THE RELATIONSHIPS BETWEEN COGNITIVE STYLE OF FIELD DEPENDENCE AND LEARNER VARIABLES IN E-LEARNING INSTRUCTION

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ABSTRACT

This study examines the relationships between cognitive styles of field dependent learners with their attitudes towards e-learning (distance education) and instructional behavior in e-learning instruction. The Group Embedded Figures Test (GEFT) and the attitude survey (for students' preferences) towards e-learning instruction as distance education was administered to 157 students enrolled in various distance education programs at Fatih University, in Turkey. The study findings indicated that students' cognitive style of field dependence was correlated with their attitudes and preferences for students' roles in e-learning for distance education. Other factors such as a previous background in e-learning, including gender, educational level, use of social networks, and e-learning tools, and preferences for instructional variables and assessment in distance learning processes were also used.

Finally, technological, motivational, and instructional-learning variables in learner interface design (LID) for e-learning instruction were correlated with students' learning outcomes, attitudes, perceptions and preferences in learner interface design (LID) and attitudes toward e-learning instruction. At the end of the study, research questions were tested and instructional variables for distance education were indicated in tables. The findings were then assessed to see if they supported previous research or not and considered to future expectations for distance education and learner interface design (LID) procedures with field dependence learners.

Keywords: Field dependence, instructional variables, e-learning attitudes, learner interface design variables.

INTRODUCTION

Recent technological advances in instructional technology and learning have paved the way for new learning strategies in instructional design processes. These strategies lead to instructional environments by providing many enabling materials that satisfy learners' and instructors' needs in the fields of instructional design and technology (IDT) and integrated e-learning. Integrated e-learning as a new approach includes technology, organization and pedagogy. That is, it applies all technologies to develop courseware and e-learning materials for distance education.

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At the same time, it provides vital contributions to all educational environments. Recently, the term e-learning was defined as a vital learning technique in the field of IDT to provide contributions within different working locations and learning environments (Reiser & Dempsey, 2012).

As a part of computer-based instruction, new concepts of multimedia and e-learning instruction are also used as tutorials, drill-practice, simulation, animation, games, tests and others. All of them have been designed for the online instruction of learners who have different learning environments, network systems and cognitive styles (Alessi & Trollip, 2001; Ipek, 2010, 2011).

Advanced network systems and new e-learning tools have brought about a revolutionary change in education by allowing alternative new learning methods for distance education learners around the world (Oh & Lim, 2005). This kind of instructional development in instructional technology has produced many benefits for both learners and organizations in several ways. They are new skills required of 21st century teachers and students to develop e-learning materials in education. There are several types of e-learning technique which can be used for different purposes, that is, the range of e-learning types can be extended from face to face class teaching to mobile or U-learning for distance education (Allen, 2006, 2011; Dempsey & Van Eck, 2012; Piskurich, 2009). Therefore, the e-learning design process requires digital skills for learners and teachers, including communication, effective design, critical thinking and problem solving, creativity and invention, global awareness, information and technology literacy, self-direction, and collaboration. These skills are important for the teaching and learning process in the digital age of computers. These skills are also defined as digital skills for e-learning design for teachers as well as learners. Learners as individuals take advantage of self-paced learning spaces or locations in which they have control over their pace of learning activities or distance education (Jung, 2001).

For learning and teaching, cognitive styles may be vital for learning from visuals and computer screens such as e-learning tools and multimedia learning. Each learner has different perceptions, attitudes, preferences and learning strategies and cognitive styles. Cognitive style levels can be defined as field dependent (FD), field neutral (FN) and field independent (FI). Cognitive style of field dependence indicates different perceptions, information processing, retrieving, perceiving information, and knowledge levels for learners in e-learning process as well. The cognitive style of field dependence is a continuum that includes FD, FN and FI levels for each dependency (Goodenough & Witkin, 1977; Witkin, & Goodenough, 1981; Witkin, Moore, Goodenough & Cox 1977).

Cognitive styles have historically referred to a psychological dimension representing consistencies in an individual's manner of cognitive and information processing (Kozhevnikov, 2007).

As learning variables, e-learning environment, cognitive styles, instructional materials and their design variables can be vital for designing effective distance education processes, that is, learner characteristics based on cognitive styles require efficient learner interface design (LID) procedures in e-learning instruction. For this purpose, instructional designers and developers should be aware of learner attitudes, preferences and perceptions for using e-learning technologies in developing instructional materials for their distance education environments.

Today, there are new approaches for designing courses and using technologies to make learning activities effective, efficient and more active. Educators and designers should have all information about learner characteristics. These characteristics can be defined as perceptions, learning styles and attitudes in addition to their abilities for using technology in e-learning. Designers should use both instructional approaches and technological power in order to develop effective instructional materials for learners and teachers. From this perspective, instructional and pedagogical strategies are very important concepts for learning, but visual design effects and how users learn from audio-visuals materials are also important variables for e-learning process.

In e-learning structure, both instructional design and learner interface design (LID) are necessary subjects for creating successful e-learning design, that is, visual design and learning strategies should be used as effectively and efficiently as well as selected learning strategies by using new technologies. To do this, designers and educators should develop a link between cognitive styles and e-learning variables. And they should also struggle to cope up with disadvantages of technologies for using high quality e-learning materials.

In this process, organizations develop high quality materials to provide e-learning conditions and performance supporting e-learning tools in distance education with learner interface design principles, including psychological, instructional and technological variables in e-learning design with learners' cognitive style of field dependence. This paper includes three parts:

> ➢ a review of basic dimensions of cognitive styles of FD – FI,
> ➢ major characteristics of cognitive styles and e-learning instruction for distance education,
> ➢ students' attitudes and preferences toward LID for cognitive style of FD.

THE PURPOSE OF THE STUDY

The purpose of this study was to examine the relationship between FD learners' attitudes towards distance education and other variables in learning/instructional behavior as they experience e-learning, assessment in e-learning and competencies in LID within an e-learning (distance education) environment. For the current study, research questions were given as follows.

> ➢ What are the relationships between distance education learners' cognitive style of FD and their experience/background with having e-learning program in the distance education program?
> ➢ What are the relationships between distance education learners' cognitive style of FD and their attitudes in e-learning instruction in the distance education program?
> ➢ What are the relationships between distance education learners 'cognitive style of FD and their preference of testing instructional processes in the distance education program?
> ➢ What are the relationships between learners' cognitive style of FD and their attitudes, preferences, and perceptions with LID features in using e-learning instruction?

In the current study, learning and instructional procedures in distance education programs are defined as sensory pathways through which individual learners give, receive, evaluate, organize and store information or data through preferred perception channels, including different methods such as kinesthetic/tactual, auditory and visual ways (Eislzer, 1983). In addition to these channels, field dependent/independent characteristics indicate similar pathways as well (Witkin, et. al., 1977).

