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Design and Effects of a Concept Focused Discussion Environment in E-Learning

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Abstract

Problem Statement: Within the frame of learning management systems, this study develops a concept focused discussion environment and validates the effectiveness of this environment's use through an experimental study.

Purpose of the Study: Online discussion forums, which are commonly used in learning management systems (LMS), can negatively influence the integration and motivation of learning in terms of learner-content and learner-learner interactions, as online discussions take place in a physical situation apart from the content environment. The development of the concept focused discussion environment (CFDE) and its integration into into LMS as well as another environment, LMS TDE (traditional discussion environment), which possess a hierarchical threaded discussion structure, are assessed in terms of learning perceptions, usefulness perceptions, qualities of the messages sent to discussion environments, and student learning styles.

Method: The experimental design of the research is structured in the "application and final test" form (Karasar, 2007). Experiment group students (44) joined online learning environments in which the concept focused discussion environment (CFDE) was embedded, and on the other hand, control group students (46) joined online learning environments that possessed a traditional discussion environment (TDE). After the experimental work, scales measuring learning perception in discussion environments, usefulness perception in discussion environments, and contribution quality analysis (degree assessment type) were applied.

Findings: At the end of the research, the study found that CFDE that draws on students' perceptions of learning and usability is more effective than

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TDE that uses students' perceptions. In addition, the messages sent in the discussion environments were analyzed in terms of contribution quality. The relation between students' learning styles and their perception of learning was investigated. Messages sent in CFDE were compared to messages sent in TDE in terms of knowledge validity, cognitive attempt effort, showing understanding of the subject, showing sample reference, being understandable, involving cooperation, and orientation skills; the comparison revealed significant differences. Finally, the research also examined learning styles and learning perception relationships. Developed CFDE demonstrates no differences between students with tendencies toward ordered or integrated learning; in contrast, TDE creates negative effects and inequality for students that have sequential learning style (according to cognitive and affective learning perceptions) in particular. The case can be made that CFDE removes this inequality.

Conclusion and Recommendations: This study, in contrast with current LMSs, designed a new product to integrate content and discussion boards. Integrating content and discussion boards with each other as we did in this study will increase students' learning perception and decrease the individual differences between students.

Keywords: Discussion forum, online learning environment, learning styles, learning management system.

Introduction

Learning is a dynamic process that is dependent on the interaction between the components of the individual's learning environment (Lave & Wenger, 1991; Wenger, 1998; Haslaman et al., 2008; Bleiler, 2014). Through detailing these interactions, Moore (1989) developed models of "learner-content", "learner-teacher" and "learner-learner" interactions. However, these interactions are available in physical learning environments but are not inherent to the virtual learning environment in the context of e-learning. Since in e-learning describes a situation in which learners have access to the learning environment at different times and in different locations, the learner-learner interaction come into particular prominence in discussion environments in learning management systems (LMS) (West et al. 2007). While learners have the opportunity to structure information from the socio-cultural aspects of these environments (Gunawardena & Zittle, 1997; Brown, 2001; Rovai, 2002; Swan, 2004), they will also have the opportunity to benefit from these environments through criticizing, self-evaluating (Roberts, 2006; Kayler & Weller, 2007; Gerosa et al., 2010; Pilli & Sozudogru, 2012; Gao et al., 2013), as well as sharing (Lave & Wenger, 1991; Akkoyunlu & Soylu, 2008; Pilli & Sozudogru, 2012). In other words, learner-learner interactions in virtual classes are functionally differentiated from those in physical classes. Discussions in physical classes have some advantages as well, however, among which the state of engagement of the content environment and interaction environment is considered the primary advantage. This means that

