Nabhan & Habók, 2025). Since these dimensions involve distinct but interconnected, demographic variables may be associated with particular dimensions in different ways. For example, higher education is often correlated with

greater proficiency in digital and multimodal literacy, due to increased exposure to diverse communication modes and technological tools during academic training (Janković, 2025; Peled, 2021). In this regard, Fedorenko (2019) emphasized that modern education fosters multimodal literacy by integrating various communication methodologies, especially in digital environments. Similarly, G. Chan (2024) found that educational attainment was more strongly associated with digital literacy development than socio-demographic background, since it equips individuals with the ability to leverage technology in knowledge acquisition and social engagement. In addition, Jones (2019) underscored the role of participatory approaches in fostering gender equity in multiliteracies, indicating how the backgrounds of educators can affect literacy outcomes in diverse classroom settings.

Within English language teacher education, digital literacy may be more strongly associated with technological familiarity and exposure (J. Zhang, 2023), while critical and socio-cultural literacy may be shaped by instructional interaction, cultural engagement, and reflective pedagogical experiences (Pascoal & Mattos, 2022; Seo, 2022). Examining demographic variables such as gender, age, academic level, and instructional teaching exposure provides a theoretically grounded approach for understanding variations across the multidimensional components of multiliteracies among pre-service English language teachers. Therefore, pre-service teachers' opportunities to engage in multimodal communication, digital pedagogy, critical reflection, and culturally responsive teaching may vary according to individual and educational backgrounds.

Gender differences have been identified as a key factor influencing teachers' perceived literacy levels, particularly in digital literacy, with male teachers often demonstrating higher proficiency than female teachers, underscoring the need for targeted professional development (Adeoye, 2023). While male and female teachers may differ in literacy engagement and pedagogical effectiveness based on demographic profiles (Gündoğan et al., 2023), the same study found no significant links between factors like age, academic level, teaching experience, and postgraduate education status with curriculum literacy. Broader demographic differences in multiliteracies reflect the principles of transformative pedagogy, which emphasize that social and educational backgrounds shape access to and engagement with literacy practices (Botelho et al., 2014). Addressing these disparities through targeted training can enhance multiliteracies and promote more inclusive and equitable literacy education. Additionally, teaching experience and its relationship with perceived levels of multiliteracies are shaped by teachers' exposure to diverse pedagogical practices. Specifically, experienced educators tend to integrate multimodal literacy more effectively, since they have developed various strategies to engage students through different media formats (Rajendram, 2015). Meanwhile, although digital literacy can initially pose certain challenges (due to rapid technological advancements), experienced educators typically adapt and incorporate digital tools into their instruction. However, continuous professional development is essential (Gouseti et al., 2024). Moreover, experienced educators often emphasize critical literacy, fostering the ability of students to critically evaluate digital content (Gouseti et al., 2024). In this regard, socio-cultural literacy is also strengthened through teaching experience, since it enables educators to create more inclusive and culturally responsive learning environments (Rajendram, 2015).

3. Methods

3.1. Setting and Participants

The participants in this study comprised a sample of pre-service English language teachers from universities in Indonesia that provide language teacher education programs. This study is relevant because the Indonesian government has integrated 21st-century skills and new literacy perspectives into its higher education curriculum, including teacher education

(Herlinawati et al., 2024; Mukminin et al., 2019). The participants were selected through convenience sampling and met the qualification of having teaching experience in formal or non-formal settings, such as teaching practicums, tutoring, or similar instructional activities. Participants without any teaching experience were excluded because the study specifically aimed to investigate multiliteracies among pre-service teachers who had engaged in authentic instructional activities. The convenience sampling technique was used since it simplified the recruitment process and reduced the time and costs associated with data collection.

In the present study, teaching experience refers to pre-service teachers' engagement in authentic pedagogical activities prior to entering the teaching profession. Unlike professional in-service teaching experience, this construct emphasizes practice-based instructional engagement that supports the development of pedagogical competencies and multiliteracies within pre-service teacher education contexts. Moreover, in the Indonesian context, volunteer teaching programs at schools such as *kampus mengajar* (teaching campus) provide pre-service teachers with authentic instructional experiences that help bridge the gap between theoretical knowledge and classroom practice while fostering professional development (Suyatno et al., 2023). Therefore, pre-service teachers often engage in volunteer teaching, private language instruction, or community-based educational programs while completing their university studies. Furthermore, previous teacher education research has highlighted the important role of experiential and practice-based learning opportunities in developing pedagogical competencies, classroom readiness, and instructional decision-making among pre-service teachers (Meij et al., 2025; Nabhan & Habók, 2026; Witt et al., 2022; Young et al., 2026). Since multiliteracies are closely associated with authentic instructional practices, varying levels of instructional teaching exposure may meaningfully contribute to pre-service teachers' perceived multiliteracies development.

According to Table 1, which includes the demographic characteristics of the participants ($n = 393$), the females consisted of 68.4% ($n = 269$), while the males consisted of 31.6% ($n = 124$). In terms of age, the majority were aged 21–23 years (52.9%, $n = 208$), followed by those aged 18–20 years (42.5%, $n = 167$) and 24–26 years (4.6%, $n = 18$). Regarding academic level, most of the participants were fourth-year students (40.7%, $n = 160$), followed by second-year students (29.3%, $n = 115$), third-year students (15.3%, $n = 60$), and first-year students (14.8%, $n = 58$). As for teaching experience, the majority (92.1%, $n = 362$) had 1–2 years of experience, while a smaller group (7.9%, $n = 31$) had 3–4 years of experience, reflecting the fact that some pre-service teachers had accumulated several years of practice-based instructional experiences during their university studies. Overall, the data indicate that the majority of the participants were young, female, and in their second-year or later of their studies, with brief exposure to teaching.