A REVIEW OF COGNITIVE STYLES AND DISTANCE LEARNING (E-LEARNING INSTRUCTION) FIELD INDEPENDENCE VERSUS FIELD DEPENDENCE

Cognitive styles have been proposed by Witkin and his colleagues (1962, 1979) for decades and all cognitive styles were also defined as 20 styles by Messick (1976), including their characteristics for receiving, perception and learning contents. One of the most important styles is FD and FI. According to Witkin (1979), field dependence is a continuum which means that each measurement of cognitive style such as field dependence has field dependence (FD), field neutral (FN) and field independence (FI) dimensions. For this reason, the current study depends on the concept of field dependence and deals only with FD. Each FD has all FDI dimensions on its range according to literature as indicated by Witkin (1979) and Messick (1976).

There have been many studies in the past decades since the field dependence-independence approach was first defined by Witkin (1962, 1979). It is indicated that field dependence-independence is value-neutral, that is open-ended, and is characterized as the ability to select important key elements from a disturbing or confusing background. Thus, FD is named as a continuum that presents each cognitive style dimension. Field dependence-independence has important implications for an individual's cognitive behavior and for his/her learning strategies. Specifically, FI learners tend to be more independent in relation to the development of cognitive restructuring skills and less independent in relation to the development of interpersonal communication skills and learning methods. Conversely, FD learners tend to be more independent in relation to the development of high interpersonal communication skills and less independent in relation to the development of cognitive restructuring skills and learning strategies (Liu & Ginther, 1999).

In addition, according to Witkin, et al., (1977), FI learners tend to be intrinsically motivated and enjoy individualized learning in the learning process, while FD ones tend to be extrinsically motivated and enjoy cooperative or collaborative learning (Liu & Ginther, 1999).

Basically, FI learners have analytic, competitive, independent and individualistic characteristics. They have self-defined goals or objectives, learning strategies and different types of reinforcement in education. They also have weak social skills and prefer individual projects. They are well organized and structured in their learning process as well. Conversely, FD learners are more sensitive to learning environments and are easily influenced by the prevailing context. They are team work oriented, global and socially-sensitive and prefer team work projects in their learning process. FD learners, who are less analytical, process information globally. They do not pay much attention to detail and view the perceptual field as a whole (Chan, 2009; Oh & Lim, 2005; Ruttin, 2009; Sealetsa & Moalosi, 2012).

The FD style is also related to some other individual characteristics, such as solving analogical problems, visual-verbal effects and their perceptions. Learners prefer different types of learning processing, such as serial and parallel. Cognitive styles, rather than general abilities, are related to analogical problem solving and analytical procedures as well. FI learners are more likely to be analogical solvers than FD ones. FI learners perform better in parallel processing conditions in learning, while FD ones perform better in serial processing conditions (Liu & Ginther, 1999).

Cognitive Style of Field Dependence/Independence and Distance Education (e-Learning)
Cognitive style has been widely investigated by psychologists and used in research by educators. There are many different ideas and definitions of cognitive style. Cognitive style has often been used interchangeably with learning styles. However, Clanton and Ralston (1978) argued that cognitive style was only one type of learning style. Kefee (1979, 1982), extending this view of cognitive style as a subcategory of learning style, indicated that learning styles have cognitive, affective and physiological traits. Witkin (1979) and Witkin et al. (1971) have accepted that learning styles are a subcategory of cognitive styles. In addition, Kolb's learning style model is one of the most important approaches to presenting cognitive styles (Tennant, 1988). Kolb's approach has been found to be more effective in some teaching activities (Kolb, 1984). Based on the above definitions, cognitive/learning styles refer to the individual's consistent and special trends of perceiving, remembering, organizing, processing, thinking, and problem solving procedures (Liu & Ginther, 1999).

Perception time for each individual involves different characteristics, such as how learners perceive visuals from the text or computer screen and which activities are most important in an event. Both the law of proximity in perception and the law of contiguity in memory indicate that displays and elements which appear close together in space tend to grouped in perception and memory (İpek, 1995, 2001). Display differences can be in terms of time of presentation, in the spatial location within the display, or in the style or format (Fleming, 1989).

Dwyer and Moore (1991) indicated that field dependency is an important variable and that for some types of learning objectives, the process of color coding and instructional materials may reduce achievement differences attributed to differences in cognitive style. They also indicated that FD learners scored significantly higher on the drawing test than FI learners on both the black and white- and color-coded treatments (Dwyer & Moore, 1992, 1994). There was also a relationship between achievement and attitudes based on cognitive styles for computers (Altun & Cakan, 2006). As a result, visuals are very important instructional variables for designing e-learning materials as well as learner interface design (LID) principles, including content, empower and control with context clarity, visuals, challenges and feedback decisions (Allen, 2011).

The visual perception in information processing works based on individual perceptional skills. When learners see the same visuals on the computer screen, web sites, or e-learning instruction as a distance education program, their perceptions of the visuals may be different. The differences among learners are based on cognitive styles, in brief, their learner characteristics and perceptual skills in e-learning instruction or web instruction (İpek, 1995, 2010 and 2011). In addition, Taylor (1960) indicated that "perception is often defined as awareness of objects in the environment" (p.58).

Perception is an interaction between the perceiver and the object perceived. Learners' perceptions are related, selective and organized. Each of these characteristics in perception provides some general guidelines for e-learning designers and developers in distance education as well.

Major tendencies of distance education (DE) include definition, learner characteristics and technology characteristics (Liu & Ginther, 1999). Definition of DE deals with emerging as a viable and vital power in instructional delivery systems in the different learning levels. That is, interpersonal communication is not a natural characteristic of distance education.

Thus, there are different perceptions between teacher and learner and among learners. Distance education integrates several formats such as mass media, audio-visual lessons, social interaction, and technological advances for learners and users. Distance education is also an umbrella for all multimedia learning approaches and e-learning techniques. Thus, DE can be used interchangeably with e-learning instruction in the current study. According to Harper and Kember (1986), the characteristics of distance education for students are basically similar to those of students studying in face-to-face learning environments in schools.

Today, e-learning programs in distance learning require different learning formats to change the traditional face-to-face learning environment by using e-learning design models or integrated e-learning approaches and learner interface design variables (Jochems, Van Merrienboer & Koper, 2005; Waterhouse, 2005).

For this to succeed, learning formats in an e-learning design should be consistent with cognitive style of FD and learning styles. Adaptations of design variables in LID include several steps to be considered by designers and teachers in distance education environments (Allen, 2003, 2011; Liu & Ginther, 1999).

In these learning environments, instructional designers and developers should consider the cognitive style characteristics of all students to engage effective learning. For designing distance learning, there are major roles and meaningful steps or procedures in the educational process. Thus, they are defined as analyzing learners, using instructional design models in e-learning design, and using interface design variables with available technologies for e-learning in distance education (Sözcü, İpek & Kınay, 2013).