students who enter into interactions in physical classes within the same environment repeatedly (apart from the interactions related to content) have to chance to interact with other students or the teacher. However, in widely used LMSs (for example, Blackboard, Moodle, Sakai, WebCT, etc.) the content and discussion environments are structures that are different individual modules (components). After the students interact, they leave one module and enter the discussion module, and in threaded discussions, they touch on the related subject and are intended to follow discussions related to the content or join into discussions individually. This process negatively influences the integration and motivation of learning. In order avoid this negative outcome, anchored discussion environments have been developed to connect the content and discussion modules (Guzdial & Turns, 2000; George & Labas, 2008; Link, Siemon, Vreede & Robra-Bissantz, 2015). However, these environments are commonly created with the frame structure in a browser window, executing discussions with text-based learning materials, adding comments onto these text-based materials and displaying the discussions with them. Learners generally make markings and add notes onto these text-based learning materials, and other learners can write their comments on the marked fields. In such studies, however, learning material occasionally has a learning task (Dabbagh & Kitsantas, 2013; Echeverria et al., 2013).

Within the frame of such work, the concept focused discussion environment (CFDE) has been developed to simplify the learner's transitions between content and discussion, and as in bound discussion environments, to treat the interaction not as a learning task but as direct learning content. When developing this environment, wiki environments have been drawn on as a metaphor. In wiki environments, concepts based on conceptual learning (ones that generally depend on pre-learning) are explained with other concepts. If learners do not understand the sub-concepts that are mentioned in the target concept definition, they can activate connections (links) belonging to these concepts, and the transition to concept content is achieved. In CFDE, only the concept related discussion frame will open when learners click on the concept within the content. In other words, when the connection related to the concept in the wiki environment is activated, rather than opening content about another concept, it provides access to discussions related to the specific concept. To simplify learners' transitions between content and discussion environments, CFDE provides sliding windows for the learners to open that will show them content on the content frame of the discussion. Thus, learners will see discussions on a concept basis both by maintaining proximity to the content environment and through content-based discussions. As a result, an environment has been developed for LMSs that is an independent module as an alternative to traditional discussions that have a messy, hierarchical structure. The transition from the content environment to CFDE will be concept based, but transition without activating any concept connection is also possible. In such a case, the design allows learners to see all related the discussions to displayed content. Within the frame of this paper, the development of CFDE and its effectiveness has been investigated with an experimental study that involves threaded discussion environments as well.

Traditional and Alternative Environments in E-Learning

Asynchronous online discussion environments are forums for educational institutions that use a threaded discussion structure and are utilized with a variety of purposes. These environments are one of the most important platforms in support of learning in the e-learning field (Gao et al., 2013). Generally, within LMSs are for student use, and the most significant components of LMSs (Marra et al., 2004) are those that enable students to interact with the content, teachers, and each other (Brower, 2003). Traditional discussion environments are web-based environments that are developed based on a hierarchical structure with a forum method, which is a teaching technique.

Alternative Discussion Environment and Designs

Discussion environments that have a threaded discussion structure face problem such as not a failure to focus on the discussed subject or the lesson content (Lambiase, 2010), messages that are irrelevant to the subject, receiving replies late, difficulty working cooperatively (Curtis & Lawson, 2001), difficulty synthesizing opinions (Jeong & Frazier, 2008), and an inability to provide interactions in various dimensions (Thomas, 2002) (Knowlton, 2001; Gao et al., 2013). To avoid these problems in discussion environments and to improve the quality of executed discussions, different kinds of teaching approaches have emerged, such as guidance studies (Nussbaum, 2005), improving participants' discussion skills (Choi & Johnson, 2005; Yang et al., 2005), improving moderators' control skills (Bradley et al., 2008) and study of new designs (Topcu, 2007). These solution attempts have mostly produced successful results, in contrast to traditional threaded discussion structured discussion environments produced through new discussion environment designs.

Usually, environments that are developed in LMS with the text-based content are environments that aim to put the discussion environment on the same screen. These environments with a content environment depicted in Figure 1 aim to avoid separation between discussion environments for learner-teacher-learner interactions.