Table 1. Demographic characteristics of the participants ($n = 393$).

Variable	Categories	Frequency	Percentages
Gender	Female	269	68.4
	Male	124	31.6
Age	18–20 years	167	42.5
	21–23 years	208	52.9
	24–26 years	18	4.6
Academic level	First year	58	14.8
	Second year	115	29.3
	Third year	60	15.3
	Fourth year and more	160	40.7
Teaching experiences	1–2 years	362	92.1
	3–4 years	31	7.9

3.2. Instruments

To measure the perceived levels of multiliteracies among the pre-service English language teachers, we adopted the TMS, developed by Nabhan and Habók (2025). This instrument comprises four dimensions, with a total of 27 items: (1) the multimodal literacy (ML) dimension, with eight items; (2) the digital literacy (DL) dimension, with six items; (3) the critical literacy (CL) dimension, with seven items; and (4) the socio-cultural literacy (SCL) dimension, with six items. Examples of such items are as follows. For the ML dimension, there is “I can consider appropriate modes, such as pictures, audio, and visual, when creating multimodal materials based on the content and students’ preferences.” For the DL dimension, there is “I can facilitate online communication and collaboration among my students, including discussion forums, video conferencing, and email.” For the CL dimension, there is “I can critically analyze multimedia resources and digital content for my materials.” Finally, for the SCL dimension, there is “I am aware of the cultural diversity among my students, including their cultural backgrounds, languages, and experiences.”

The responses to these items were based on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). In this case, the higher the scale, the higher the perceived level of multiliteracies. Additionally, this instrument collected demographic items such as gender, age, academic level, and teaching experience. As for the original scale, it exhibited strong validity and high reliability, with Cronbach’s alpha values ranging from 0.954 to 0.980 across the dimensions (Nabhan & Habók, 2025). Although the TMS has been previously validated, reliability and validity are sample-dependent properties rather than fixed characteristics of an instrument. Therefore, the psychometric properties of the instrument were re-examined to ensure that the measurement model remained appropriate for the present sample and context.

3.3. Research Design and Data Collection

This study employed a quantitative research design to evaluate the perceived levels of multiliteracies among the pre-service English language teachers and to examine the association of the demographic factors with their perceptions. A cross-sectional methodology was also applied, enabling data collection at a single point in time. Further, data collection was performed by administering online surveys (Google Forms). Data collection was conducted during the Spring semester of 2024. Participants were recruited from both public and private universities in Indonesia that offer English language teacher education programs based on their accessibility and willingness to participate in the study.

Before initiating this process, ethical approval was obtained from the Institutional Review Board of the university. To maintain the confidentiality of the participants, strict data protection measures were implemented. In this study, participation was entirely voluntary, with informed consent obtained before completing the surveys. In addition, the participants were fully briefed on the study’s purpose, procedures, and ethical considerations, including their right to withdraw at any time without consequence.

3.4. Data Analysis

A series of statistical analyses were performed to examine the psychometric properties of the instrument, describe participants’ multiliteracies, and investigate the associations between demographic variables and the perceived dimensions of multiliteracies.

3.4.1. Measurement Model Assessment

The validity and reliability of the questionnaires were assessed through covariance-based structural equation modeling (CB-SEM) by using SmartPLS 4 software (Version 4.1.1.6). Although SmartPLS has traditionally been associated with PLS-SEM, the latest

version of the software also supports CB-SEM, allowing the estimation of confirmatory factor models within a covariance-based framework (Hair et al., 2025). The model fit was evaluated based on various indices, such as chi-square, standardized root mean squared residual (SRMR), and the normed fit index (NFI), in which an NFI value above 0.90 and an SRMR value below 0.08 were considered acceptable (Hu & Bentler, 1999). The measurement model was examined through factor loadings, Cronbach's alpha for internal consistency, composite reliability (CR), and the average variance extracted (AVE) for convergent validity. According to Hair et al. (2006), Cronbach's alpha should exceed 0.70, CR should be greater than 0.70, and the AVE should be above 0.50. Fourth, following Henseler et al. (2015), discriminant validity was assessed by using the heterotrait-monotrait ratio (HTMT), with all values expected to remain below 0.95.

3.4.2. Descriptive Statistics

SPSS software version 32 was utilized for data analysis. The demographic characteristics of the participants, including gender, age, academic level, and teaching experience, were analyzed using descriptive statistics, such as frequencies and percentages, to provide an overview of the sample.

3.4.3. Inferential Analyses

For inferential statistics, independent sample *t*-tests and a one-way analysis of variance (ANOVA) were conducted to examine the differences in the perceived levels of multiliteracies based on the demographic variables. These analyses provide information regarding between-group differences for individual demographic variables. According to Cohen (1992), the benchmarks for interpreting Cohen's *d* in independent-samples *t*-tests are 0.20 (small effect), 0.50 (medium effect), and 0.80 (large effect). For one-way ANOVA, the reported effect size is eta squared (η^2), with values of 0.01, 0.06, and 0.14 representing small, medium, and large effects, respectively. In contrast, multiple regression analysis was conducted to determine the extent to which demographic variables collectively explained variance in the perceived multiliteracies dimensions while controlling for the other demographic characteristics in the model. Therefore, the regression analyses extend the group comparison analyses by examining the relative associations of the demographic variables with multiliteracies and their overall explanatory power. Effect size was calculated using Cohen's f^2 values of 0.02, 0.15, and 0.35, which represent small, medium, and large effects, respectively (Cohen, 1992).

