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Classification of e-learning styles in online learning environment

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Highlights

- Determining the learning styles of learners in an organization will facilitate training.
- Differences in e-learning styles were found.
- Online training programs should be designed based on learners' e-learning styles.

Abstract

Institutions have tended to provide online training and in-service training by using today's technologies due to the increasing number of employees and the increase in the number of in-service trainings to be given. While the number of trainings held in online environments is increasing day by day, it has gained importance to help learners learn and understand their e-learning styles to organize online learning environments according to their learning styles. The purpose of this research is to investigate the e-learning styles of employees who receive in-service training in corporate companies in online learning environment. The e-learning styles of the employees in this research investigated by gender, generation, education level, occupational experience period, occupational class, occupational lane, e-learning experience duration, and education category they have experienced. The data for the research were collected by the survey method. To determine the e-learning styles of the employees, the e-Learning Styles Questionnaire was applied. Data were collected by e-mail, and 2.796 people participated in the survey. Differences in e-learning styles were found in a sample of 2.796 people according to the variables of gender, generation, education level, occupational experience period, occupational class, occupational lane, e-learning experience duration, and education category they have experienced. As a result of this research, in order to create more learner-centered education environment, it is important to consider learners' e-learning styles. Also, establishing online training and development activities that appeal to the target audience or various learning styles by evaluating the learner profile in educational environments will serve the purpose of improving the competencies of the employees.

Article Info: Research Article

Keywords: *Learning styles, online learning, competency based learning*

1. Introduction

It is important that in-service trainings provided by organizations for employees are appropriate for employees and supportive of learning for the time and cost spent by companies to pay off. Organizations can only provide better learning by getting to know their employees and their individual differences better. Learning styles are one of the individual differences thus it is important to determine the learning styles of employees to support their learning and development by getting to know them better.

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Determining the learning styles of employees will help to improve the quality of instructional designs and help employees learn better.

Learning styles refer to theories that take into account people's differences in learning, one of the individual differences. Most of the theories are of the view that people can be classified according to their learning styles. The common point of the theories is that individuals have differences in learning styles (Willingham, et al., 2015). Individualized learning style was introduced in the 1970s (Coffield et al., 2004). Theories and models of learning styles start with Carl Jung's Theory of Personality Types (1971). Carl Jung (1971) stated that personality traits are important in the formation of learning styles.

The concept of learning style was introduced by Rita Dunn in the 1960s (Dinçol et al., 2011). Later, many researchers conducted research on learning styles. Dunn & Dunn (1979) defined learning style as the way learners process, assimilate, and recall academic information. Keffe (1982) defined learning style as cognitive, affective, and psychological behaviors that show how learners perceive their environment in the learning environment, the way they interact in this environment, and their reactions at the end. Kolb (1984) defined learning style as the way learners prefer in the process of receiving and processing information. Gregorc (1985) defined learning style as distinctive behaviors that show how an individual learns and how he/she adapts what he/she learns to the environment. McCarthy (1987) defined learning style as the preferences used by an individual in perceiving and processing information. Grasha (1996) defines learning style as a person's ability to combine his/her abilities and learning experiences in the process of acquiring knowledge. According to Dunn and Dunn (1993), learning style is the way of receiving, processing, and assimilating information, which starts with the individual's concentration on new and difficult information. Learning style can be defined as the distinctive characteristics and preferences of individuals in the way they receive and process information (Felder & Brent, 2005; Hsieh et al., 2011). In summary, learning style can be expressed as the way(s) individuals prefer in the learning process (Coffield et al., 2004; Tomlinson, 2001). Research shows that learners learn more easily, effectively, and permanently in educational environments suitable for their learning styles (Şimşek, 2022; Tulbure, 2010; Hargadon, 2010; Rogers, 2009).

Competency-based learning is an educational approach that focuses on the learner's demonstration of the desired learning outcomes in the learning process. The main purpose of competency trainings is to ensure the continuous development of individuals in accordance with their duties and responsibilities. It is aimed that the knowledge, practice, and experience gained from trainings are reflected in the performance of individuals. The competencies of employees in the field of business are largely learned in working life, and there is a view that these competencies can be continuously developed through training (Acar, 1999). The most important feature of competence is that it is measurable and observable.