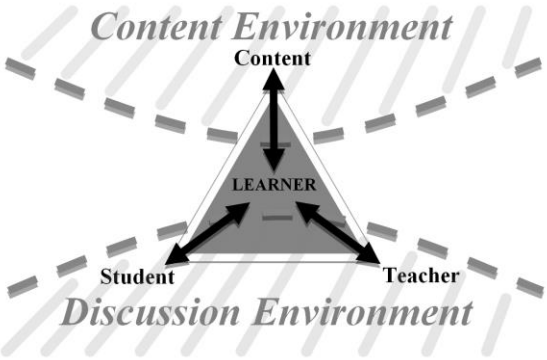

Figure 1. Discussion and content environments in LMS

The common characteristics of environments that are designed to integrate the content environment with the discussion environment are adding comments to text-based materials and displaying the discussions alongside them. It has not been possible in any environments to structure content that is presented inside LMS.

To simplify the transitions between content and discussions in web based learning management systems, not as a learning task as in anchored discussion environments but as direct learning through content related interaction, this study developed concept focused discussion environments.

In the context of this research's inspiration from the wiki environment, within an online learning environment that locates connection proposals and connections to terms through hypertext-based learning content, the condition of staying on the same page directly with these connection proposals aims at transitions to integrated discussion environments. Since transitions are connected by these concepts through terms that are abstract visual states of concepts, this new design is called concept focused discussion environment (CFDE). This research describes concepts and concept sentences, referred to briefly as concepts. In CFDE the researchers developed, when learners clicked on concepts within the content, it is opened only one discussion window related to the concept. In other words, in activating a connection related to a concept in the wiki environment, rather than opening other concept content, the related information can be accessed alongside the original concept.

The integration of CFDE in LMS as well as the other LMS environment of TDE (traditional discussion environment), which possesses a hierarchical threaded discussion structure, were reviewed on the basis of learning perceptions, usefulness perceptions, qualities of the messages sent to discussion environments, and student learning styles.

Design and Development of Concept Focused Discussion Environment

CFDE is a system that integrates the content of learning management systems by providing students links in LMS that are directly related to concepts in the targeted content texts and allow students to explore these links without distancing them from the content by remaining on the same screen and providing transitions to the discussion environment. The researcher developed LMS for this project with Adobe Flash software and the discussion environment infrastructure with the PHP-based Vbulletin discussion environment. The system resided on a Linux host and became platform free so that it could be opened via Flash-supported browsers over a domain address.

Experimental group students signed into the CFDE main access screen with their user names and passwords and reached the LMS access screen. In this section, they could reach from the subject section to the weekly subject section and the six-week subject list, and by accessing the related week, they could display content related to that particular week. The automatically activated/deactivated discussion

environment connection where topics are discussed in CFDE is presented to the students in the right upper section of the screen inside a black box (Figure 2).

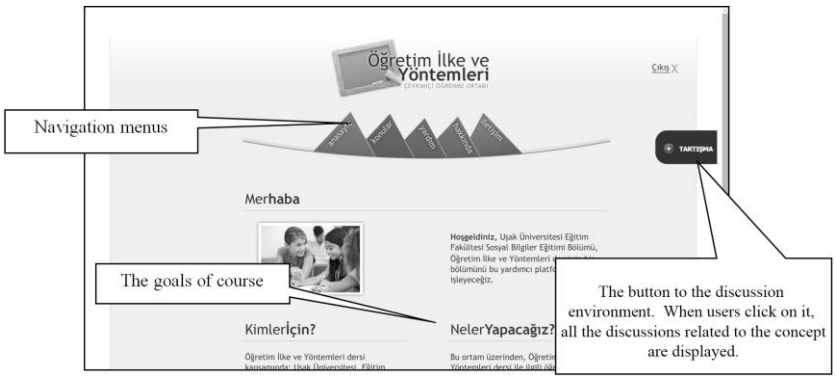

Figure 2. Homepage of the concept focused discussion environment

In the weekly content texts, concepts directly related to the subject and concepts significant to learning the content are displayed within the text as dark and underlined. In addition, the significant concepts are once again listed under the content text. Unlike traditional discussion environments, in CFDE, clicking on the concepts that are deemed significant and involved with the researchers' purpose leads to discussion about the clicked concept, which aims to keep students on the same screen. This structure is similar to the structure of wiki environments in that the concept←→concept discussion structure is inspired by the connection metaphor of concept←→concept in wiki contents (Figure 3).