4. Results

4.1. Confirming the Validity and Reliability

In this study, we performed several analytical tests to confirm the validity and reliability of the instrument to assess the perceived levels of multiliteracies among the pre-service English language teachers. Based on the Kaiser-Meyer-Olkin test, Bartlett's test of sphericity (0.970) and the chi-square ((df = 351) = 9025.653, $p < 0.001$), the sample in this study was adequate. We also validated and ensured the instrument's reliability. In this case, the goodness-of-fit indices indicated a well-fitting model: chi-square = 834.747, df = 318, NFI = 0.910, CFI = 0.942, TLI = 0.936, RMSEA = 0.064, SRMR = 0.033, and $p < 0.001$. As for the four latent constructs (ML, DL, CL, and SCL), they demonstrated good factor loadings, indicating good correlations between the observed variables and their respective latent constructs. Specifically, the factor loadings for the ML construct ranged from 0.712–0.890, those for the DL construct ranged from 0.780–0.852, those for the CL construct ranged from 0.786–0.846, and those for the SCL construct ranged from 0.755–0.901.

To confirm the instrument's reliability, we assessed the internal consistency and composite reliability for each factor. In this case, ML, comprising eight items, included a Cronbach's alpha of 0.972 and a composite reliability (ρ_c) of 0.959. Additionally, DL, with six items, recorded a Cronbach's alpha of 0.958 and a composite reliability of 0.957, while CL, consisting of seven items, achieved a Cronbach's alpha of 0.982 and a composite reliability of 0.966. Finally, the SCL, with six items, had a Cronbach's alpha of 0.968 and a composite reliability of 0.956. These high reliability values indicate that the instrument was robust and capable of yielding consistent and reliable results. The four-factor structural model of the TMS is presented in Figure 2.

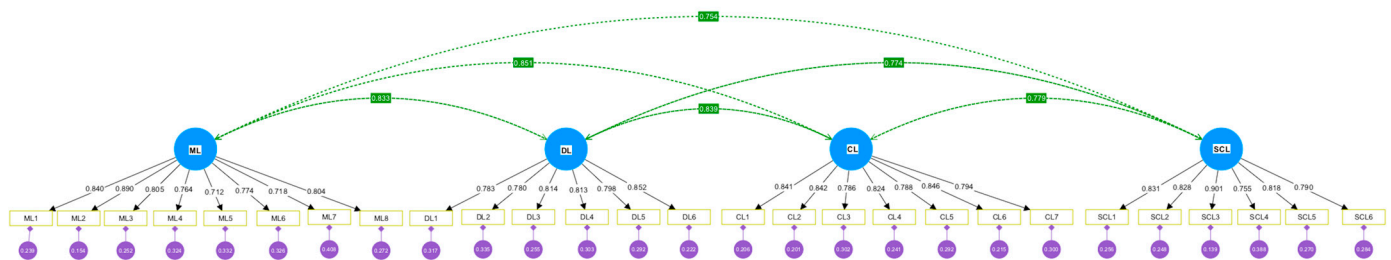


Figure 2. The four-factor structural model of the TMS.

Finally, to assess convergent validity, the AVE values were calculated. In this regard, Fornell and Larcker (1981) suggested that convergent validity should be based on internal consistency reliability (Cronbach's alpha), the AVE, and composite reliability. Specifically, the AVE values for the four factors ranged from 0.744–0.801 (ML = 0.744, DL = 0.787, CL = 0.801, SCL = 0.782), exceeding the recommended threshold of 0.50 (Hair et al., 2006). In addition, Cronbach's alpha values were above 0.70 (Hair et al., 2006), while the CR values exceeded 0.70 (Nunnally & Bernstein, 1994), further confirming the instrument's convergent validity. Regarding discriminant validity, it determines whether the items correlate in one construct more than those in another construct. Here, we assessed the instrument's discriminant validity through the HTMT ratio (Henseler et al., 2015). Based on the results, the HTMT values ranged from 0.748–0.856, which were all below the 0.90 threshold (Gold et al., 2001; Henseler et al., 2015), thereby confirming discriminant validity.

4.2. Perceived Levels of Multiliteracies Among the Pre-Service English-Language Teachers

Table 2 presents the perceived levels of multiliteracies among the pre-service English language teachers ($n = 393$), including the ML, DL, CL, and SCL dimensions. To interpret the mean scores obtained from the TMS, the present study employed the equal interval method, a widely accepted approach in quantitative educational research for reducing descriptive ambiguity and establishing objective interpretation criteria (Lindner & Lindner, 2024). The five-point Likert scale was divided into equal intervals of 0.80 based on the scale range. Accordingly, mean scores of 1.00–1.80 were interpreted as very low competent, 1.81–2.60 as low competent, 2.61–3.40 as basic competent, 3.41–4.20 as moderately competent, and 4.21–5.00 as advanced competent. Based on the findings, the DL dimension included the highest mean score ($M = 3.868$, $SD = 0.763$), indicating that the pre-service teachers perceived themselves as moderately competent in utilizing digital literacy skills. This was closely followed by the SCL dimension ($M = 3.838$, $SD = 0.765$), suggesting the ability to effectively navigate socio-cultural contexts. As for the ML ($M = 3.790$, $SD = 0.718$) and CL dimensions ($M = 3.737$, $SD = 0.734$), they were slightly lower, but still reflected moderately perceived competencies. Overall, the data suggest that the pre-service English language teachers perceived themselves as “moderately competent” across all the multiliteracies dimensions, with slight variations in the mean scores. Meanwhile, the standard deviations for all the factors indicate relatively consistent perceptions among the participants.