The procedures should include connect, empower and orchestrate (CEO) steps with context, challenge, activity and feedback terms (CCAF) for developing effective and efficient e-learning lessons. In addition, students' preferences in e-learning are indicated as learning activities and multimedia formats (Carmona, Castillo & Millan, 2007).

There are also six learning activities (lesson objective, simulation, conceptual map, synthesis, explanation and example) and six multimedia formats (text, image, audio, video, animation and hypertext). Based on this classification, these activities can be used in e-learning instruction with learner interface design features as we used in this work and survey to discover students' perceptions and attitudes. That is, all dimensions of the cognitive style provide attributes with perception, understanding, processing and learning activities in distance education and learner interface design as well.

Hannafin and Hooper (1989) and Jonassen (1989) indicated that an FD learner views information on a computer screen globally and differently. Each learner has different perceptual skills such as attitudes or preferences, attention, organization skills and reading abilities to have information from computer windows as well as e-learning instruction tools (Ipek, 1995). It is important to know how learners in the different cognitive style of FD can be affected from e-learning instruction and LID principles during a distance education experience (Sözcü, et. al., 2013).

As a result, instructional variables in the e-learning process and distance education, such as learners' background, instructional perceptions, attitudes toward assessment and LID variables are very important factors for developing effective, efficient and engaged learning in e-learning instruction.

LEARNER INTERFACE DESIGN (LID) IN LEARNING

Human computer interaction (HCI) is a very important process with learning technologies in education for educators, designers and learners. The process deals with learner characteristics, perceptions, attitudes, knowledge about human purposes, human capabilities, limitations, machine capabilities and limitations to learn content and learning environments as well.

To design and develop an effective e-learning environment, a designer should have e-learning design guidelines, including fast and correct e-learning instruction design skills. One of these guidelines is learner or user interface design technique. User interface design (UID) means dealing with principles in applying technology. However, LID deals with making people think, learn and perform as well (Allen, 2011). That means LID provides ways for designers to create new ideas themselves.

User interface design (UID) is about efficiency, and it does not make people think. Yet LID provides an opportunity for thinking, learning and doing new things while applying rules. For this reason, LID is preferred in the current study.

A successful LID makes learning technology agreeable, effective and fun. The process, in general, also includes connect, empower and orchestrate terms (CEO) and the design process starts with providing learner attention. Learners want to feel empowered and in control. Then well-orchestrated learning events lead to outcomes that make them feel successful. In this case, learner interface design (LID) is challenging.

Learner interface designers need to catch and maintain learners' interest. In brief, they provide interactions for learners who want to think any action for improving ability, reading in performance, learning and matching practice to individual needs (Allen, 2003, 2007).

According to Allen (2011), CEO includes context, challenge, activity and feedback terms (CCAF). All interactive learning events are built from CCAF.

The qualities of CCAF components, which are integrated with each other, are essential for success in learning. LID guidelines include these steps for effective, efficient and engaging e-learning environments, and they should be used for creating distance education materials as well as designing e-learning instruction tools.

Although there have been many research studies conducted into the FD with instructional variables such as screen design in recent decades, limited research has dealt deals with discussing relationships between cognitive styles and hypermedia environments or LID features directly (Ruttun, 2009; Wang & Shen, 2012).

There has not been much research conducted to establish the relationships between FD and LID variables (Sözcü, et al., 2013).

For this reason it is necessary to have new ideas for understanding learners' perceptions, attitudes, and preferences to develop high level e-learning environments with new technologies. Successful e-learning interface designs and their effects on learning and students should provide effective, efficient learning performances.

For this to succeed, LID features should provide opportunities for developing instructional visual design and enhancing learner motivation and learning activities (Allen, 2011; Keller & Suziki, 2004).

The instructional activities should be clear, meaningful and understandable for designers and developers in instructional e-learning processes with learner characteristics.

METHODOLOGY

This study is descriptive research analysis. Descriptive research seeks to characterize a sample of students, teachers, and so forth on one or more variables. For this reason, the study completed and used all steps for having frequencies, means, percentages and correlations between research variables. With this way, survey items were clarified and evaluated to be effectively used for future classes, teachers and designers.

The study also used one-way ANOVA test to evaluate and compare requested research variables based on research design. The units of analysis were categorized as FD, FN, and FI, and other variables such as learners' preferences, attitudes toward e-learning, testing, and LID features.

The cognitive style levels were identified as field independent, field neutral-FN, and field dependent (Dwyer and Moore, 1991, 1992, 1994; İpek, 1995, 2011). Field dependence is demonstrated by achieving scores $(scores < 10(\overline{X} - 0.5\sigma))$ on the group embedded figure test, and field independence is demonstrated by achieving scores (scores $\geq 14(\overline{X} + 0.5\sigma)$). Students achieving scores $(10 \leq scores < 14(\overline{X} + 0.5\sigma))$ were considered to be field-neutral in the study.

Participants
The subjects included in this study were undergraduate students enrolled in courses at Fatih University in the fall semester of 2012.

A total of, 157 college freshman-undergraduate students participated in the study. They were in different programs (see Table 1). Their native language was Turkish, and for the majority English was their second language. Instruction at the university was in English.

Table: 1
Participants' Departments

Department	Frequency	Percent	Male	Female
Justice	35	22.30	7	28
Computer and Instructional Technology	19	12.10	11	8
English Teaching	8	5.10	3	5
Guidance and Psychological Counseling	42	26.80	7	35
Preschool Education	53	33.80	1	52
Total	157	100.00	29	128

Data Gathering

The sampling method used for this study was convenience sampling. In order to gather data, the researcher asked instructors who were teaching distance education courses in various subjects at the university to allow willing students to participate in the study.

The demographic information, including gender, age, access to distance education and participants' educational levels is presented in the findings section of this article. In order to complete the study and identify the students' cognitive styles of FD and perceptions about e-learning in distance education, the Group Embedded Figures Test (GEFT) and an attitude survey were administered to students with the permission of the participants' instructors. After administering the GEFT, the students were assigned to three cognitive style groups (FD, FN, and FI). The students' cognitive style of FD levels were defined as field dependent (FD), field neutral (FN), and field independent (FI) by using one-half standard deviation value for the mean for each learner and other instructional variables.

The students' participation was voluntary, and their perceptions and preferences and confidentialities were secured before administering the research instruments.

Instrumentation

The Group Embedded Figures Test (GEFT). This is a version of the Embedded Figures Test (EFT). It can be used for group administration to measure the FD of students (Goldstein & Blackman, 1978; Witkin et al., 1977). For this study, the GEFT was administered in a 20-minute testing session. The test contains three sections and total 25 items: The first section contains seven simple items, and the second and third sections contain nine items that are more difficult than those in the first section. The reliability coefficient was calculated as ($r = .82$). The validity with criterion variable was found to be in the range of .63 to .82. In this study, the last two sections containing 18 items were used for scoring.