Through training activities, employees' low-performing competencies can be improved, and their strong competencies can be polished. While determining competency-based training needs, questions such as "What are the strongest competencies of the person?", "What does the person do best?", "What does the person need to do?", "What are the aspects that the person does at the basic level but can improve?" are sought to be answered.

Almost every organization applying the competency-based training model has its own competency development model and training sets developed in line with its own needs and requirements. Since the online trainings analyzed in the study consisted of the trainings experienced by ASELSAN Inc. employees, the training categories in the competency development model of the organization were taken as the basis. ASELSAN Inc. is a company of Turkish Armed Forces Foundation and there are more than 10.000 employees in the organization. The organization has corporate academy in it and the corporate academy aims to develop employees' competencies according to its' competency development model. The competency development model is divided into three main categories: technical, core, and leadership competencies. The figure below shows the core, leadership, and technical competencies and the scope of the trainings designed for these competencies.

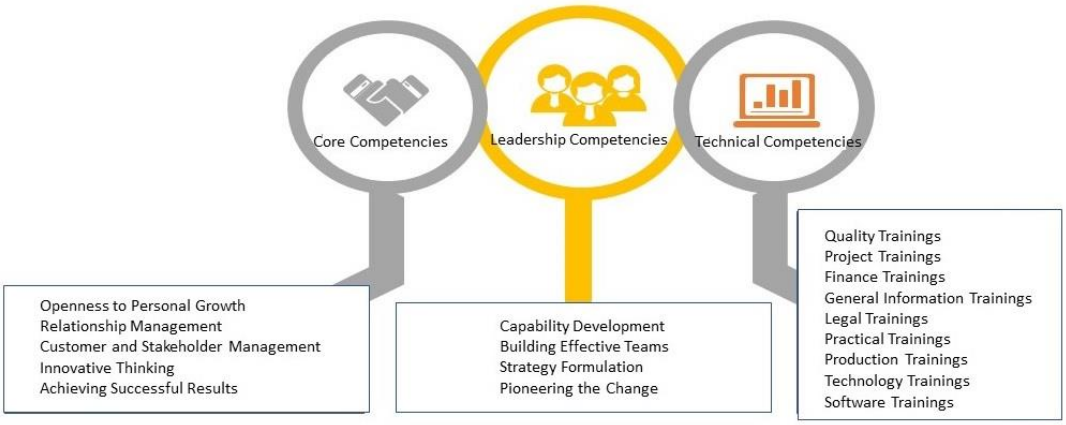

Fig. 1. ASELSAN Inc. competency development model

There are many studies on learning styles and learning preferences in traditional learning environments (Heidrich, et al., 2018; Knight, 2016; Seyal & Rahman, 2015; Cela, Sicilia & Sánchez-Alonso, 2015; Halili et al., 2014; Mansor & Ismail, 2012; Bernier, 2009). In this study, it was aimed to use the "e-Learning Styles Scale" (Gülbahar & Alper, 2014) to reveal learning styles in online learning environments. The research is important for determining e-learning styles and providing guidance in e-learning applications. There are limited studies examining e-learning styles by using this scale (Dikmen, 2020; Ergün & Kurnaz, 2019; Kuru, 2018; Şentürk & Ciğerci, 2018). It is believed that this research will contribute to the literature since there is limited research on determining e-learning styles in the literature.

This study aims to examine the e-learning styles of employees according to the variables of gender, generation, duration of professional experience, professional class (white collar/blue collar), professional category, duration of e-learning experience, and the category of online training they have experienced. In this context, the following question was sought to be answered: Do the e-learning styles of the employees show a significant difference according to the variables of gender, generation, education level, professional experience duration, professional class, professional category, e-learning experience duration, and online education category they have experienced?

2. Methodology

2.1. Research Model/Design

This research aims to determine the learning styles of employees who participate in competency-based online training in corporate academies and classify and examine their learning styles with various variables. This study is descriptive in nature. General survey model was used in the research. General survey model is a form of survey conducted on a sample or samples taken from the whole population or a group of samples to make a general judgment about the population (Karasar, 2005: 79). The study aims to describe the subject as it is in its normal state. It does not attempt to change or influence individuals in any way (Karasar, 2005).

