Id: 1530449

Participatory Educational Research (PER)
Vol.11(6), pp. 56-74, November 2024
Available online at http://www.perjournal.com
ISSN: 2148-6123
http://dx.doi.org/10.17275/per.24.79.11.6

Lifelong Learning Center Trainers: What Are Their Perceived Curriculum Literacy and Digital Technology Usage Levels?

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Article history

Received:
08.06.2024

Received in revised form:
20.08.2024

Accepted:
04.09.2024

Key words:
Adult education; trainers; curriculum literacy; instructional technology

Education and training are crucial components of society's ever-changing nature, and having a strong understanding of curriculum literacy is necessary for trainers in adult education to successfully execute curriculum. Similarly, effective use and integration of digital technologies into educational settings is a necessary skill for trainers. These competencies are critical for K-12 and higher education educators, as well as for adult education trainers who guide the learning process in line with their assigned program. In this study, we have investigated the relationship between trainers' perceived competence in curricular literacy (CL) and their use of digital technologies in education (DTUE). This study employed a descriptive survey methodology to gather data from a total of 628 individuals. The average age of the participants was 41.7 years, and they were all employed at a lifelong learning institution in Türkiye. MANOVA and correlation analysis were executed. We examined whether there were any differences in the trainers' perceived CL and DTUE levels based on the specified variables. The results revealed a positive and weak correlation between trainers' perceived curriculum literacy levels and their use of digital technology. Also, the trainers without prior formal pedagogical training had significantly lower scores in CL and DTUE compared to the trainers who had either graduated from the Faculty of Education or earned a pedagogical formation certificate.

Introduction

In the always changing and advancing world, education and training are essential and vital. The strong connection between education and society is due to this essential requirement (Labbo, Reinking, & McKenna, 1998; Özkan, 2011; Shayestehnia, Shafizadeh, & Soleimani, 2023). A necessary aspect for societies to maintain their position in the evolving and progressing world is the adjustment of basic values that influence institutions and organizations across all levels of society under the era's demands (Labbo, Reinking, & McKenna, 1998). By appropriately organizing educational programs, educational institutions can effectively impart the necessary knowledge and skills to individuals, instilling these core

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values (Özkan, 2011). Curricula serve as a roadmap and guidance for teachers in the education process, and they are a crucial factor in determining the quality of the learning experience (Şınego & Çakmak, 2021).

Understanding and valuing the significance of curriculum and putting it into practice in the classroom are two distinct issues (Steiner, Magee, Jensen & Button, 2018). To attain the objectives described in educational curricula, it is crucial to effectively implement them in the realm of education and instruction. Mere functionality and meeting all necessary requirements in the curriculum are insufficient to enhance the quality of instruction. The educators' competencies are also a crucial factor. These competencies include both the knowledge and skills required for program implementation, as well as relevant field background. When we conceptualized these knowledge and skills into a single category, we encountered the concept of "curriculum literacy".

Simply put, "curriculum literacy" refers to the skills needed for understanding, implementing, and evaluating the curriculum (Akyıldız, 2020). In detail, curriculum literacy refers to the comprehension and skills necessary for a teacher or trainer to thoroughly analyze a curriculum, understand its characteristics, and strategize how to implement it according to the requirements (Akyıldız, 2020; Bolat, 2021; Yar Yıldırım,2020). No matter how well the curriculum is prepared, the implementation of these programs in a way that meets the learning needs of learners is only possible if the teacher in charge understands the curriculum correctly, in other words, has curriculum literacy competence (MoNE, 2022). It is unrealistic to anticipate that educators lacking this competency will be able to achieve program goals (Bolat, 2021).

Curriculum literacy skills are crucial for educators at all levels of schooling. Through the identification of quantifiable attributes of this concept, we can assess the proficiency of teachers, trainers, or adult educators in curriculum literacy and address any areas of shortcoming. There are studies in the literature that attempt to establish the conceptual framework of curriculum literacy (Akınoğlu & Doğan, 2012). Furthermore, there are also studies that focus on defining the specific skills and abilities associated with the subject matter, and subsequently constructing measurement scales based on these competencies (Akyıldız, 2020; Bolat, 2017). Several scale development studies have been conducted to ascertain the necessary skills associated with this concept (Akyıldız, 2020; Bolat, 2017; Kahramanoğlu, 2019; Kasapoğlu, 2020; Keskin & Korkmaz, 2021; Kızılaslan Tunçer, 2019; Yıldırım, 2019). The focus of these studies was mostly to examine the literacy levels of educators in K-12 and higher education curricula. However, there is a scarcity of research in the existing literature that specifically examine the notion of curriculum literacy within the context of "adult education".