The test takes approximately 20 minutes for a subject to complete. Materials created by the researcher were used to facilitate and examine the performance of students. In the current study, students' attitudes and preferences were defined to present instructional e-learning variables based on their cognitive styles of field dependence and learner interface design guidelines. The variables are related to learner interface design (LID) guidelines and its concepts.

They consisted of connect, empower, orchestrate parts which are covered by context, challenge, feedback and activity design principles for creating an effective, fast and accurate e-learning design.

Student attitudes toward e-learning instruction (distance education) survey. The survey instrument regarding distance learning (containing 55 items) was developed by the researcher. The survey is composed of three sections: (A) students' background and demographic information in e-learning technology, (B) attitudes for instructional variables including preferences and perceptions for learning and assessment in distance learning, and (C) attitudes, perceptions and preferences for LID in e-learning for distance education. The attitude survey except for students' background section was developed using a five-point Likert scale (1=Strongly Disagree, 2=Disagree, 3=Not Sure, 4=Agree, 5=Strongly Agree). Three experienced researchers in the field of instructional design and technology reviewed the instrument to provide enough content validity for each survey item. Each section in the survey contains 10, 22, and 23 items respectively. The responses to the last two sections were analyzed separately by Cronbach's alpha test, and the results yielded a reliability estimate of 0.91 and 0.93, respectively. From now on, A, B and C will be used to indicate the relevant section of the survey. The subsequent numbers for each section will identify the question number in each section. For example, A1 means the first question of section A while B7 means the seventh question of section B.

The first section in the survey presents students' backgrounds, including gender, learning benefits, preference about e-learning experience, using social networks, attitudes towards e-learning for delivery instruction, and attitudes towards types of instructional activities in e-learning. The second section in the survey contains attitudes and perceptions towards e-learning for distance instruction and assessment in e-learning. In the last section, all preferences and perceptions deal with competencies in LID for developing e-learning lessons for distance education as well.

Data Analysis

After getting the responses, the researcher analyzed the answers for each item for both students and teachers. For this purpose, objectives as indicated were reviewed to explain preferences for each item. As a result, except for the beginning parts the survey items are followed by a five–point Likert scale, with the alternatives labeled from 'Strongly disagree (1), to 'Strongly Agree' (5).

Analyzing data was intended to explain main problems and sub research problems. Thus, data analysis was basically completed to clarify those questions in the paper. For data analysis, the students who had experience in e-learning based on their background were analyzed by using descriptive analysis. Pearson's correlation analysis was conducted to determine the correlations among the variables. An independent t-test and ANOVA test were also employed to determine results in detail, depending on the issues and variables to be addressed. Data analysis process also included subject matter experts' values for this work in detail, including successful e-learning interface design considerations. As a result, decisions were made about LID variables based on item responses and students' comments in the survey.

FINDINGS AND RESULTS

Based on GEFT scores (*M =12.36, SD =4.35*), of those 157 students, 40 students (25.47%) were defined as field dependent (FD), 57 (36.31%) as field neutral (FN), and 60 (38.22%) as field independent (FI) learners. In gender, 128 students (81.50%) were female and 29 (18.50%) were male.

Correlations for Variables in the Current Study

Pearson's correlations for all variables in the current study are given in Table 2.

Table 2
Pearson's Correlations Matrix for the Selected Variables

	Variables	1	2	3	4	5	6	7	8	9	10
1	Levels of FDI	1									
2	E-learning techniques	-.053	1								
3	Attitudes about e-learning instruction	.103	-.001	1							
4	Attending distance learning programs before	-.109	.138	.022	1						
5	Locations for accessing distance education programs	.009	.120	-.147	.177*	1					
6	Knowledge levels about e-learning and distance education	.104	-.057	.352**	-.028	.076	1				
7	Assessment in e-learning instruction	.074	.050	.745**	.061	-.075	.263**	1			
8	Knowledge about e-learning instruction	-.001	.057	.393**	.154	-.069	.136	.559**	1		
9	Learner Interface Design features	.096	.062	.469**	.125	-.067	.135	.589**	.783**	1	
10	Prefer reading materials (printed texts) in e-learning	.041	.061	.131	.016	-.048	-.030	.104	.057	.061	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The variables also indicate attitudes, preferences and LID features for the current study as well as experience in e-learning and distance education. The correlation matrix also offers general information to consider relationships between research questions and their variables. As seen in Table: 2, there are statistically meaningful relationships between variables which can be effectively used for designing e-learning materials. And they also indicate how much attitudes are related to having knowledge for e-learning and learner interface design (LID) features (r=.39, and r=.47).

Relationships Between Cognitive Styles And Learner Experience In E-Learning
Eleven questions in the first section looked at students' attitudes related to background features from the distance education and e-learning experience as well as demographic information such as gender, age, educational level and so on. Tables from 3 to 7 shows that e-learning experience for the FD levels was found to be important which explains their interests in distance learning via e-learning.

As a background to e-learning for students, gender, age, educational level, before attending e-learning program, happiness in taking instruction by distance education, accessing e-learning or internet, and following e-learning from where, knowledge level about e-learning, preferred and used social networks, using e-learning tolls, learning styles-formats, and preferred styles for printed texts via distance education were reviewed and their results indicated.

Attitudes of distance education based on cognitive styles and experience in e-learning are also given in Tables 4 and 5 respectively. For instance, the relationships between attitudes in e-learning and experience in e-learning are given in Table 2. There are meaningful correlations between research variables (such as r= .35, r= .26). As a result, cross relationships between instructional variables, such as having experience in e-learning and attitudes were found important in distance education.

Table: 3
Means and Standard Deviations GEFT Scores based on Gender (in item A1)

		N	M	SD	SE
Gender	Female	128	12.31	4.20	0.37
	Male	29	12.59	5.07	0.94

Students' general attitudes towards e-learning and distance education. Questions in the survey such as A1, A2, and A3 deal with presenting general attitudes towards e-learning instruction as distance education. In this part of the survey.

Table: 3 indicates gender distribution and GEFT scores with their means and standard deviations (for example, item A1, *what is your gender?*).

According to the results, the majority of the group is female (128 students, 81.50 %) and these students are 31 FD, (19.70%), 52 FN, (33.10%), and 45 FI, (28.70%), and within the female group 24.20%, 40.60%, 35.20% and within group 77.50%, 91.20 %, and 75.00 %, and total 19.70 %, 33.10 % and 28.70 % respectively. Total male students are 29 (18.50 %) and they are 9 FD (22.50%), 5 FN (8.80%), 15 FI (25.00%) within group, and within male group cognitive styles, 31.00 %, 17.20 %, and 51.70 %, respectively. Distribution of the total group is considered as 40 FD students (25.50%), 57 FN students, (36.30%), and 60 FI students (38.20 %), respectively.

In addition, age as a factor of experience in distance education (A2), the age group between 17 and 22 years represented the majority of students.