2.2. Data Collecting Tools

In order to determine the e-learning styles of employees, the e-Learning Styles Questionnaire (developed by Gülbahar and Alper, 2014) was sent to all employees via email to collect data. Demographic information of the participants and data related to their learning experiences were obtained from the company's database. The learning experiences of the employees were limited to competency-based trainings completed in 2021.

The e-Learning Styles Scale developed by Gülbahar and Alper (2014) was used in the study. This scale, aiming to reveal the learning styles of learners in online learning environments, consists of seven dimensions in total. The scale consists of 38 items and seven sub-factors. These factors are determined as independent learning, social learning, visual-auditory learning, active learning, verbal learning, logical

learning, and intuitive learning. The analysis results of the "e-Learning Styles Scale", which was developed within the scope of this study and underwent validity and reliability analyses, are as follows: the reliability analysis conducted during the development stage of the scale resulted in a Cronbach's Alpha coefficient of .94 for the entire scale. The Cronbach's Alpha coefficients of the sub-dimensions during the preparation of the scale were found to be as follows: visual-auditory learning .86, verbal learning .86, active learning .83, social learning .87, independent learning .82, logical learning .77, and intuitive learning .72.

2.3. Sampling or Study Group

The population of the study consists of adults who receive in-service trainings in corporate companies through online platforms. In the study, the purposive sampling method, one of the non-random sampling methods, was used, and typical sampling method was employed within the scope of purposive sampling methods. The sample was limited to the employees (9.198 people). A total of 2.815 people participated in the study from the sample. In the analyses, 19 outliers were identified therefore excluded from the analyses. The data of 2.796 individuals were evaluated in the analyses.

2.4. Data Analysis

Data analysis was performed using the SPSS v22 program. Arithmetic mean, standard deviation, MANOVA, post hoc test, ANOVA, and clustering analysis methods were utilized in the data analysis. MANOVA, post hoc test, and K-Means clustering analysis were employed in the analysis of the collected data. One-way ANOVA test was applied to test the validity.

2.5. Reliability

The reliability of the e-learning styles scale used was measured, and the scale was found to have high reliability (38 items; $\alpha = .85$).

2.6. Findings

The e-learning styles of the employees show differences according to gender, F (7, 2788) = 35.66, p = .00, η^2 =.08. While Active Learning, Visual-Auditory Learning, and Logical Learning styles exhibit statistically significant differences according to gender; Independent Learning, Social Learning, Verbal Learning, and Intuitive Learning styles do not show statistically significant differences according to gender. See Table-1 for details.

Table 1
Relationship between e-Learning and Gender

E-Learning Styles	**Gender**	***M***	***SS***	***MANOVA***
Active Learning	Female	3.36	.67	F (1, 2794) = 114.75, p = .00*, η^2 = .04
	Male	3.02	.69	
Independent Learning	Female	3.85	.53	F (1, 2794) = .10, p = .76
	Male	3.86	.54	
Visual-Auditory Learning	Female	4.00	.41	F (1, 2794) = 9.9, p =.00*, η^2 = .00
	Male	4.06	.44	
Logical Learning	Female	3.72	.79	F (1, 2794) = 25.47, p =.00*, η^2 = .01
	Male	3.90	.76	
Social Learning	Female	3.65	.64	F (1, 2794) = .84, p =.36
	Male	3.68	.68	
Verbal Learning	Female	3.42	.52	F (1, 2794) = .05, p =.82
	Male	3.41	.55	
Intuitive Learning	Female	3.02	.62	F (1, 2794) = 2.29, p =.13
	Male	3.07	.67	

Note: Female = 585, Male = 2211, *significantly different at $p < .05$

Although there are many studies that show that there are significant differences in learning styles according to gender, there are also studies that show the opposite of these findings. In the studies, while Özdemir and Kesten (2012); Gencel (2006); Kılıç and Karadeniz (2004); Elban (2018); Alemdağ and

Öncü (2015); Brown (2013) and Jones and others (2003) found that there is no statistically significant difference in learning styles according to gender, White (1994); Ergür (1998); Heffler (2001); Karamustafaoğlu and others (2016); Bakır and Mete (2014); Sidekli and Akdoğdu (2018); Eymir, (2011); Baneshi, Dehghan and Mokhterpour (2014) ve Mahiroğlu (1999) found that there is a statistically significant difference in learning styles according to gender. This may be due to the fact that the research was conducted on people of different ages, education levels, educational backgrounds and cultures. Although learning style differs according to individuals, it also differs according to age, gender, culture and level of achievement (Özer, 2001).