Curriculum literacy and adult education

Okçabol (2009) defines adult education as the engagement of adults in activities specifically designed for their learning process. Adult education requires a "learner-centered" structure for both curriculum and curriculum implementation (Knowles, 1984). Due to their intrinsic qualities, it is crucial to prioritize the adult learner and place them at the core of the learning process. This approach should serve as the primary framework for organizing education, as stated by Knowles (1984). The adult education curriculum can utilize various approaches and models that specifically target adult characteristics, such as Thorndike's Adult Learning Approach, Knowles' Andragogy Model, and Cross' Response Chain Model.

Additionally, there are models like McClusky's Life Situation Model and Knox's Competence Model, which closely resemble real-life situations faced by adults. Furthermore, there are approaches like Freire's Consciousness Raising Approach and Mezirow's Transformation of Perspectives Approach, which aim to elevate adult awareness (Güneş & Deveci, 2022).

Furthermore, adult education curricula should be flexible, adaptable to available resources, new situations, and needs, with significant responsibilities for those who assume the role of "trainer" in adult education (Duman, 2007). During the process of implementation of curriculum, individuals who assume the role of "trainer" in adult education bear significant duties. Hence, it is crucial to investigate the competencies of adult educators as learning is an essential aspect of life that goes beyond formal education and persists throughout one's lifespan (Okçabol, 2009). Moreover, the teaching methods provided to adults within a structured framework hold significant societal significance. Considering all these factors, it can be stated that trainers in adult education must have an acceptable degree of proficiency in curricular literacy.

While implementing the curriculum, it is important to consider various elements, including the educator's competence, the quantity and characteristics of the participants, their expectations and interests, goals, and instructional objectives (Okçabol, 2006). The trainer's proficiency, level of literacy in the curriculum, and skills in teaching are also crucial during the curriculum implementation process. One of the skills required is the trainer's ability to use educational technology effectively.

Curriculum literacy and technology integration

Educational technology is *"the ethical study and application of theory, research, and practices to advance knowledge, improve learning and performance, and empower learners through strategic design, management, implementation, and evaluation of learning experiences and environments using appropriate processes and resources"* (AECT, 2023). It involves the utilization of technological tools throughout various stages of the educational process, including planning, developing, producing, presenting, and assessing education (Özkul & Girginer, 2002). Teachers must possess proficiency in utilizing suitable technologies to achieve learning outcomes, possess the knowledge to enhance the learning environment through technological tools, and be able to identify the relevant technologies and their potential to fulfill student requirements (Koehler & Mishra, 2009).

Enhancing educators' knowledge and skills in the realm of digital technologies is essential for effectively utilizing their benefits in educational settings. For educators to integrate digital technologies successfully and effectively into the teaching and learning process, it is essential that they possess the skills and knowledge needed. Additionally, they should have a proficient command of the subject of instruction (Fidan & Yeleğen, 2022). Several research have been conducted to examine the impact of curriculum literacy on instructional practices along with additional variables spanning different educational levels. Some of these studies include publications by Aslan (2019), Avar Vayvay (2020), Berkant et al. (2023), Dağ (2021), Kahraman (2020), Ozudogru (2022), Süral & Dedebali (2018), and Yar Yıldırım (2021). However, any of these studies did not investigate the relationship between trainers' competence in curricular literacy and their integration of digital technology in education.

Research questions

According to the reviewed literature, curriculum literacy is an important trainer competency that deserves research. Simultaneously, the ability to integrate digital technologies into education, which is a critical requirement in today's world, is an undeniable competency. These competencies are also critical for trainers working in adult education because they guide the learning process based on specific program requirements.

The 2016 UNESCO report "Recommendation on Adult Learning and Education" highlighted the importance of improving the quality of adult education. This can be achieved by improving the content and presentation formats of the subjects, assessing the specific needs of learners, acquiring a range of competencies and knowledge, professionalizing educators, enhancing learning environments, and ultimately empowering individuals and communities. However, there continues to be a lack of well-qualified adult trainers, and frequently, educational institutions are insufficient for providing training before and throughout employment (UNESCO, 2016).

Two other important factors in achieving the targeted quality in adult education are the program literacy skills of trainers and their competencies in utilizing digital technology. This research addressed the quality of adult trainers from the perspective of these two factors. Both program literacy and using digital technologies in education are skills acquired during formal teacher training. Despite their professional experience, the trainers in institutions often lack formal teacher training. We deemed it worthwhile to investigate the impact of the trainers' prior "Instructional Design/Curriculum Development" and pedagogical formation training on these two skills. Furthermore, we reexamined and questioned the literature's findings of a positive relationship between teachers' pedagogical competencies and their motivation to access digital technologies in adult education. We also explored the impact of the professional experience factor on the associated skills.