Table 4
Demographic Information Representation Based on Cognitive Styles of Learners (items A2, A3, A4, A5, A6, A7, A8)

		FDI groups (N)			Total	%
		FD	FN	FI		FDI-Total
Age (A2)	17-22	38	53	55	146	92.99
	23-25	1	2	3	6	3.82
	25-30	1	2	2	5	3.18
Total		40	57	60	157	100%
Educational level (A3)	Associate degree	19	13	4	36	22.90%
	Undergraduate	21	44	56	121	77.10%
Total		40	57	60	157	100%
Did you attend any distance learning program before? (A4)	Yes	10	14	22	46	29.30%
	No	30	43	38	111	70.70%
Total		40	57	60	157	100%

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Are you happy for attending distance education? (A5)	Yes	22	23	24	69	43.90%
	No	18	34	36	88	56.10%
Total		40	57	60	157	100%
Are you accessing Internet very easily? (A6)	Yes	32	51	50	133	84.70%
	No	8	6	10	24	15.30%
Total		40	57	60	157	100%
Following distance education program from where (A7)	Home	21	33	32	86	54.80%
	Work	0	0	2	2	1.30%
	University	16	19	19	54	34.40%
	Internet cafe	0	0	1	1	.60%
	Other	3	5	6	14	8.90%
Total		40	57	60	157	100%
Knowledge levels about e-learning (A8)	None	6	6	4	16	10.20%
	Poor	11	12	15	38	24.20%
	Moderate	15	23	25	63	40.10%
	Very Good	7	14	14	35	23.30%
	Excellent	1	1	2	4	2.50%
Total		40	56	60	156	99.40%

The age group is presented as 146 students (92.99%), and 38 students FD, 53 students FN, and 55 students FI, respectively (Table 4). Students who are over 30-years old are not considered at Fatih University.

In brief, college students in the traditional age range were indicated as the majority. For educational level of participants (A3), 121 students (77.10%) are calculated as undergraduate and 36 students (22.90%) are calculated as associate degree students in distance education (Table: 4). Table: 4 presents learners' field dependencies based on their demographic information. As an answer to question (A4) asking whether they had attended any distance education program in the past, 46 students (29.30%) indicated that they had taken some distance education courses before participating in the study. Among those 10 (6.40%) were coded as FD, 14 (8.90%) as FN, and 22 (14.00%) as FI (Table 5). Students (111, 70.70%) who had not taken any distance education program prior to the study were categorized as FD (30, 19.10), FN (43, 27.40%), and FI (38, 24.20%). 69 Students (43.90%) in the survey were happy to take distance education and 88 students (56.10%) were unhappy (A5) as shown in Table: 4.

In the survey, the question (A6), "*accessing internet easily* (A6)" was indicated by the majority of students (133 students, 84.70%) as 32 FD (20.40%), 51 FN (32.50%), and 50 FI (31.80%) in cognitive styles (Table: 4).

In addition, the majority of students follow distance education courses from home (86 students, 54.80%) as 21 FD (13.40%), 33 FN (21.00%), 32 FI (20.40%) and university (54 students, 34.40%) as 16 FD (10.20%), 19 FN (12.10%), 19 FI (12.10%), consecutively (item A7, see Table 4).

In item A8 in the survey, students indicated their attitudes. Their level of knowledge in e-learning reflected 63 students (40.40%) as a majority of groups presented their levels as moderate as 15 FD (9.60%), 23 FN (14.70%), and 25 FI (16.00%) students, respectively (Table: 4).For section A, descriptive statistics for 8 items are given in Table 5. The survey items are indicated in tables above respectively. In addition, Table 6 shows that e-learning experience for the field dependence levels is found to be important which explains their interest in distance learning via e-learning. A majority of learners (111 students out of 157) did not have experience in using e-learning tools and distance education program. FI learners have statistically more experience in e-learning than others. There is also a relationship between knowledge levels about e-learning (distance education) and attitudes and other learning variables (Table 2). For instance, the correlation between knowledge levels about e-learning and distance education and attitudes towards assessment in e-learning instruction was given (r= .26) and calculated as significant at the 0.01 level.

Table: 5
Demographic Information Items and Their Statistics (A1-A8)

	Items	A1	A2	A3	A4	A5	A6	A7	A8
N	Valid	157	157	157	157	157	157	157	156
	Missing	0	0	0	0	0	0	0	1
Mean		1.18	1.10	1.77	1.70	1.56	1.15	2.08	2.83
Median		1.00	1.00	2.00	2.00	2.00	1.00	1.00	3.00
Std. Deviation		.39	.40	.42	.46	.50	.361	1.31	.99
Minimum		1.00	1.00	1.00	1.00	1.00	1	1.00	1.00
Maximum		2.00	3.00	2.00	2.00	2.00	2	5.00	5.00

Table: 6
Attitudes of Distance Education Based on Cognitive Styles and Experience in e-Learning

		N		Mean	t	p
FDI groups	FD	10	Yes	7	1.279	.209
		30	No	6.06		
	FN	14	Yes	12.07	.320	.750
		43	No	11.95		
	FI	22	Yes	16.77	.031	.975
		38	No	16.76		
E-learning Experience		46	Yes	13.21	1.591	.114
		111	No	12.00		

As a result, findings related learner experiences and cognitive styles were indicated with t test and percentages. The results indicated differences between learner preferences and attitudes. For this reason, results provided contributions with distance education.Are there significant differences in preferred learning types for e-learning instruction between e-learning students with cognitive style of field dependence?

Based on demographic information from students, learning styles with field dependence are given in Table: 7. These results were found to be consistent with other studies (Oh & Lim, 2005). As a best learning style, read-listen-note was selected by the majority of students (68 students, 43.30%). Other stages were close to Dale's Cone of Experience considerations and theoretical bases in visual learning and instructional design with statistically clear support. As a result, students prefer using read-listen-note learning style in the majority. The preferences are consisted with literature related to audio-visual learning as indicated by Dale.

Table: 7
Frequency Tables of e-Learning Techniques

Modality	FD	FN	FI	Total	Percent
Listen	1	5	3	9	5.70
Read	0	0	1	1	.60
Read-Listen	6	4	10	20	12.70
Listen-Note	8	15	10	33	21
Read-Note	6	9	11	26	16.60
Read-Listen-Note	19	24	25	68	43.30
Total (N)	40	57	60		

What are the relationships between distance education learners' cognitive styles of field dependence and their preference of instructional delivery of written text in e-learning?

Table: 8
Prefer Reading Materials (Printed Texts) in e-Learning

Modality	FD	FN	FI	Total	Percent
On Screen	1	4	2	7	4.50
On paper	26	39	37	102	65
Video & Text	3	7	4	14	8.90
Video & paper & Screen	10	7	17	34	21.70
Total (N)	40	57	60		

According to results in Table: 8, the majority of learners preferred paper reading for distance education with reading materials as expected (102 students, 65%). The result may be related to computer literacy skills and experience in e-learning for distance education.