The e-learning styles of the employees show differences according to generation, F (21, 8364) = 11.74, p = .00, η^2 =.03. With the exception of Verbal Learning (p > .05), Active Learning, Independent Learning, Visual-Auditory Learning, Logical Learning, Social Learning, and Intuitive Learning styles show statistically significant differences according to generation (p < .05). See Table-2 for details.

Table 2
Relationship between e-Learning and Generation

E-Learning Styles	**Generation**	***M***	***SS***	***MANOVA***
Active Learning	Gen X^{A}	2.84	.67	F (3, 2792) = 41.96, p = .00*, η^2 = .04
	Gen Y^{B}	3.13	.67	
	Gen Z^{C}	3.28	.73	
Independent Learning	Gen X^{A}	3.81	.53	F (3, 2792) = 6.36, p = .00*, η^2 = .01
	Gen Y^{A}	3.85	.53	
	Gen Z^{BC}	3.94	.55	
Visual-Auditory Learning	Gen X^{A}	3.97	.41	F (3, 2792) = 16.04, p = .00*, η^2 = .02
	Gen Y^{B}	4.05	.43	
	Gen Z^{C}	4.15	.46	
Logical Learning	Gen X^{A}	3.64	.79	F (3, 2792) = 28.13, p = .00*, η^2 = .03
	Gen Y^{B}	3.87	.76	
	Gen Z^{C}	4.10	.75	
Social Learning	Gen X^{A}	3.55	.64	F (3, 2792) = 13.60, p = .00*, η^2 = .02
	Gen Y^{B}	3.67	.67	
	Gen Z^{C}	3.82	.69	
Verbal Learning	Gen X	3.44	.51	F (3, 2792) = 1.79, p = .15
	Gen Y	3.40	.54	
	Gen Z	3.45	.62	
Intuitive Learning	Gen X^{A}	3.01	.61	F (3, 2792) = 6.80, p = .00*, η^2 = .007
	Gen Y^{A}	3.05	.65	
	Gen Z^{B}	3.17	.74	

Note: Gen X = 549, Gen Y = 1788, Gen Z = 445, * significantly different at p < .05
^{ABC} There is no meaningful difference among the same letters.

Generations were evaluated in three categories within the scope of the research: Those born in 1946-1964, Generation X; Born in 1965-1980, Generation Y; 1981-1996, Generation Z; 1997-2012 (Beresford, 2022). When the literature is examined, there are studies stating that there is a significant difference between learning style and age variable. Özdemir and Kesten (2012); Merter (2009); Ural and Esmer (2017) observed that there are significant differences between learning styles and age variable. The results of the research also support the previous studies.The e-learning styles of the employees differ according to educational level with statistically significant differences found (F (28, 11152) = 12.82, p = .00, $\eta 2$ =.03). Except for Visual Auditory Learning and Verbal Learning (p > .05), Active Learning, Independent Learning, Logical Learning, Social Learning, and Intuitive Learning styles show statistically significant differences according to educational level (p < .05). See Table-3 for details.

Table 3
Relationship between e-Learning and Educational Level

E-Learning Styles	Educational Level	*M*	*SS*	*MANOVA*
Active Learning	High School^{A}	2.99	.72	F (4, 2791) = 3.77, p = .01*, η^2 = .01
	Undergraduate^{BC}	3.12	.71	
	Graduate^{ABC}	3.07	.65	
Independent Learning	High School^{A}	3.82	.56	F (4, 2791) = 6.30, p = .00*, η^2 = .01
	Undergraduate^{A}	3.84	.54	
	Graduate^{A}	3.87	.49	
Visual-Auditory Learning	High School	4.04	.48	F (4, 2791) = 1.78, p = .13
	Undergraduate	4.06	.44	
	Graduate	4.03	.38	
Logical Learning	High School^{A}	3.41	.87	F (4, 2791) = 6.30, p = .00*, η^2 = .01
	Undergraduate^{B}	3.89	.75	
	Graduate^{C}	3.98	.68	
Social Learning	High School^{A}	3.81	.65	F (4, 2791) = 13.26, p = .00*, η^2 = .02
	Undergraduate^{B}	3.69	.68	
	Graduate^{C}	3.54	.65	
Verbal Learning	High School	3.41	.60	F (4, 2791) = 1.60, p = .17
	Undergraduate	3.40	.56	
	Graduate	3.42	.48	
Intuitive Learning	High School^{A}	3.23	.71	F (4, 2791) = 12.06, p = .00*, η^2 = .017
	Undergraduate^{B}	3.07	.67	
	Graduate^{C}	2.96	.57	