Therefore, this study addressed the gap in the literature by examining curriculum literacy and digital technology usage levels in adult education, taking into account various variables, and exploring the relationship between these two.

Therefore, this study addressed the gap in the literature by examining curriculum literacy and digital technology usage levels in adult education, considering various variables below, and exploring the relationship between these two. The questions identified to fulfill this objective are as follows:

(1) What are the trainers' perceived levels of Curriculum Literacy (CL) and Digital Technology Use in Education (DTUE)?
(2) Do the following variables influence the trainers' perceived CL and DTUE levels:
    (a) years of professional experience in adult education.
    (b) having prior pedagogical formation education,
    (c) having taken instructional design or curriculum development courses before?
(3) Is there a significant correlation between adult trainers' perceived DTUE and CL levels?

Method

Research Model

We used a descriptive correlational survey research design to define and examine the relationships between adult education trainers' perceived DTUE and CL levels, as well as to identify the impact of significant factors related to these levels. Survey models, as defined by Karasar (2000), aim to describe the past or current situation without any intervention. Researchers use this model to quantitatively describe the population's tendencies, attitudes, or opinions through the sample (Creswell, 2017).

Participants

The study's entire population consists of 1204 trainers, with 24% male and 76% female. These trainers work in various branches at the Institute Istanbul ISMEK adult education centers located in 35 districts of Istanbul throughout the 2022-2023 academic year. Institute Istanbul ISMEK is an institution that operates under the General Directorate of Lifelong Learning of the Ministry of National Education and serves adult learners as an institution affiliated to the metropolitan municipality of Istanbul.

We preferred the convenience sampling method to reach as many study participants as possible. To achieve this, we distributed the data collection tools online to 1204 trainers, representing the entire population, using their corporate e-mails provided by Institute Istanbul ISMEK. The study included the data collected from a total of 628 trainers who volunteered to participate. Table 1 presents the distribution of participants based on their demographic characteristics.

Table 1. Demographic Characteristics of the Trainers Participating in the Study

Characteristics	Groups	f	%
Gender	Female	536	85.4
	Male	92	14.6
Age	21-30 years old	48	7.6
	31-40 years old	244	38.9
	41-50 years old	242	38.5
	51-60 years old	80	12.7
	60+ years old	14	2.2
Professional experience	1-5 years	77	12.3
	6-10 years	182	29.0
	11-15 years	138	22.0
	16-20 years	163	26.0
	20+ years	68	10.8
Training areas	Vocational and Technical Education	286	45.5
	Personal Development Trainings	101	16.1
	Fine Arts Education	57	9.1
	Handicrafts and Crafts Education	184	29.3
Education level	High school	123	19.6
	Two-year degree	107	17.0
	Undergraduate level	330	52.5
	Graduate and postgraduate	68	10.8
Prior pedagogical formation	Faculty of Education	111	17.7
	Certificate of pedagogical formation	193	30.7

	N/A	324	51.6
Taking instructional design / curriculum development course	During bachelor's / master's degree	331	52.7
	Through in-service training	155	24.7
	Never taken	142	22.6
	Total	628	100

Table 1 shows that the 628 trainers who participated in the study ranged in age from 24 to 68, with an average age of 41.7. The highest range of professional experience is between 6 and 10 years, with 29%. Out of all the participants, the majority of trainers, specifically 330 individuals, held a bachelor's degree. This group constituted 52.5% of the total participants. Over half of the trainers (51.6%) lacked any previous pedagogical formation training.

Data Collection Tools

The researchers created the "Personal Information Form" to collect demographic information about the participants within the study's scope. We used Bolat's (2017) "Curriculum Literacy Scale" to gauge the trainers' perceptions of their curriculum literacy levels. A study conducted by Aytekin, Erik, and Yılmaz (2023) introduced the "Scale of Digital Technology Use in Education" as a tool for assessing the extent to which participants utilize digital technology in educational settings. We electronically implemented the data collection tools and sent the necessary links to the entire population via the institution's official e-mail account. The Ethics Committee of the university conducting the research and the institution collecting the data provided the necessary approvals and permissions prior to data collection. The data gathering relied on individuals volunteering to participate.

Personal Information Form

The researchers created an online personal information form to gather details about the trainers' gender, field of study, professional experience, and academic background.