Table 2. Descriptive statistics (N = 393).

Dimensions of Multiliteracies	<i>M</i>	<i>SD</i>
ML	3.790	0.718
DL	3.868	0.763
CL	3.737	0.734
SCL	3.838	0.765

Note. ML = multimodal literacy; DL = digital literacy; CL = critical literacy; SCL = socio-cultural literacy.

4.3. Differences in the Perceived Levels of Multiliteracies Among the Pre-Service English Language Teachers Based on Demographic Characteristics

4.3.1. Differences in the Perceived Levels of Multiliteracies Based on Gender

Table 3 presents the perceived levels of multiliteracies among the pre-service English language teachers based on gender. According to the independent sample *t*-tests, there were no significant differences in the perceived levels of multiliteracies in the ML dimension between the females ($M = 3.831$, $SD = 0.698$) and males ($M = 3.700$, $SD = 0.753$) ($t(391) = 1.681$, $p = 0.094$), with a small effect size ($d = 0.18$). Similarly, no significant differences were found in the DL dimension between the females ($M = 3.868$, $SD = 0.739$) and males ($M = 3.868$, $SD = 0.818$) ($t(391) = -0.003$, $p = 0.998$), indicating a negligible effect size ($d = 0.00$). In the CL dimension, females ($M = 3.763$, $SD = 0.695$) and males ($M = 3.680$, $SD = 0.813$) also did not differ significantly, $t(391) = 1.031$, $p = 0.303$, with a small effect size ($d = 0.11$). Likewise, no significant gender difference was found in the SCL dimension between females ($M = 3.853$, $SD = 0.744$) and males ($M = 3.806$, $SD = 0.812$), $t(391) = 0.569$, $p = 0.570$, with a negligible effect size ($d = 0.06$). Overall, these findings suggest that gender was not associated with the perceived levels of multiliteracies among the pre-service English language teachers. Female and male participants reported comparable levels of ML, DL, CL, and SCL. The small to negligible effect sizes further indicate that the practical differences between male and female participants were minimal.

Table 3. Independent sample *t*-tests for the differences according to gender.

Dimensions	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>t</i> (391)	<i>p</i>	Cohen's <i>d</i>	Effect Size Interpretation
ML	Female	269	3.831	0.698	1.949	0.163	1.681	0.094	0.18	Small
	Male	124	3.700	0.753						
DL	Female	269	3.868	0.739	2.788	0.096	−0.003	0.998	0.00	Negligible
	Male	124	3.868	0.818						
CL	Female	269	3.763	0.695	7.259	0.007	1.031	0.303	0.11	Small
	Male	124	3.680	0.813						
SCL	Female	269	3.853	0.744	2.508	0.114	0.569	0.570	0.06	Negligible
	Male	124	3.806	0.812						

Note. ML = multimodal literacy; DL = digital literacy; CL = critical literacy; SCL = socio-cultural literacy.

4.3.2. Differences in the Perceived Levels of Multiliteracies Based on Age

Table 4 presents the results of the one-way ANOVA for the differences in the perceived levels of multiliteracies among the pre-service English language teachers according to age. Based on the findings, the perceived levels of multiliteracies were generally similar across the three age groups, and no statistically significant differences were found in any of the four dimensions of ML, DL, CL, and SCL. Specifically, there was no significant difference in the ML dimension among the age groups ($F(2, 390) = 0.486$, $p = 0.615$), with a negligible effect size ($\eta^2 = 0.002$). Similarly, no significant difference was found in the DL dimension among the age groups ($F(2, 390) = 0.399$, $p = 0.671$), with a negligible effect size ($\eta^2 = 0.002$). As for the CL dimension, no significant difference was observed across the age groups

($F(2, 390) = 2.180, p = 0.144$), although a small effect size was observed ($\eta^2 = 0.011$). Finally, the SCL dimension did not show any significant difference based on age ($F(2, 390) = 0.052, p = 0.949$), with a negligible effect size ($\eta^2 = 0.000$). These findings indicate that age was not significantly associated with the perceived levels of multiliteracies among the pre-service English language teachers, and the negligible to small effect sizes further indicate that age contributed very little to the variance across the multiliteracies dimensions.

Table 4. One-way ANOVA for the differences according to age.

Dimensions	Age	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i> (2, 390)	<i>p</i>	Eta Squared (η^2)	Effect Size Interpretation
ML	18–20 years	167	3.748	0.598	0.486	0.615	0.002	Negligible
	21–23 years	208	3.820	0.778				
	24–26 years	18	3.826	0.988				
DL	18–20 years	167	3.835	0.627	0.399	0.671	0.002	Negligible
	21–23 years	208	3.884	0.831				
	24–26 years	18	3.981	0.081				
CL	18–20 years	167	3.679	0.602	2.180	0.144	0.011	Small
	21–23 years	208	3.802	0.786				
	24–26 years	18	3.515	1.115				
SCL	18–20 years	167	3.824	0.679	0.052	0.949	0.000	Negligible
	21–23 years	208	3.849	0.810				
	24–26 years	18	3.851	1.001				

Note. ML = multimodal literacy; DL = digital literacy; CL = critical literacy; SCL = socio-cultural literacy.