Note: High School = 352, Undergraduate = 1578, Graduate = 768, * significantly different at $p < .05$. ^{ABC} There is no meaningful difference among the same letters.

The e-learning styles of the employees also differ according to professional experience with statistically significant differences found (F (35, 13940) = 7.88, p = .00, η^2 =.02.). Except for Verbal Learning (p > .05), Active Learning, Independent Learning, Visual Auditory Learning, Logical Learning, Social Learning, and Intuitive Learning styles show statistically significant differences according to professional experience (p < .05). See Table-4 for details.

Table 4
Relationship between e-Learning and Professional Experience

E-Learning Styles	Professional	*M*	*SS*	*MANOVA*
Active Learning	<= 3 year^{A}	3.23	.68	F (5, 2790) = 22.25, p = .00*, η^2 = .04
	4 – 7 year^{A}	3.21	.70	
	8 – 11 year^{ABC}	3.10	.65	
	12 – 15 year^{BCD}	3.03	.69	
	16 – 19 year^{CD}	2.93	.65	
	20+ year^{D}	2,87	.71	
Independent Learning	<= 3 year^{A}	3.92	.54	F (5, 2790) = 4.28, p = .00*, η^2 = .01
	4 – 7 year^{AB}	3.89	.53	
	8 – 11 year^{B}	3.79	.53	
	12 – 15 year^{AB}	3.81	.52	
	16 – 19 year^{AB}	3.5	.54	
	20+ year^{AB}	3.83	.53	
Visual-Auditory Learning	<= 3 year^{A}	4.13	.44	F (5, 2790) = 11.10, p = .00*, η^2 = .02
	4 – 7 year^{AB}	4.08	.43	
	8 – 11 year^{BC}	4.04	.43	
	12 – 15 year^{ABC}	4.04	.43	
	16 – 19 year^{C}	3.96	.40	
	20+ year^{C}	3.96	.42	
Logical Learning	<= 3 year^{A}	4.12	.72	F (5, 2790) = 24.62, p = .00*, η^2 = .04
	4 – 7 year^{B}	3.91	.76	
	8 – 11 year^{BD}	3.78	.76	
	12 – 15 year^{B}	3.80	.76	
	16 – 19 year^{B}	3.86	.78	
	20+ year^{D}	3.62	.77	
Social Learning	<= 3 year^{A}	3.78	.69	F (5, 2790) = 8.50, p = .00*, η^2 = .015
	4 – 7 year^{AB}	3.73	.67	
	8 – 11 year^{ABCD}	3.67	.65	
	12 – 15 year^{BCD}	3.61	.67	
	16 – 19 year^{CD}	3.56	.69	
	20+ year^{D}	3.57	.65	
Verbal Learning	<= 3 year	3.44	.57	F (5, 2790) = 2.23, p = .05
	4 – 7 year	3.42	.57	
	8 – 11 year	3.35	.54	
	12 – 15 year	3.39	.54	
	16 – 19 year	3.39	.50	
	20+ year	3.45	.53	
Intuitive Learning	<= 3 year^{ABCD}	3.10	.68	F (5, 2790) = 3.53, p = .003*, η^2 = .006
	4 – 7 year^{B}	3.12	.70	
	8 – 11 year^{C}	3.00	.61	
	12 – 15 year^{ABCD}	3.03	.62	
	16 – 19 year^{D}	2.98	.63	
	20+ year^{ABCD}	3.04	.63	

Note: 0 – 3 years = 545, 4 – 7 years = 712, 8 – 11 years = 486, 12 – 15 years = 348, 16 – 19 years = 228, 20+ years = 477, * significantly different at $p < .05$. ^{ABCD} There is no meaningful difference among the same letters.