Curriculum Literacy Scale (CLS)

Bolat (2017) developed the "Curriculum Literacy Scale" to determine trainers' perceptions of curriculum literacy levels. The scale includes a total of 29 items under the sub-dimensions of "reading" (15 items) and "writing" (14 items). The scale contains no negative items, and the participants can achieve a minimum score of 29 and a maximum score of 145. The original scale's two factors explain 43.54 of the total variances. The original Cronbach-Alpha reliability coefficients are 0.88 for the reading dimension, 0.90 for the writing dimension, and 0.94 for the overall scale. Current study calculated Cronbach-Alpha reliability coefficients of 0.96, 0.97, and 0.97 for the factors of the scale and the entire scale, respectively. These values show that the scale is reliable (Büyüköztürk, 2018). The Pearson correlation analysis shows that there is a high correlation between the two factors of the scale ($r = .820$, $p<.000$).

The items are scored in five-point Likert format, and the interpretation of the scores obtained from the scale is as follows: 1.00-1.80: "strongly disagree";1.81-2.60: "slightly agree"; 2.61-3.40: "moderately agree"; 3.41-4.20: "strongly agree"; and 4.21-5.00: "strongly agree".

Digital Technology Use in Education (DTUE) Scale

To determine the level of trainers' use of digital technology in education, we applied Aytekin et al.'s (2023) "Scale of Digital Technology Use in Education" to the sample. The

scale includes a total of 22 items under the sub-dimensions "Creating Alternative Learning Environments" (9 items), Assessment and Evaluation (4 items), Professional Development (4 items), and Creating Interactive and Dynamic Content (4 items). There are no negative statements in the scale. The scale has a minimum score of 22 and a maximum score of 110 for participants. The four factors in the scale explain 71.72% of the total variance. In the original study, the Cronbach-Alpha reliability coefficient for the factors "active participation and alternative learning environments" was 0.94, "assessment and evaluation" was 0.90, "professional development" was 0.83, "interactive and dynamic content" was 0.89, and overall was 0.95. The present study calculated the Cronbach-Alpha reliability coefficient to be 0.94, 0.91, 0.87, and 0.90 for the factors of the scale, and 0.96 for the total score. These values indicate a high level of reliability for the scale (Büyüköztürk, 2018). The Pearson correlation analysis shows that there is a high level of relationship between the dimensions of the scale, ranging from 0.789 to 0.666.

The items are scored in five-point Likert format, and the interpretation of the scores obtained from the scale is as follows: 1.00-1.80: "never"; 1.81-2.60: "rarely"; 2.61-3.40: "sometimes"; 3.41-4.20: "frequently"; and 4.21-5.00: "always".

Data Analysis

To address the research questions, we conducted correlational and MANOVA analyses on the data collected through data collection tools. We employed percentage, frequency, normality, and multiple normality analyses prior to the correlational amd MANOVA analyses.

The study used both two-way and multivariate two-way analysis of variance (MANOVA). MANOVA is a technique used to investigate the effect of two dependent variables on more than one independent variable (Kalaycı, 2009). Since the MANOVA test handles independent variables at the same time, it controls the possibility of making a type one error (Stevens, 1996). We employed Levene's test to confirm the homogeneity of group variance, a crucial assumption for the MANOVA test, and Box's M statistic to confirm the assumption of covariance equality. We examined the linear correlation between the dependent variables, which is another essential need for MANOVA. Furthermore, Mahalanobis distance values were computed to detect any anomalies in the dataset, and a single data point that significantly deviated from multiple normal distributions was removed from the dataset. Additionally, we employed scatter diagrams to examine the relationships between the dependent variables and found that each one had a linear relationship with the others. The analyses were conducted using the SPSS 25 statistical tool, with a confidence interval of 0.95.

Findings

The following section presents the findings based on the research questions:

Findings related to the first research question

To address the first study question, we computed the mean, standard deviation, median, variance, standard deviation, minimum and maximum values, as well as the range of the scores obtained from the CL and DTUE scales. As a result, we attempted to determine the trainers' CL and DTUE levels, as well as their respective factors, and Tables 2 and 3 present the results.

Table 2. Descriptive values of the scores obtained from the CL scale

	Reading Factor	Writing Factor	Total Score
Mean	4.596	4.485	4.538
Median	4.786	4.600	4.656
Variance	0.192	0.255	0.204
Std. Deviation	0.438	0.505	0.451
Minimum	3.00	2.13	3.00
Maximum	5.00	5.00	5.00
Range	2.00	2.87	2.00

The findings in Table 2 show that the trainers' responses to the items in the curriculum literacy scale aligned with to the 'strongly agree' option for both the overall mean ($\overline{X}$ =4.538) and the reading ($\overline{X}$ =4.596) and writing ($\overline{X}$ =4.485) factors. In other words, trainers' self-perceptions about their curriculum literacy levels are very high.