4.3.3. Differences in the Perceived Levels of Multiliteracies Based on Academic Level

A one-way ANOVA was also used to determine if there were any significant differences in the perceived levels of multiliteracies among the pre-service English language teachers based on academic level. As shown in Table 5, no statistically significant differences were identified across academic levels for any of the multiliteracies dimensions. Specifically, there was no significant difference in the ML dimension based on academic level ($F(3, 389) = 1.570, p = 0.196$), with a small effect size ($\eta^2 = 0.012$). Similarly, no significant difference was found in the DL dimension according to academic level ($F(3, 389) = 1.743, p = 0.158$), with a small effect size ($\eta^2 = 0.013$). As for the CL dimension, no significant difference was observed based on academic level ($F(3, 389) = 1.566, p = 0.197$), also indicating a small effect size ($\eta^2 = 0.012$). Finally, the SCL dimension did not show any significant difference according to academic level ($F(3, 389) = 2.057, p = 0.105$), with a small effect size ($\eta^2 = 0.016$). These findings suggest that academic level was not associated with the perceived levels of multiliteracies among the pre-service English language teachers, and the consistently small effect sizes further indicate that academic level contributed only minimally to the variance across the multiliteracies dimensions.

Table 5. One-way ANOVA for the differences according to academic level.

Dimensions	Academic Level	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i> (3, 389)	<i>p</i>	Eta Squared (η^2)	Effect Size Interpretation
ML	First year	58	3.840	0.571	1.570	0.196	0.012	Small
	Second year	115	3.687	0.695				
	Third year	60	3.739	0.778				
	Fourth year or more	160	3.864	0.753				

Table 5. Cont.

Dimensions	Academic Level	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i> (3, 389)	<i>p</i>	Eta Squared (η^2)	Effect Size Interpretation
DL	First year	58	3.864	0.733	1.743	0.158	0.013	Small
	Second year	115	3.801	0.678				
	Third year	60	3.738	0.887				
	Fourth year or more	160	3.965	0.777				
CL	First year	58	3.756	0.578	1.566	0.197	0.012	Small
	Second year	115	3.646	0.653				
	Third year	60	3.661	0.886				
	Fourth year or more	160	3.824	0.772				
SCL	First year	58	3.885	0.741	2.057	0.105	0.016	Small
	Second year	115	3.758	0.676				
	Third year	60	3.694	0.848				
	Fourth year or more	160	3.934	0.793				

Note. ML = multimodal literacy; DL = digital literacy; CL = critical literacy; SCL = socio-cultural literacy.

4.3.4. Differences in the Perceived Levels of Multiliteracies Based on Teaching Experience

Table 6 presents the results of the independent sample *t*-tests for the differences in the perceived levels of multiliteracies among the pre-service English language teachers based on teaching experience. In contrast to the other demographic variables, teaching experience showed significant differences in means between the groups in several dimensions of multiliteracies. Specifically, for the ML dimension, the perceived levels of multiliteracies among the teachers with 3–4 years of teaching experience ($M = 4.121$, $SD = 0.878$) were significantly higher than those for the teachers with 1–2 years of teaching experience ($M = 3.761$, $SD = 0.696$) ($t(391) = -2.694$, $p < 0.01$), with a moderate effect size ($d = 0.49$). For the DL dimension, no significant difference was found between the teachers with 3–4 years of teaching experience ($M = 4.010$, $SD = 0.867$) and those with 1–2 years of experience ($M = 3.855$, $SD = 0.754$) ($t(391) = -1.083$, $p = 0.279$), although a small effect size was observed ($d = 0.20$). However, in the CL dimension, the teachers with 3–4 years of teaching experience ($M = 4.023$, $SD = 0.964$) reported significantly higher perceived levels than those with 1–2 years of experience ($M = 3.172$, $SD = 0.708$) ($t(391) = -2.268$, $p < 0.05$), with a large effect size ($d = 1.09$). Similarly, in the SCL dimension, the teachers with 3–4 years of teaching experience ($M = 4.139$, $SD = 0.845$) demonstrated significantly higher perceived levels, compared to those with 1–2 years of teaching experience ($M = 3.813$, $SD = 0.754$) ($t(391) = -2.293$, $p < 0.05$), with a moderate effect size ($d = 0.42$). These results indicate that differences in teaching experience were associated with differences in the perceived levels of multiliteracies among the pre-service English language teachers, particularly in the ML, CL, and SCL dimensions, with the largest practical difference observed in the CL dimension.

Table 6. Independent sample *t*-tests for the differences according to teaching experience.

Dimensions	Teaching Experiences	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>t</i> (391)	<i>p</i>	Cohen's <i>d</i>	Effect Size Interpretation
ML	1–2 years	362	3.761	0.696	3.192	0.075	−2.694	0.007 **	0.49	Small to medium
	3–4 years	31	4.121	0.878						
DL	1–2 years	362	3.855	0.754	1.060	0.304	−1.083	0.279	0.20	Small
	3–4 years	31	4.010	0.867						
CL	1–2 years	362	3.172	0.708	4.886	0.028	−2.268	0.024 *	1.09	Large
	3–4 years	31	4.023	0.964						

Table 6. Cont.