The e-learning styles of the employees differ according to professional class with statistically significant differences found (F (7, 2788) = 85.45, p = .00, η^2 =.18). Except for Active Learning and Independent Learning (p > .05), Visual Auditory Learning, Logical Learning, Social Learning, Verbal Learning, and Intuitive Learning styles show statistically significant differences according to professional class (p < .05). See Table-5 for details.

Table 5
Relationship between e-Learning and Professional Class

E-Learning Styles	Professional	*M*	*SS*	*MANOVA*
Active Learning	Blue Collar	3.06	.72	F (1, 2794) = 3.39, p = .70
	White Collar	3.10	.68	
Independent Learning	Blue Collar	3.84	.56	F (1, 2794) = .62, p = .43
	White Collar	3.86	.52	
Visual-Auditory Learning	Blue Collar	4.08	.47	F (1, 2794) = 9.06, p = .00*, η^2 = .003
	White Collar	4.03	.41	
Logical Learning	Blue Collar	3.57	.81	F (1, 2794) = 207.97, p = .00*, η^2 = .07
	White Collar	4.00	.71	
Social Learning	Blue Collar	3.87	.66	F (1, 2794) = 126.58, p = .00*, η^2 = .04
	White Collar	3.58	.66	
Verbal Learning	Blue Collar	3.45	.58	F (1, 2794) = 7.19, p = .01*, η^2 = .003
	White Collar	3.39	.53	
Intuitive Learning	Blue Collar	3.24	.71	F (1, 2794) = 7.19, p = .00*, η^2 = .035
	White Collar	2.97	.61	

Note: Blue Collar = 919, White Collar = 1877, * significantly different at $p < .05$

The e-learning styles of the employees also differ according to professional category, with statistically significant differences found (F (35, 13940) = 26.78, p = .00, η^2 =.056). Except for Independent Learning (p > .05), Active Learning, Visual Auditory Learning, Logical Learning, Social Learning, Verbal Learning, and Intuitive Learning styles show statistically significant differences according to professional category (p < .05). See Table-6 for details.

Table 6
Relationship between e-Learning and Professional Category

E-Learning Styles	Professional	*M*	*SS*	*MANOVA*
Active Learning	Administrative^{A}	3.29	.64	F (5, 2790) = 7.5, p = .00*, η^2 = .01
	Engineering^{B}	3.10	.67	
	Technicians^{BC}	3.06	.72	
	Management^{D}	2.78	.67	
Independent Learning	Administrative	3.80	.54	F (5, 2790) = 1.81, p = .11
	Engineering	3.87	.52	
	Technicians	3.85	.56	
	Management	3.75	.48	
Visual-Auditory Learning	Administrative^{A}	3.94	.39	F (5, 2790) = 5.39, p = .00*, η^2 = .01
	Engineering^{BC}	4.05	.41	
	Technicians^{C}	4.08	.47	
	Management^{A}	3.93	.38	
Logical Learning	Administrative^{A}	3.46	.78	F (5, 2790) = 83.15, p = .00*, η^2 = .13
	Engineering^{BD}	4.09	.65	
	Technicians^{AC}	3.58	.81	
	Management^{D}	3.86	.76	
Social Learning	Administrative^{AB}	3.59	.69	F (5, 2790) = 25.94, p = .00*, η^2 = .04
	Engineering^{ABC}	3.57	.66	
	Technicians^{D}	3.88	.65	
	Management^{B}	3.58	.60	
Verbal Learning	Administrative^{A}	3.52	.52	F (5, 2790) = 4.62, p = .00*, η^2 = .008
	Engineering^{B}	3.37	.53	
	Technicians^{C}	3.46	.59	
	Management^{ABC}	3.45	.47	
Intuitive Learning	Administrative^{AB}	3.08	.57	F (5, 2790) = 22.34, p = .00*, η^2 = .039
	Engineering^{B}	2.96	.61	
	Technicians^{C}	3.24	.71	
	Management^{B}	2.98	.57	

Note: Administrative = 162, Engineering = 1566, Technicians = 867, Management = 92, * significantly different at $p < .05$. ^{ABCD} There is no meaningful difference among the same letters.