Table 3. Descriptive values of the scores obtained from the DTUE scale

	F1	F2	F3	F4	Total Score
Mean	3.642	2.371	3.891	3.717	3.473
Median	3.778	2.00	4.00	4.000	3.591
Variance	0.974	1.616	0.961	1.160	0.856
Std. Deviation	0.987	1.271	0.980	1.077	0.925
Minimum	1.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00
Range	4.00	4.00	4.00	4.00	4.00

F1: Creating Alternative Learning Environments; F2: Assessment and Evaluation; F3: Professional Development; F4: Creating Interactive and Dynamic Content

The data presented in Table 3 indicates that the participants' responses for the first factor 'Creating Alternative Learning Environments' were 'frequently' ($\overline{X}$ =3.642), for the second factor 'Assessment and Evaluation' were 'rarely' ($\overline{X}$ =2.371), for the third factor 'Professional Development' were 'frequently' ($\overline{X}$ =3.891), and for the fourth factor 'Creating Interactive and Dynamic Content' were 'frequently' ($\overline{X}$ =3.717). Based on the average scores received from the scale, trainers report using digital technologies 'often' ($\overline{X}$ =3.473) in their courses. These findings suggest that trainers' perceptions of their level of digital technology use are quite high.

Findings related to the second research question

The study employed a multivariate two-way MANOVA as the chosen test to address the second research issue. Table 4 displays the descriptive statistics of the trainers' CL and DTUE scores utilized in the MANOVA analysis, based on the independent variables.

Table 4. Descriptive statistics of the trainers' CL and DTUE scores

Variable	Score	Groups	Mean	Std. Deviation	N
Professional Experience	**CL**	1-5 years	4.518	0.450	77
		6-10 years	4.536	0.448	182
		11-15 years	4.578	0.453	138
		16-20 years	4.512	0.458	163
		21 year and above	4.545	0.453	68
	DTUE	1-5 years	3.770	0.726	77
		6-10 years	3.551	0.894	182
		11-15 years	3.560	0.985	138
		16-20 years	3.267	0.929	163
		21 year and above	3.249	0.947	68
Prior pedagogical formation	**CL**	No prior formation	4.476	0.452	324
		Prior formation	4.605	0.443	304
	DTUE	No prior formation	3.255	0.935	324
		Prior formation	3.706	0.857	304
Taking Instructional Design/ Curriculum Development Course	**CL**	Never taken	4.398	0.43402	142
		During bachelor's / master's degree	4.618	0.42996	331
		Through in-service training	4.497	0.47715	155
	DTUE	Never taken	3.078	0.87305	142
		During bachelor's / master's degree	3.740	0.83808	331
		Through in-service training	3.267	0.97088	155

According to the findings in Table 4, trainers with 1–5 years of professional experience have the highest mean score on the DTUE scale, while trainers with 11–15 years of professional experience have the highest mean score on the CL scale. In other words, while junior trainers use more digital technology, they do not have the same advantage in CL. Analyzing the table based on prior pedagogical formation reveals that trainers with prior pedagogical formation have higher CL and DTUE scores than the average scores of trainers without such formation. The mean scores of the group of trainers who had previously taken an instructional design or curriculum development course at the undergraduate or graduate level or through a private institution were the highest among the groups.

We used Levene's test to ensure the equality of variance for the dependent variables, thereby testing the applicability of the MANOVA test. Levene's test results were found as CL total score (Levene Statistic = 1.368, p >.05) and DTUE (Levene Statistic = 1.367, p >.05). The data obtained provide evidence supporting the equality of variances, with a p-value greater than 0.05 (Büyüköztürk, 2018; Can, 2016).

In addition, to examine the homogeneity of variance and covariance matrices, "Box's M Test" was applied according to the independent variables of "having taken instructional design or curriculum development courses before", "having prior pedagogical formation education", and "years of professional experience in adult education". The evaluation of the test result (Box's M=89.191, p>.05) indicated that the homogeneity of variance and covariance matrices was confirmed (p>.05) (Büyüköztürk, 2018; Can, 2016). Wilk's lambda was employed as the MANOVA test statistic because the assumptions were met.

An essential assumption in MANOVA is that there must be a linear correlation between the dependent variables (Büyüköztürk, 2018). Examining the scatter diagram between the CL and DTUE scale scores revealed a linear relationship. We calculated the correlation strength between the dependent variables in the study to control multicollinearity and found the

correlation coefficient to be.307 (Pallant, 2020). According to Pallant (2020), when the correlation coefficient exceeds .80 or .90, the presence of multicollinearity is accepted, and this assumption is considered violated. The found value led to the conclusion that there was no multicollinearity issue between the dependent variables.