Dimensions	Teaching Experiences	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>t</i> (391)	<i>p</i>	Cohen's <i>d</i>	Effect Size Interpretation
SCL	1–2 years	362	3.813	0.754	1.031	0.311	−2.293	0.022 *	0.42	Small to medium
	3–4 years	31	4.139	0.845						

Note. ML = multimodal literacy; DL = digital literacy; CL = critical literacy; SCL = socio-cultural literacy. * significant $p < 0.05$, ** significant $p < 0.01$.

4.4. Association of the Demographic Variables with the Perceived Levels of Multiliteracies Among the Pre-Service English-Language Teachers Across Different Dimensions

The multiple regression analysis examined the association of the demographic variables with the perceived levels of multiliteracies across different dimensions. As shown in Table 7, the model for the ML dimension was statistically significant ($F(4, 388) = 2.761$, $p < 0.05$; explaining 2.768% of the variance). The model demonstrated a small effect size ($f^2 = 0.029$). Among the demographic variables, teaching experience significantly contributed to the model, indicating that participants with greater teaching experience reported higher perceived ML. This indicates that the participants with more teaching experience had higher perceived ML. However, gender, age, and academic level did not significantly contribute to the model. Conversely, the model for the DL dimension was not significant ($F(4, 388) = 0.651$, $p = 0.626$; explaining only 0.667% of the variance). The effect size for the DL model was negligible ($f^2 = 0.007$). None of the demographic variables showed a significant effect. With no independent variables showing a significant effect. Similarly, the model for the CL dimension was not significant ($F(4, 388) = 1.842$, $p = 0.120$; explaining 1.863% of the variance). The model showed a negligible to small effect size ($f^2 = 0.019$). Teaching experience had a significant effect. This suggests that the participants with more teaching experience had higher CL. Additionally, the model for the SCL dimension was not significant ($F(4, 388) = 1.647$, $p = 0.162$; explaining 1.669% of the variance). The SCL model also demonstrated a negligible to small effect size ($f^2 = 0.017$). Teaching experience also had a significant association. This implies that the participants with more teaching experience had higher SCL.

Table 7. Results of the multiple regression analysis for multiliteracies, as a dependent variable across different dimensions.

Independent Variables	ML Dimension ^a		DL Dimension ^b		CL Dimension ^c		SCL Dimension ^d	
	<i>r</i> · β ·100	<i>p</i>	<i>r</i> · β ·100	<i>p</i>	<i>r</i> · β ·100	<i>p</i>	<i>r</i> · β ·100	<i>p</i>
Gender	0.786	0.066	1.010	0.990	0.291	0.270	0.092	0.525
Age	0.047	0.870	−0.006	0.981	−0.065	0.763	−0.062	0.520
Academic level	0.109	0.755	0.441	0.317	0.374	0.381	0.318	0.370
Teaching experience	1.824	0.009 **	0.232	0.415	1.261	0.033 *	1.320	0.028 *
Total variance explained ($R^2\%$)	2.768		0.667		1.863		1.669	
Effect size (f^2)	0.029		0.007		0.019		0.017	
Effect size interpretation	Small		Negligible		Negligible to small		Negligible to small	

Note. ML = multimodal literacy; DL = digital literacy; CL = critical literacy; SCL = socio-cultural literacy. $N = 393$; ^a $F(4, 388) = 2.761$, $p < 0.05$; ^b $F(4, 388) = 0.651$, $p = 0.626$; ^c $F(4, 388) = 1.842$, $p = 0.120$; ^d $F(4, 388) = 1.647$, $p = 0.162$. * significant $p < 0.05$, ** significant $p < 0.01$.

Overall, gender, age, and academic level were not significantly associated with DL, CL, or SCL. Based on these findings, teaching experience demonstrated a statistically significant

but practically limited association with the ML, CL, and SCL of the pre-service English language teachers, while no statistically significant associations were observed between DL and the demographic variables examined in this study. However, the small effect sizes suggest that the practical association of the demographic variables with multiliteracies was limited. It should be noted that in the present model, a large portion of the variance was left unexplained. In this regard, it is most likely that additional multiliteracies-related factors were responsible for the rest of the variance.

5. Discussion

The results of this study revealed the perceived levels of multiliteracies among the pre-service English language teachers and the association of the demographic factors with their perceptions. Based on the first research question, which explored the pre-service teachers' ML, DL, CL, and SCL, the findings indicated that they perceived themselves as "moderately competent" across all four dimensions. Specifically, DL had the highest mean score, followed by SCL, ML, and CL. The second research question examined if there were any significant differences in the perceived levels of multiliteracies based on demographic characteristics such as gender, age, academic level, and teaching experience. The results showed that there were no significant differences in the perceived levels of multiliteracies based on gender, age, and academic level. However, teaching experience showed statistically significant differences in means between the groups in ML, CL, and SCL, although the practical magnitude of these relationships was relatively small. Meanwhile, the DL dimension showed no significant differences in the perceived levels of multiliteracies. Finally, the third research question investigated if there were any significant associations between the perceived levels of multiliteracies and the demographic variables. In this case, the multiple regression analysis identified that teaching experience demonstrated statistically significant associations with ML, CL, and SCL; however, the overall explanatory power of the regression models remained low, whereas other demographic factors, such as gender, age, and academic level, had no association.