The e-learning styles of the employees differ according to the duration of training experience with statistically significant differences found (F (21, 8364) = 2.18, p = .004, η^2 =.005). While Verbal Learning, Independent Learning, Social Learning, and Intuitive Learning styles show statistically significant differences according to the duration of training experience (p < .05), Active Learning, Visual

Auditory Learning, and Logical Learning styles do not show statistically significant differences according to the duration of training experience ($p > .05$). See Table-7 for details.

Table 7
Relationship between e-Learning and Duration of Training Experince

E-Learning Styles	Duration of	*M*	*SS*	*MANOVA*
Active Learning	<= 1 hr	3.11	.73	F (3, 2792) = 2.15, p = .91
	1 – 10 hrs	3.08	.70	
	11 – 50 hrs	3.15	.66	
Independent Learning	<= 1 hr^{A}	3.93	.54	F (3, 2792) = 3.18, p = .02*, η^2 = .001
	1 – 10 hrs^{B}	3.84	.53	
	11 – 50 hrs^{B}	3.83	.52	
Visual-Auditory Learning	<= 1 hr	4.06	.47	F (3, 2792) = .48, p = .70
	1 – 10 hrs	4.04	.43	
	11 – 50 hrs	4.06	.42	
Logical Learning	<= 1 hr	3.85	.78	F (3, 2792) = .74, p = .53
	1 – 10 hrs	3.86	.78	
	11 – 50 hrs	3.88	.74	
Social Learning	<= 1 hr^{A}	3.76	.67	F (3, 2792) = 4.00, p = .01*, η^2 = .004
	1 – 10 hrs^{B}	3.65	.68	
	11 – 50 hrs^{AB}	3.70	.62	
Verbal Learning	<= 1 hr^{A}	3.47	.56	F (3, 2792) = 3.19, p = .02, η^2 = .003
	1 – 10 hrs^{B}	3.39	.54	
	11 – 50 hrs^{AB}	3.45	.57	
Intuitive Learning	<= 1 hr^{A}	3.13	.71	F (3, 2792) = 2.88, p = .035, η^2 = .003
	1 – 10 hrs^{B}	3.04	.64	
	11 – 50 hrs^{AB}	3.09	.68	

Note: <= 1 hr = 397, 1 – 10 hrs = 1957, 11 – 50 = 419, * significantly different at $p < .05$. ^{ABCD} There is no meaningful difference among the same letters.

Within the scope of in-service training at the organization, competency-based trainings have been clustered into 6 different subgroups using K-means clustering analysis. Training categories have been clustered based on the duration of training experiences and learning styles. See Table-8 for details.

Table 8
Category of Online Training and Clusters

Category of Training	Clusters
Achieving Successful Results Strategy Formulation	Cluster 1
Pioneering the Change Customer and Stakeholder Management Quality Trainings	Cluster 2
Relationship Management Innovative Thinking Openness to Personal Growth Project Trainings	Cluster 3
Finance Trainings	Cluster 4
Building Effective Teams General Information Trainings Legal Trainings Practical Trainings Production Trainings Capability Development	Cluster 5
Technology Trainings Software Trainings	Cluster 6

One-way ANOVA was performed for clustering analysis validation. According to the results of clustering analysis, the e-learning styles of the employees show statistically significant differences among the online training categories belonging to 6 different clusters. See Table-9 for details.

Table 9
K-means Clustering Analysis Validation

	Clusters (mean *M*)						
E-Learning Styles	**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Cluster 5**	**Cluster 6**	**ANOVA**
Active Learning	-1.04	1.21	.80	-.34	-.29	-1.33	F (5, 12) = 8.42, p = .001*
Independent Learning	-.85	-.10	.35	2.19	-.65	1.14	F (5, 12) = 5.57, p = .007*
Visual-Auditory Learning	-.69	1.74	.01	-1.40	-.41	-.01	F (5, 12) = 7.85, p = .002*
Logical Learning	.22	.61	1.16	.47	-.92	-.92	F (5, 12) = 9.49, p = .001*
Social Learning	-1.15	1.90	-.22	-1.01	-.13	-.37	F (5, 12) = 18.69, p = .00*
Verbal Learning	.42	1.08	-.70	2.42	-.50	-.34	F (5, 12) = 9.07, p = .001*
Intuitive Learning	-1.15	-.73	-.39	-1.14	.80	1.18	F (5, 12) = 4.74, p = .013*
Duration of Training	1.67	-.62	.18	1.50	-.60	-.04	F (5, 12) = 5.95, p = .01*