What are the relationships between distance education learners' cognitive style of field dependence and their attitudes towards learning activities by e-learning instruction for distance education? Students' attitudes for learning and teaching activities towards the use of e-learning courses
In Table: 9 attitudes and perceptions of students for distance education are presented. According to the findings in Table 9, the values between items and learners' evaluations for activities in lessons were very close to each other. Here, 14 survey items were assigned to clarify students' preferences and attitudes for lessons in survey B section. Thus, item B1 (*lesson activities have characteristics to arouse curiosity*) was preferred by most students (80 students, 51%).

Between item B3 and B10, the majority of students' preferences and attitudes was indicated as over 45%. In brief, B3 item (*I have benefited from several information resources to discover problems in class)* was preferred by 99 students (63.10%), who found an important lesson activity in e-learning instruction. Survey items in B section were preferred by students as for item B5 (113 students, 71.90%), item B6 (107 students, 68.20%), B7 (100 students, 63.70%), item B8 (101 students, 64.30%), item B10 (87 students, 55.40%), item B13 (100 students, 63.70%), respectively. Rests of items were, in general, preferred by students in the range of over 45% and less than 50%. With the very high level correlation between survey items (over r= 0.91), these items were supported by learners as meaningful for e-learning activities as learning and active teaching variables in addition to design and assessment processes in distance education lessons. As instructional design variables in e-learning lessons, item B14 and item B15 were preferred by students (77 students, 49.10%, and 74 students, 47.20%) respectively. (*B14, Learning activities help for constructing/designing all problems and solutions I met) and (B15, I found that instructional design approaches for lessons are effective, meaningful and efficient).* Thus, individual learning activities in lessons need an effective, efficient instructional design content for active learning in distance education courses.

Table: 9
Attitudes for Individual Learning Activities and Variables in e-Learning

No	Items	Frequency (A + SA =)	Percentage (%)	Mean	St. Dev.
B1	Lesson activities have characteristics to arouse curiosity	80	51	3.27	1.05
B2	Looking at content related to questions has motivated me in e-learning	75	47.70	3.27	0.92
B3	I have benefited from several information resources to discover problems in class	99	63.10	3.52	1.02
B4	I am attending all lessons to answer questions related to contents in my mind	75	47.80	3.33	0.98
B5	During the teaching process, I find that reading materials suggested are useful.	113	71.90	3.83	0.94
B6	Learning materials are good enough to meet my needs.	107	68.20	3.59	0.93
B7	I am managing my learning process myself	100	63.70	3.61	0.88
B8	My learning speed makes me very happy.	101	64.30	3.59	1.00
B9	I am working at my lessons, because all e-learning materials are very interesting	46	29.30	2.84	1.12
B10	I have experiences produced from class which are used in my work out of the class.	87	55.40	3.41	1.06
B11	I have developed some practical solutions for class problems	71	45.20	3.32	0.93
B13	I have reached all lesson materials in e-learning whenever I want.	100	63.70	3.60	0.89
B14	Learning activities help for constructing/designing all problems and solutions I met	77	49.10	3.47	0.87
B15	I found that instructional design approaches for lessons are effective, meaningful and efficient.	74	47.20	3.31	1.01

Notes: F = frequency, SD = strongly disagree, D = disagree, NI = no idea,
A = agree, SA = strongly agree; STD = standard deviation

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In brief, the results offer new opportunities for designing e-learning materials and include needs assessment strategies for users and designers in their work. The results also consider how much learner expectations are important with learning from e-learning courses.

What are the relationships between distance education learners' cognitive style of field dependence and their preference of testing instructional process in e-learning?
Preferences and attitudes of testing-assessment for instructional process in e-learning
In table: 10 attitudes and perceptions for assessment in e-learning courses for distance education are indicated. According to the findings in table 10, there were equal and very close values between items and learners' evaluations.

Here, 8 survey items were assigned to clarify students' preferences and attitudes for testing procedures in survey part B section.

Thus, item B12 (*new activities in e-learning help answering correctly*) was preferred by the majority of students (95 students, 60.50 %). For the item B21 (*I completed all work and tests on time*), B22 (*I found formative assessment to complete my lack of lessons and results*) items, students' preferences and attitudes were found meaningful at 62% and 56% respectively.

With the very high level correlation between survey items (over 0.91), these items were supported by learners as meaningful for e-learning assessment processes in distance education.

Table: 10
Descriptive Statistics of Attitudes for Assessment
in e-Learning Instruction (Distance Education)

	items	B12	B16	B17	B18	B19	B20	B21	B22
N									
	Valid	157	157	157	157	157	157	157	157
	Missing	0	0	0	0	0	0	0	0
Mean		3.43	3.18	3.27	3.09	2.91	3.08	3.52	3.48
Std. Deviation		0.94	1.17	1.09	1.09	1.08	1.06	1.07	1.01
Minimum		1	1	1	1	1	1	1	1

In Table: 11, findings show attitudes and preferences for assessment in e-learning lessons. With the exception of question B16, the majority of students have preferred all items over 50%.

With this information, students' attitudes for each survey question was calculated based on strongly agree and agree marks selected by learners.

According to these responses, learners support evaluation strategies for distance education lessons.

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They agree with questions for considering interests and testing decisions. That is, assessment and testing activities were found very effective and clear while taking e-learning courses in distance education.

For instance, most students (106 students, 67.5%) indicated that e-learning courses were developed with enough testing criteria. Understanding testing materials and contents for designing assessment in e-learning program was preferred by learners, which was good (91 students, 57.90%).

The relationship between attitudes about e-learning activities and assessment in e-learning instruction was calculated (r= .75) and other correlations were presented as significant at the 0.01 or at the 0.05 level (such as r= .39, and r= .47).

As a result, it can be seen that attitudes for evaluation strategies in e-learning instruction were found as very close values and important instructional variables for all FDI learners.

Table: 11
Attitudes for Assessment Activities in e-Learning Instruction

	Items	Frequency (A + SA =)	Percentage (%)	Mean	Std. Dev.
B12	Combining new information contents for e-learning helps to answer correctly for all class questions	95	60.50	3.50	0.92
B16	I can define application and test methods for produced information in class.	73	46.50	3.36	0.88
B17	I feel myself at ease while communicating via online tools	88	56	3.46	0.99
B18	Class assignments and tasks given in courses are suitable	86	54.70	3.39	0.97
B19	I understood all contents for testing and assessment.	91	57.90	3.41	0.98
B20	Measurement and evaluation criteria are clear enough.	106	67.50	3.65	0.93
B21	I have completed all assignments and tasks which are given in distance education class on time.	97	61.70	3.50	0.99
B22	I have follow-up opportunities that include a lack of my lessons' and results of my work at any time.	88	56	3.43	0.94

Notes: F = frequency, SD = strongly disagree, D = disagree, NI = no idea, A = agree, SA = strongly agree; STD = standard deviation

What are the relationships between learners' cognitive style of field dependence and their attitudes, preferences and perceptions with learner interface design (LID) features in using e-learning instruction? Learners' attitudes and preferences toward the use of activities in e-learning instruction (distance education)

Students' attitudes and preferences were defined as instructional variables based on their cognitive styles of FD. The variables are related to learner activities and considerations in distance education as given below.