The relatively higher perceived DL may reflect the increasing integration of digital technologies within teacher education programs and participants' frequent engagement with technology-mediated learning environments. This is also in line with previous research suggesting that perceived DL among pre-service teachers may reflect their frequent use of such tools/technologies in educational settings (Kivunja, 2014). In the present study, the participants demonstrated confidence in employing digital tools for instructional purposes. This supports the assertion that DL can enable both educators and learners to critically engage with digital platforms, with digital storytelling as one of its practical applications (Lam & Putri, 2024; Yap & Gurney, 2023). Conversely, the comparatively lower scores in CL may indicate that pre-service English language teachers have fewer opportunities to critically analyze texts, media, and socio-cultural issues during their teacher preparation programs. This could be attributed to the complex nature of CL, which involves analyzing texts, questioning authenticity, evaluating certain information, and interrogating multiple perspectives, thus requiring more explicit instruction and practice (Lee, 2019; Mirra et al., 2018; Share et al., 2019; Vasquez et al., 2019).

As for the finding that teaching experience demonstrated a modest association with the ML, CL, and SCL dimensions. It may suggest that pre-service teachers' practice-based instructional engagement, such as teaching practicums, tutoring, and volunteer teaching programs contributes to the development of these competencies by providing opportunities for pre-service teachers to design and implement multimodal instructional materials, critically reflect on teaching practices, and respond to diverse sociocultural contexts in real classroom settings. Recent evidence indicates that teaching practicums enable pre-service

English teachers to integrate digital multimodal composing into their pedagogical practices and strengthen their understanding of multimodal meaning-making and instructional design (Humairoh et al., 2025). Similarly, pre-service language teachers who actively engage in authentic teaching practices tend to employ higher-order thinking skills in classroom contexts, while continuous critical reflection contributes to a deeper understanding of critical thinking (Risanti & Pratolo, 2025). Moreover, cross-cultural teaching experiences provide pre-service teachers with opportunities to interact with diverse learners, adapt to new educational environments, and reflect on different pedagogical approaches that promote professional growth and broaden the understanding of cultural diversity (Ateşkan, 2016). Therefore, experienced teachers have had more opportunities to apply, integrate, and refine their skills in real-world contexts, leading to higher perceived competence (Gouseti et al., 2024; Rajendram, 2015). This is in line with the multiliteracies framework, which emphasizes the importance of situated and transformed practice in developing multiliteracies skills (Cope & Kalantzis, 2009; Kalantzis & Cope, 2023).

However, the results of this study contradict those of previous research. In terms of gender, some studies have found differences based on gender, with male teachers exhibiting higher levels of DL skills than their female counterparts (Adeoye, 2023). Similarly, among pre-service teachers, males have been found to report higher levels of digital competence and confidence in using digital technologies than females, suggesting that gender may shape technology-related experiences and engagement in teacher education (Getenet et al., 2026). In contrast, this study found no significant gender differences across the multiliteracies dimensions. This discrepancy may be due to the differences in this study's context or participants. Specifically, the present study involved predominantly female participants (68.4%), most of whom were between 18 and 23 years old and had relatively limited teaching experience (1–2 years). Moreover, the absence of significant gender differences in the present study may reflect the increasing accessibility of digital technologies and the integration of technology-rich learning experiences within teacher education programs, which provide comparable opportunities for both male and female pre-service teachers to develop their multiliteracies competencies. This interpretation is also consistent with Jones (2019), who argued that participatory and inclusive educational approaches can reduce gender disparities in literacy development.

Likewise, no significant differences were observed across age groups or academic levels. Previous research has shown that higher educational attainment is often associated with stronger DL and ML due to greater exposure to diverse communication modes and technological tools (Janković, 2025; Peled, 2021). Similarly, Fedorenko (2019) emphasized that modern educational environments foster ML through the integration of diverse communication methodologies, particularly in digital contexts, while G. Chan (2024) reported that educational attainment was more strongly associated with DL than socio-demographic background. However, the present findings suggest that progression through the academic program alone may not necessarily translate into higher perceived multiliteracies. One possible explanation is that the participants were enrolled in similar English-language teacher education programs and therefore had relatively comparable opportunities to engage with digital technologies, multimodal communication, and literacy-related pedagogical experiences regardless of their year of study.

Moreover, although theoretical perspectives suggest that DL may be associated with technological familiarity and exposure, whereas critical and sociocultural literacy may be shaped by instructional interaction and reflective experiences (Pascoal & Mattos, 2022; Seo, 2022; J. Zhang, 2023), the current findings imply that demographic characteristics alone are insufficient to explain variations in pre-service teachers' perceived multiliteracies. The negligible to small effect sizes and low explained variance further indicate that other

factors, such as digital self-efficacy, pedagogical beliefs, resource support, and technology acceptance, may play a more substantial role in shaping multiliteracies among pre-service English language teachers. Overall, by providing empirical evidence on the perceived levels of multiliteracies and the association of demographic factors with their perceptions, this research offers valuable insights for English language teacher education programs.

6. Conclusions and Implications

This study examined the perceived levels of multiliteracies among pre-service English language teachers and the association of demographic factors with their perceptions. Based on the results, the pre-service teachers perceived themselves at a moderate level of multiliteracies across all four dimensions, with DL receiving the highest mean score. Meanwhile, teaching experience was modestly associated with the perceived levels of ML, CL, and SCL, whereas gender, age, and academic level did not have such associations. Overall, these findings suggest that pre-service teachers with greater practice-based teaching experiences tended to report higher perceived levels of ML, CL, and SCL, reinforcing the need for teacher education programs to integrate more practice-based learning opportunities among pre-service English language teachers.