After ensuring that the required assumptions were met, we conducted a two-way MANOVA to examine whether there were any differences in the trainers' CL and DTUE levels based on the specified variables. Table 5 presents variance analyses results of trainers' CL and DTUE scores.

Table 5. Analysis of variance results of trainers' CL and DTUE scores

Effect	λ	F	Hypothesis df	Error df	p	η^2
Intercept	0.019	15109.656	2.000	598.000	0.000	0.981
Professional Experience	0.986	1.071	8.000	1196.000	0.381	0.007
Prior pedagogical formation	0.987	3.874	2.000	598.000	0.021	0.013
Taking Instructional Design/ Curriculum Development Course	0.963	5.707	4.000	1196.000	0.000	0.019

The MANOVA results in Table 5 reveal that there is no significant difference in the scale scores of the trainers based on their professional experience (λ=.98; F=1.071; p>.005). However, there is a significant difference in the scale scores among the groups based on the prior pedagogical formation variable (λ=.98; F=3.874; p<.005). Similarly, the findings indicate a significant statistical difference between the groups based on the variable of Taking Instructional Design/ Curriculum Development Course (λ=.96; F=5.707b; p<.001).

Table 6 presents the analysis of the relevant table's findings to determine which score type groups showed a significant difference.

Table 5. MANOVA findings based on CL and DTUE scores of groups

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Professional experience	CL score	0.532	4	0.133	0.672	0.611	0.004
	DTUE score	3.048	4	0.762	1.027	0.393	0.007
Prior pedagogical formation	CL score	0.201	1	0.201	1.016	0.314	0.002
	DTUE score	5.700	1	5.700	7.679	0.006	0.013
Taking instructional design / curriculum development course	CL score	2.035	2	1.018	5.146	0.006	0.017
	DTUE score	13.618	2	6.809	9.173	0.000	0.030

According to the findings in Table 6, the level of professional experience does not have a statistically significant effect on the trainers' CL and DTUE averages. On the other hand, there is a significant difference in DTUE scores in terms of prior pedagogical formation. Examining Table 4's group means reveals a statistically significant difference between the groups, favoring those with prior educational formation.

Furthermore, both CL and DTUE scores show a statistically significant difference among groups based on previous attendance at instructional design and curriculum development courses. To identify the dependent variable or factors that had a significant impact on the

multivariate outcome, we conducted the Tukey test (Tukey, 1949). This test was chosen since the variances were evenly distributed. After analyzing the findings, we identified the parameters that showed significant differences, which are presented in Table 7.

Table 6. Tukey HSD test findings

Dependent Variable	(I) Taking Instructional Design/ Curriculum Development Course	(J) Taking Instructional Design/ Curriculum Development Course	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
CL score	Never taken	During bachelor's / master's degree, etc.	-0.220*	0.045	0.000	-0.325	-0.115
		Through In-Service Training	-0.099	0.052	0.136	-0.220	0.023
	During bachelor's / master's degree, etc.	Never taken	0.220*	0.045	0.000	0.115	0.325
		Through In-Service Training	0.121*	0.043	0.014	0.020	0.223
	Through In-Service Training	Never taken	0.099	0.052	0.136	-0.023	0.220
		During bachelor's / master's degree, etc.	-0.121*	0.043	0.014	-0.223	-0.020
DTUE score	Never taken	During bachelor's / master's degree, etc.	-0.662*	0.086	0.000	-0.865	-0.459
		Through In-Service Training	-0.189	0.100	0.142	-0.425	0.046
	During bachelor's / master's degree, etc.	Never taken	0.662*	0.086	0.000	0.459	0.865
		Through In-Service Training	0.4723*	.084	0.000	0.2753	0.669
	Through In-Service Training	Never taken	0.1894	0.101	0.142	-0.046	0.425
		During bachelor's / master's degree, etc.	-0.4723*	0.084	0.000	-0.669	-0.275

** $p<0.05$*

When Table 7 is examined, it is seen that there is a significant difference ($p<0.05$) between the mean scores of the trainers on both CL and DTUE scales between the trainers who have taken any instructional technology or material development course during their bachelor's/master's degree and the trainers who have taken it through private courses, etc., or have never taken it. The findings in Table 4 show that this difference is in favor of trainers who completed instructional design or curriculum development courses as part of their bachelor's or master's degrees. However, there is no statistically significant difference between the CL and DTUE scores of the trainers who received this training through in-service training and the trainers who did not receive any training.

Findings related to the third research question

The third research problem of the study asked, "Is there a significant correlation between adult trainers' perceived CL and DTUE levels?" Table 8 presents the results of the Pearson correlation analysis, which calculated the relationship between the CL and DTUE scores.