Fourteen items explored the students' attitudes and preferences toward the use of e-learning instruction as distance education specifically in terms of instructional and technical issues. These issues deal with learner perceptions and feelings during the distance education courses. That is, how learners make evaluations depends on their individual perceptions and attitudes. For this, making decisions for learning processes may be based on their cognitive style of field dependence with a slight contradiction. That is, the results in table 12 show a slight contradiction for learners. The items show the effects of distance education activities based on students' attitudes and preferences while learning with distance education programs.

Table: 12
Students' Attitudes and Preferences Based On Cognitive Style toward Instructional Activities /Variables in e-Learning Instruction (Distance Education)

	Items	Frequency (A + SA =)	Percentage (%)	Mean	Std. Deviation
C1	I believe that all characteristics of courses in e-learning (online) are presented with effective style.	68	43.40	3.29	0.98
C2	Internet provides increasing motivation for learners.	74	47.10	3.19	1.17
C3	I believe that distance education (internet) provides a good learning environment	82	52.30	3.32	1.15
C4	Goals are clear and complementary in distance education process for learners	72	45.90	3.18	1.17
C5	Definitions of concepts are good enough in distance education.	77	49	3.27	1.09
C6	Main contents given in distance education have enough impact in our life.	59	37.60	3.09	1.09
C7	Learners in distance education have reached learning objectives very well which are requested.	56	35.70	2.91	1.08
C8	Directions given in distance education are clear and complementary for learners	59	37.60	3.08	1.06
C9	Repeating is enough as possible as in distance education courses.	93	59.20	3.52	1.07
C10	Materials in e-learning (distance education) are following orderly and logical sequencing	88	56	3.48	1.01
C11	Definitions of storyboards and scripts are used enough in distance education	86	54.80	3.41	0.98
C12	Using video and sound are well offered based on e-learning objectives	99	63	3.57	0.89
C13	I watch instructional videos on the internet that provide information	117	74.60	3.71	0.89
C14	I find that lessons given in distance education (internet) are more useful than lessons in formal education.	44	28.10	2.62	1.21

Notes: F = frequency, SD = strongly disagree, D = disagree, NI = no idea,
A = agree, SA = strongly agree; STD = standard deviation

Although there were twenty three survey items in this C section, fourteen items C1 to C14 have been set up to define attitudes for the general distance education process. For this, fourteen items from the student questionnaire aimed to investigate the participants' attitudes towards the use of distance education programs.

At the same time, the learner interface design (LID) and its principles including connect, empower, orchestrate (CEO) parts for effective and efficient e-learning design were investigated as students' attitudes in this part of the survey. The descriptive statistics in table 12 show that students agreed with all statements in this category.

In addition, a significant correlation was calculated in knowledge levels about e-learning and distance education at the 0.01 and 0.05 level (such as r=. 39, and r= .56) (Table 2).

Students' attitudes, perceptions and preferences toward the
use of learner interface design (LID) features in e-learning instruction development
Nine items from the student questionnaire aimed to investigate the participants' attitudes towards the use of the learner interface design (LID) approach and its principles including connect, empower, and orchestrate parts for effective and efficient e-learning design for distance learning. The descriptive statistics in table 13 show that students agreed with all statements in this category. The LID characteristics were accepted by the majority of learners. The LID characteristics in distance education development were accepted by the majority of learners as shown in table 13.

Table: 13
Students' Attitudes and Preferences towards the
Use of the Learner Interface Design (LID)

	Items	Frequency (A + SA=)	Percentage (%)	Mean	Std. Deviation
C15	Effectiveness of e-learning design provides learning subjects with learners to be easy, meaningful, and motivational.	69	44	3.17	1.04
C16	Learner interface design (LID) provides individual needs required as meaningful and useful in e-learning.	80	51	3.29	1.01
C17	LID in e-learning related to skills that learners have	85	54.10	3.40	0.91
C18	LID provides real problem solving strategies	68	43.30	3.16	0.94
C19	Providing visual clarity and control needs	81	51.60	3.32	1.03
C20	LID gives learners meaningful responsibility that they need with ease and comfort	84	53.50	3.39	0.97
C21	LID is a way that provides learning techniques for lessons	73	46.50	3.29	0.93
C22	LID makes following mobile learning easy.	82	52.50	3.29	1.09
C23	Contents with LID are presented as visual and real clearly with effective feedback	95	60.50	3.58	1.06

Notes: F = frequency, SD = strongly disagree, D = disagree, NI = no idea, A = agree, SA = strongly agree; STD = standard deviation

The results in Table: 13 show that there is a significant relationship between cognitive style of field dependence and preferences for learner interface design features for a few items. In general, just items C21 and C23 show a significant relationship between field dependence and learner interface design (LID) as shown in Table 14.

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On the other hand, the results in Table 12 show that there is no significant relationship between cognitive style of field dependence and distance education variables with e-learning instruction (r= .096). Learner interface design (LID) features as variables in e-learning design have a significant correlation with assessment in e-learning instruction and knowledge about e-learning instruction for the FD learners, such as r= .47, r= . 59 and r= .78 at the 0.01 level respectively (Table: 2). For the current study, providing techniques for lessons and effective feedback as visual and real features in LID were indicated as meaningful activities for designing and applying these features in e-learning instruction.

As a result, findings related to e-learning and LID features for the last research question indicated two vital dimensions.

First, there were preferences about e-learning course for learners who attended distance education and evaluated e-learning contents such as designing goals, content structures, organizing directions, materials, and other effects as visual or sound.

Second, findings in LID features indicated the concepts of e-learning process that they offer directions for connect, empower and orchestrate (CEO) for LID.

Thus, these findings provide links with LID features and learners' skills, needs, techniques, effective feedback and mobile learning to complete effective e-learning strategies for distance education.

Table: 14
ANOVA Results for Students' Preferences toward Learner Interface Design (LID)

		Sum of Squares	df	Mean Square	F	Sig.
C21	Between Groups	6.404	2	3.202	3.849	0.023*
	Within Groups	128.118	154	0.832		
	Total	134.522	156			
C23	Between Groups	6.852	2	3.426	3.115	0.047*
	Within Groups	169.403	154	1.1		
	Total	176.255	156			

* Significant at the 0.05 level
C21: LID is a way that provides learning techniques for lessons.
C23: Contents with LID are presented as visual and real clearly with effective feedback.

DISCUSSION

In the study, a broad range of English as foreign language students from different departments at Fatih University were surveyed to learn their opinions and attitudes about using distance education materials and learner interface design (LID) features for e-learning courses based on cognitive styles. Previous studies of students' attitudes and preferences based on cognitive style of field dependence have generally been conducted in schools.