6.1. Study Limitations and Directions for Future Research

This study has several limitations that should be acknowledged. First, the study employed convenience sampling involving participants from Indonesian universities offering English language teacher education programs, which may limit the generalizability of the findings to broader educational contexts. In addition, detailed information regarding institutional distribution, regional representation, and program types was not collected, thereby limiting the ability to examine contextual differences across institutions. Second, the sample was relatively homogeneous, particularly in terms of teaching experience. This limited variability may have reduced the strength of group comparisons and constrained the explanatory power of the inferential analyses. Third, the study relied on self-reported data, which may have introduced social desirability bias or inaccuracies in participants' self-perceptions of multiliteracies. Fourth, the cross-sectional design captures participants' perceptions at a single point in time and therefore does not permit causal interpretations regarding the relationships between demographic variables and multiliteracies. Fifth, the unequal distribution of teaching-experience groups may have an association with the stability of the comparative analyses and regression estimates. Finally, although the regression analyses identified several significant relationships, a substantial proportion of variance remained unexplained, suggesting that additional factors related to multiliteracies development were not captured in the present study.

Future research is recommended to employ more diverse and representative sampling strategies involving participants from different institutional contexts, geographic regions, and broader ranges of teaching experience to improve variability and enhance the generalizability of the findings. Further studies may also compare pre-service teachers across different program types to better understand contextual association with multiliteracy development. In addition, future research should incorporate mixed-methods or longitudinal designs to provide deeper insights into how multiliteracies evolve over time and across teaching experiences. The inclusion of performance-based assessments, classroom observations, or interviews may also help triangulate self-reported data and provide a more comprehensive understanding of pre-service teachers' multiliteracies. Future research should also seek more balanced group sizes to further validate the findings regarding teaching experience. Finally, future studies should explore other factors that may play a more substantial role in shaping pre-service teachers' multiliteracies, such

as socio-economic background, digital self-efficacy, pedagogical beliefs, technology acceptance, institutional support, and opportunities for authentic teaching practice within teacher education programs.

6.2. Study Implications

This study contributes to the growing body of literature on multiliteracies in English language teacher education. First, it provides empirical evidence supporting the multidimensional nature of multiliteracies among pre-service English language teachers. Second, it demonstrates that demographic characteristics explain only a limited proportion of variance in multiliteracies, suggesting that contextual and pedagogical factors may be more strongly associated. Third, the findings extend the application of the multiliteracies framework to English language teacher education by highlighting the importance of authentic teaching experiences in developing multimodal, critical, and socio-cultural literacy.

The findings of the study also have several practical implications for English language teacher education programs. First, the results highlight the association of teaching experience with the development of multiliteracies, suggesting that teacher education programs should incorporate practice-based learning opportunities to improve the competence of pre-service teachers in all dimensions, including ML, DL, CL, and SCL. Second, curriculum development should integrate multiliteracies into teacher training programs, guiding educators and policymakers in addressing the strengths and areas for improvement in such programs. Third, teacher education programs may strengthen CL by incorporating activities such as critical analysis of multimodal texts, media projects, and reflective discussions on social issues. Moreover, pre-service teachers' relatively stronger DL could be leveraged to support the development of CL and SCL through collaborative digital projects, multimodal assignments, and culturally responsive technology-enhanced learning activities. Finally, understanding the role of demographic factors can help institutions design and implement targeted interventions to support the development of multiliteracies among pre-service English language teachers.

Author Contributions: Conceptualization, S.N. and A.H.; Methodology, S.N. and A.H.; Software, S.N.; Validation, A.H.; Formal analysis, S.N. and A.H.; Investigation, S.N.; Resources, S.N.; Data curation, S.N.; Writing—original draft, S.N.; Writing—review and editing, A.H.; Visualization, S.N.; Supervision, A.H.; Project administration, S.N.; Funding acquisition, A.H. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Research Programme for Public Education Development, Hungarian Academy of Sciences (Grant KOZOKT2025-4), the University of Szeged Open Access Fund (Grant Number: 8718), and the ADVANCED 150100 project provided by the Ministry of Culture and Innovation of Hungary from the National Research, Development and Innovation Fund (ADVANCED_24).

Institutional Review Board Statement: The project received ethical approval from the Institutional Review Board of the Doctoral School of Education, University of Szeged (Reference No. 6/2024), dated 18 March 2024. The study was reviewed and deemed to comply with the ethical standards for conducting social research involving human participants, as outlined by the Doctoral School. This includes adherence to ethical protocols concerning data collection methods, informed written consent, research procedures, and data management practices.

Informed Consent Statement: All participants were informed about the nature and purpose of the study prior to participation. Informed consent was obtained before they proceeded to complete the online survey. Participants were assured that their responses would remain confidential and anonymous, and that they could withdraw from the study at any time without any consequences. No personally identifiable information was collected or stored at any stage of the research.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Acknowledgments: We extend our sincere gratitude to the University of Szeged for its generous funding and to the Hungarian Academy of Sciences for its invaluable support. We also wish to express our appreciation to the pre-service teachers who participated in this research.

Conflicts of Interest: The authors declare no conflicts of interest.

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