Table 7. Pearson Correlation Analysis Results to Determine the Relationship Between CL Scores and DTUE Scores

	CL scores	DTUE scores
CL scores	1	0.307**
DTUE scores	0.307**	1

***Correlation is significant at the 0.01 level (2-tailed)*

When Table 8 is examined, it is seen that there is a statistically positive, significant and weak relationship between trainers' perceptions of CL and DTUE at p<.01 level (r=.307, N=628, p=0.00). Accordingly, as the trainers' perceptions of CL level increase, their perceptions of DTUE level also increase.

Discussion and conclusion

Discussion on the first research question

The analyses conducted for the first study question indicate that trainers in adult education have a considerably higher perception of their CL levels. The results of the factor analysis indicate that the trainers had a little higher perception of their competence in the 'reading' dimension compared to the 'writing' dimension. To put it simply, the study participants believe they are skilled in curriculum literacy, but they feel more at ease when it comes to "reading" those curriculums. The study's findings are consistent with the conclusions drawn by other research groups in the literature regarding curriculum literacy (Aslan, 2018; Aslan, 2019; Çetinkaya & Tabak, 2019; Dağ, 2021; Demir & Toraman, 2021; Erdem & Eğmir, 2018; Gömleksiz & Erdem, 2018; Güngör Demir, 2023; Kuyubaşıoğlu, 2019; Keskin, 2020; Sarıca, 2021; Sarıgöz & Bolat, 2018; Süral & Dedebali, 2018; Şınego & Çakmak, 2021).

In the 'reading' dimension of curriculum literacy, analyzing and interpretation skills related to the previously structured elements of the curriculum come to the fore. On the other hand, the 'writing' dimension requires skills such as designing learning materials, developing measurement tools, writing new learning outcomes, and designing learning-teaching processes in accordance with methods and techniques (Erdem & Eğmir, 2018). This perspective suggests that the writing dimension necessitates more advanced skills compared to the reading dimension, which explains the current study's findings.

The current study also found that adult education trainers' perceptions of their level of digital use for educational purposes were quite high. Table 2's findings reveal that trainers 'frequently' use digital tools in education. In the literature, there are similar studies reporting that trainers generally consider themselves "sufficient" in integrating information and communication technologies into the educational process (Orhan & Tekin, 2019; Öçal, 2017; Şad & Nalçacı, 2015). One possible cause of this situation could be the mandatory in-service training that participants in the current study received from the institution they worked for during the COVID-19 pandemic. During this mandatory distance education period, trainers were trained on digital tools and environments such as Google Classroom and Canva, which yielded positive results.

Examining the averages of the scale factors reveals that adult education trainers' perceptions of their level of digital use for educational purposes vary depending on the purpose. The study found that trainers 'frequently' used digital technologies for creating alternative learning

environments, professional development, and creating interactive and dynamic content. The related factor's mean, on the other hand, shows that trainers use digital technologies 'rarely' for ‘assessment and evaluation’. This emphasizes the importance of providing trainers with digital technology training, particularly in the field of assessment and evaluation.

Discussion on the second research question

According to the results of the analyses conducted in line with the second research question, the difference between trainers' perceptions of perceived CL and DTUE levels is not statistically significant for the professional experience variable. In other words, the trainers' time in the profession does not predict their perceived CL and DTUE levels.

The results of the study, along with those of Aslan (2018), Erdamar (2020), Kahramanoğlu (2019), Keskin (2020), and Śınego and Çakmak (2021), show that teachers' levels of CL do not change based on how long they have been teaching. However, the literature presents some contradictory results regarding the study's professional experience variable. For example, Dağ (2021) found that the curriculum literacy levels of teachers with 1–5 years of professional seniority were lower than those of teachers with 11–15 and 16–20 years of professional seniority. Similarly, Barut and Gündoğdu (2023) found that the curriculum literacy scores of teachers with 1-5 years and 6-10 years of professional experience were lower than those of teachers with more professional experience.

Existing studies in the literature have similar findings to the current study about trainers' perceived DTUE levels. Çelikkaya and Köşker (2023), Orhan and Tekin (2019), Turgut and Başarmak (2019), and Yontar (2019) all did research that showed differences in teacher age and experience didn't have a big impact on things like how often students used technology, how well they knew how to use technology, and how often they used technology. Conversely, a single study revealed that younger teachers had more willingness to access digital technology, and better pedagogical competences compared to older teachers (Alkış Küçükaydın, 2022).

These findings suggest that the trainers' seniority in teaching does not determine their curriculum literacy and digital technology usage levels, but rather the training they receive in this area. This finding indirectly emphasizes the importance of providing trainers with in-service training. In other words, it suggests that not having spent years in the profession but having received training can be effective in developing both skills.