There was also a need for similar research in business and industry as well as schools. According to cognitive style of field dependence research, each learner in a group shows different perceptions and attitudes for presenting design issues as well as screen and information design.

Table: 15 shows that items in survey for LID and students' attitudes were conducted. The findings of the investigation are consistent with those of earlier studies as well. They were also indicated as students' preferences in e-learning (Allen, 2011; Carmona, Castillo, & Millan, 2007). Such students who have an experience and in FI group learners preferred LID principles as well, but there was no meaningful relationship among FDI groups for using screen design and text density activities (İpek, 2001, 2010, 2011).

There is need for experimental research to test the effects of LID variables in e-learning or distance education. Preferences and attitudes for LID and FDI groups are shown in Table 15. LID variables and their relationships between or within groups are given in Table 16.

Descriptive analysis and ANOVA results are presented in Table 15 and group relationships and interactions are indicated in Table 16. There was no statistically significant relationship or difference between variables except for items C21 and C23.Responses from the survey in three sections were given as background information values, attitudes and perceptions for distance education with assessment stage and preferences and perceptions for using effective learner interface design features in e-learning. From these results in the survey, these variables, including experience in e-learning, learning activities in distance education and LID features, seem to be vital instructional variables for student preferences in future studies. For students, to gain experience it is important to follow social networks and e-learning tools. Evaluating distance education programs with attitudes in section B, such as students' motivation, interests, speed of learning connection, learning activities, having feedback, practice, and reading materials during the class were accepted by a majority of learners (over 50%).

The results indicate that designing e-learning programs for distance education should focus on these variables for effective and efficient learning and developing tests and assessment materials in teaching. The results are given in Tables 9 and 11 respectively.

Table: 15
Descriptive Statistics for Attitudes and Distance Education Variables
As Learner Interface Design (LID) Based On Cognitive Styles (C Section*)

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
						Lower Bound	Upper Bound		
Learner Interface	FD	40	73.70	14.75	2.33	68.98	78.42	32	96
Design (LID)	FN	57	76.74	14.48	1.92	72.90	80.58	29	105
variables for	FI	60	75.55	15.74	2.03	71.48	79.62	38	109
distance education	Total	157	75.51	14.99	1.20	73.15	77.88	29	109

Table: 16
ANOVA for Students' Attitudes toward Learner
Interface Design (LID) and FDI Groups

		Sum of Squares	df	Mean Square	F	Sig.
Learner Interface Design (LID) variables for e-learning and distance education	Between Groups	216.933	2	108.467	0.479	0.62
	Within Groups	34842.303	154	226.249		
	Total	35059.236	156			

From the survey items in section C, attitudes and perceptions about distance education programs indicated that students accepted some items well, including presenting and designing distance education processes, and increasing students' interests.They also found objectives clear and good enough, as definitions of concepts and well designed. They also indicated that some variables were preferred as important, such as gaining objectives, repeating and sequencing topics as good enough, and designing multimedia formats for storyboard, video and sound effectively. Finally, directions and basically all distance education lessons were found as beneficial and effective by over 50% of learners. The results are given in Table: 12. In addition, as indicated by Allen (2011) and Piskurich (2009), e-learning design principles were accepted as connect, empower and orchestrate terms (CEO) and the design process starts with providing learner attention and motivation (such as question C15, *Effectiveness of e-learning design provides learning subjects with learners for easy, meaningful and motivational*, and (C16, *Learner interface design (LID) provides individual needs required as meaningful and useful in e-learning).* For this reason e-learning courses should be developed by LID features which include connect, empower and orchestrate characteristics for distance education programs. mIn addition to these survey items, there were clear and effective indicators in e-learning for LID features, which include learner-friendly design, skills in LID, reaching needs for learners with LID features, solving real problems with LID, visual clarity and effective control, giving meaningful responsibility to students, providing research techniques for lessons, m-learning and future e-learning design, and finally, contents in e-learning and skills used would be real and visual activities providing enough feedback in LID guidelines.

This process also provides linking with other learning activities to develop effective and efficient and engaged new LID features for e-learning in distance education programs. Also, CEO approach includes context, challenge, activity and feedback terms (CCAF) for learner interface design. All questions in survey C sections between C15 and C23 would be used for designing lessons in e-learning instruction by using LID features. With these questions in the survey, such questions were preferred as C16 (51%), C17 (54.10%). C19 (51.60%), C20 (53.50%), C21 (46.50%), C22 (52.50%, *LID makes easy following mobile learning.*), and C23 (60.50%) respectively. In this order, there were significant relationships for items C21 *(LID is a way that provides learning techniques for lessons)* and C23 *(Contents with LID are presented as visual and real clearly with effective feedback)* based on cognitive styles of field dependence and learner interface design (LID) as given in Table 14.

As a result, learners' attitudes about e-learning for distance education and assessment variables should be used for future design or development activities in e-learning instruction. LID features such as CEO and CCAF contents should be used for evaluating distance education activities and lessons and for designing e-learning instruction with newly developed LID features and principles.

According to the results in Table 2, the relationships and correlations for attitudes, perceptions and preferences in LID features and distance education should be used by designers and educators to develop effective e-learning instruction courses. The scores and values from the study can be used to predict the other criteria for future work in distance education.

CONCLUSIONS

The findings of this study reveal that the students at Fatih University have positive attitudes toward distance education and e-learning programs because of the advantages of e-learning technologies and learner interface design (LID) principles. As a background in their distance education and e-learning, learners have indicated and presented e-learning design variables as well as distance education attitudes and preferences. Although there were no interactions or high level correlations between cognitive styles of field dependence and learner interface design (LID) variables, FI learners preferred e-learning technologies and LID characteristics based on theoretical features of cognitive style of FD. Because the cognitive style of FD is a continuum, it was seen that FD, FN or FI learners were defined by their attitudes and new research studies must be conducted to develop effective, efficient and engaged e-learning courseware for future distance education.

Finally, e-learning programs with designed effective LID approach, as a theory and practical side, should be provided with technical, psychological, instructional and material-based support by using LID principles and activities in distance education. With these definitions, cognitive/learning styles refer to the individual's consistent attitudes for perceiving, remembering, organizing, processing, thinking, and problem solving in e-learning programs. Thus, learner interface design (LID) activities and multimedia formats should be clarified for learners who have different learning and cognitive styles. From the results, there are many instructional variables to develop lessons in distance education by using LID variables.

There are also several details indicated in instructional design by FD learners for teachers and designers. These details and values should be used for designing distance education programs.

As a result, experience with tools, attitudes about distance education and student preferences and perceptions for e-learning design should be provided with learner characteristics which include cognitive style, attitudes and preferences. In addition to this, e-learning designers should be aware of learner interface design (LID) features to improve future classrooms as e–learning environments.
They also integrate several instructional characteristics to apply them in their distance education programs with new technologies.

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