Note: * significantly different at $p < .05$

The findings of this study on the e-learning styles of the employees according to the variables of the education level, professional experience, professional class, professional category, online training experience period and the online training category they have experienced could not be compared with other studies because there is no research about those variables in the scope of e-learning styles . For this reason, the findings obtained from this research will contribute positively to reducing this gap in the literature regarding the e-learning styles of employees. Future studies with different variables will also contribute to the literature due to the limited number of studies on e-learning styles in the literature.

3. Conclusion and Suggestions

Each individual has their own unique learning style. Considering the individual differences of employees who receive training within the scope of core, leadership, and technical competencies in organizations, this research evaluated e-learning styles in terms of different variables. Differences in e-learning styles were found according to gender, generation, educational level, professional experience, professional class, professional category, and the duration of training experience variables among the sample of 2.796 individuals. The online competency-based trainings that the sample experienced throughout 2021 were categorized into 6 different clusters. Within these categorized clusters, also e-learning styles were found significantly different.

The research findings indicate the differences in e-learning styles among employees. Based on this information, it is important to consider the differences in e-learning styles of employees from different gender, generation, educational level, professional experience, professional class, and professional category backgrounds. It is possible to increase the value of the human resources in an organization by improving the competencies of employees (Schultz, 2021). This is important for the positive progression of the output of work within the organization. The development of employees' competencies is made

possible through the implementation of training and development activities within the organization. This research highlights the necessity of creating employee-centered learning environments by considering the learning styles of employees to enhance the quality of training and development activities in organizations. When designing online training programs, it is important to evaluate the learner profile in learning environments and develop online training and development activities that cater to the target audience or various learning styles (Pilli and Admiraal, 2017; Jaggars and Xu, 2016). This will serve the purpose of enhancing employees' competencies.

Online training programs should be designed based on employees' e-learning styles, and these programs should specifically target or cater to different learning styles. Online training programs should be designed to address active learning, visual-auditory learning, logical learning, independent learning, social learning, verbal learning, and intuitive learning styles. It is important to take into account learner's learning style when designing learning environment (Entwistle, 1981; Chick, 2019; Akkoyunlu & Soylu, 2008; Quitadamo & Brown, 2001; Moallem, 2007). Beside this, before the implementation of training, factors such as gender, generation, education level, years of experience, professional class, professional career paths, duration of online training experience, and the categories of online training experienced should be examined for employees participating in online training programs, and class distributions should be determined considering these variables. Also, in order to improve the quality of learning process, trainers should be informed about learners characteristics and learning style (Felder & Silverman, 1988, Fleming, 1995; Honey & Mumford, 1986). Information about employees' learning styles should be shared with trainers. Trainers should be informed about which learning styles are strong and the needs to consider these characteristics. It is also important for the learner to recognize herself/himself in the learning processes (Cook, 1991; Bhagat, Vyas & Singh, 2015; Vincent & Ross, 2001). Employees' e-learning styles should be identified through practical applications, and employees should be informed about this information to increase their awareness. It is recommended that employees prefer learning approaches that align with their strong learning styles throughout the learning process.

In the final research question of this study, the difference in learning styles based on the categories of online training experiences of employees was examined. The online competency-based training experiences of employees were grouped into six different clusters using K-means clustering analysis. According to the clustering analysis results, employees' e-learning styles showed statistically significant differences based on the categories of online training. It is anticipated that the dominant training category preferred by trainees can be identified based on their online training experiences. It is also believed that the dominant learning styles can be understood based on the training categories that trainees predominantly prefer. In future studies, it is recommended to focus on understanding the learning styles based on the training category that trainees predominantly prefer. As a result of these future studies, the online training categories that trainees heavily opt for can be monitored in learning management systems, and personalized recommendations for training can be provided to trainees based on their strong learning styles.

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