In fact, the trainers who lacked prior formal pedagogical training had significantly lower CL and DTUE scores compared to the trainers who had either graduated from the Faculty of Education or obtained a pedagogical formation certificate. The statistically significant difference between trainers who lack experience in instructional technology or curriculum development courses and those who have completed such courses as part of their bachelor's or master's degree further reinforces the previous finding.

These findings suggest that courses such as instructional design or curriculum development, which will improve teachers' knowledge and skills in making sense of and interpreting educational programs, will contribute positively to teachers' curriculum literacy levels. In fact, Güngör Demir's study from 2023, which examined the CL levels of pre-service teachers, revealed that students' perceptions of CL rise with their grade level. In other words, as pre-service teachers take more courses in educational sciences, their perceptions of program literacy increase. Erdem and Eğmir (2018) also found that the curriculum literacy levels of

pre-service teachers differed significantly in favor of those who were more successful according to their academic achievement. Similarly, Sarıgöz and Bolat (2018) found a statistically significant difference in the curriculum literacy scores of pre-service teachers as their grade levels increased.

However, in the current study, there was no statistically significant difference between the CL and DTUE scores of the trainers who had previously received this training during in-service training. This indicates a need to carefully examine the qualifications of the participants, as well as the content and quality of the studies conducted during in-service training. In this regard, one could argue that prior formal pedagogy training is a determining factor. For instance, Sarıca's (2021) study reveals a significant difference in the CL levels of teachers, favoring the group that underwent in-service training on curriculum development. Similarly, Erdamar's (2020) study revealed a significant difference in the curriculum literacy perception levels between classroom teachers who had previously received in-service training on curriculum development and those who had not. In both studies, the participants had prior pedagogical formation, and their CL skills improved with the in-service training they received.

Discussion on the third research question

The third research question revealed a statistically significant but weak relationship between trainers' perceptions of CL and DTUE at the p.01 level. While no previous literature has explored the relationship between adult educators' proficiency in curriculum literacy and their use of digital technology in education, this study focuses on this question as its main theme. The current study found a positive relationship between curriculum literacy and trainers' perceptions of digital technology usage in adult education, as predicted.

On the other hand, studies in the literature have examined the relationship between curriculum literacy levels and various variables at different levels of education, finding a significant positive relationship between them: Süral & Dedebali (2018) found statistically significant correlations between educators' curriculum literacy levels and their information literacy levels. Additionally, there were correlations between the curriculum literacy levels of educators' and innovativeness (Kahraman, 2020), motivation to teach (Dağ, 2021), commitment to the curriculum (Yılmaz & Kahramanoğlu, 2021), epistemological beliefs (Yar Yıldırım, 2021), reflective thinking (Barut & Gündoğdu, 2023), and critical thinking (Berkant & Mansuroğlu, 2023).

After a thorough analysis of these studies, it becomes evident that multiple factors are associated with curricular literacy, which is a critical competency for educators. In addition to these elements, we can incorporate the effective integration of technology into education, which is an essential ability for educators in the 21st century. From this perspective, practitioners need to properly comprehend the curriculum, apply it to the learning needs, and effectively integrate digital technology. These aspects interact and are not distinct procedures.

The study observed that trainers who were not graduates of the faculty of education or lacked pedagogical training had lower curriculum literacy levels and use of digital technology in education compared to those with formation knowledge. To enhance their qualifications and effectiveness, the institutions where adult education trainers work should eliminate any deficiencies in pedagogical formation. In this context, the in-service training they receive, particularly in the fields of instructional design and curriculum development, will enhance both their curriculum literacy levels and their level of technology use in education.

The finding that trainers feel themselves more inadequate in the "writing" dimension of curriculum literacy can be considered a needs analysis study for in-service training programs. These programs can be designed to specifically address the skills required in the "writing" dimension of curriculum literacy, and educators can be given opportunities to practice and improve in this area.

Additionally, the survey reveals that educators rarely employ digital tools for assessment and evaluation in the field of education. Based on the study, adult education institutions should arrange in-service training to enhance the proficiency of their trainers in this area. Finally, we suggest carrying out comparable research in diverse adult education institutions in Turkey as well as in other countries.

Declarations

Acknowledgments: *This article is based on the first author's master's thesis, written under the supervision of the second author.*
Funding: *This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.*
Ethics Statements: *This study received approval from the Yildiz Technical University, Social and Human Sciences Research Ethics Committee on January 12, 2022.*
Conflict of Interest: *Authors have no conflict of interest.*
Informed Consent: *All individuals in the study voluntarily participated in data collection, and they were informed that they could withdraw at any time. Consent was obtained from all participants.*
Data availability: *Data available on request from the authors.*

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