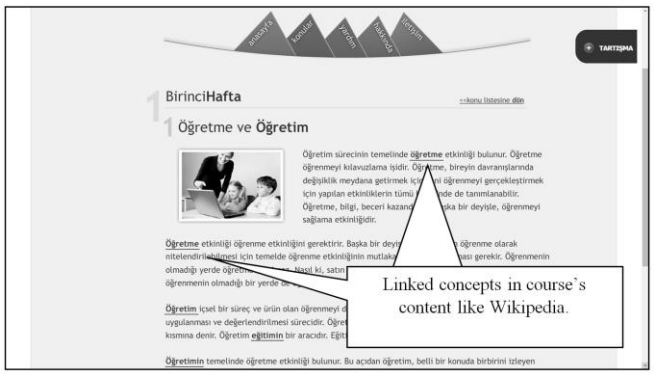

Figure 3. Linked concepts in course environment

When users click on the concept texts, rather than being distanced from the content environment, they stay on the same screen, and the discussion environment

frame is opened, sliding from the right side of the screen (Figure 4). In CFDE when the experimental group students have the opportunity to open a discussion environment, which reverts to its former turned off state and becomes invisible when the user clicks on the focused concept texts. Also, when students click on the black "Discussion" box, their most recent discussion subject returns onto the screen. When the user clicks on the "Discussion" box again, it returns to its turned off status.

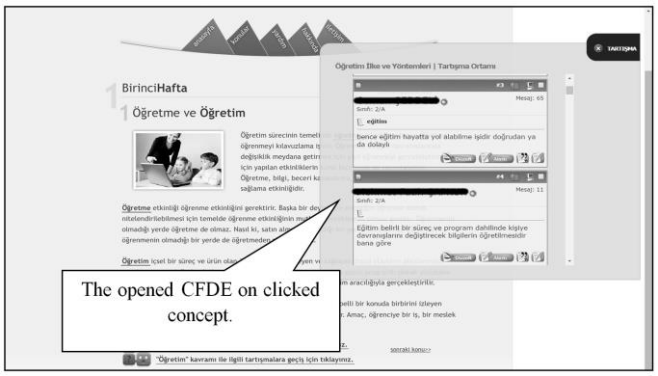

Figure 4. Opened discussion frame

The study's control group students used LMS with a traditional threaded discussion environment structure (TDE). The control group encountered the same lesson content offered as the experimental group, no links related to the concepts were provided, and the lesson content was presented to students in a standard way. When control group students click on the "Discussion" button on the main LMS menu, discussions are hosted on a separate screen, apart from the lesson content.

Within the frame of learning management systems, this research developed a concept focused discussion environment and validated the effectiveness of the use of this environment through an experimental study. Within the frame of this experimental work, the following hypotheses are taken into consideration:

H1: Learners using CFDE and learners using TDE have no difference in learning perceptions.

H2: Learners using CFDE and learners using TDE have no difference in usefulness perceptions related to the discussion environment.

H3: Learners using CFDE and learners using TDE have no difference in the qualities of the messages they sent.

H4: Learners using CFDE and learners using TDE have no differences in their learning perceptions based on their learning styles.

Methodology

Research Design

This research aims to compare concept focused discussion environments in terms of learning perception, usefulness perception, contribution quality, and student learning styles relative to the traditional discussion environments (TDE). The study's methodology initially planned to take experimental and repetitive measurements (pre-test and final-test, etc.) as required for effective research. However, since the study's research variables (learning perception, usefulness perception, learning style) are mostly situational, characteristic variables (non-improving), and since the study aims to compare two discussion environments, repetitive measurements were removed from the plan. According to this, the researcher's ultimate experimental design is structured in the form of "application and final test" (Table 1).

Table 1.

Research Variables

Research Groups	*Number of participants*	*Learning perception*	*Usefulness perception*	*Attendance quality*	*Learning style*
Experimental Group	46	X	X	X	X
Control Group	44	X	X	X	X

Sample of Research

The research group for this study consists of 90 (ninety) students from Usak University's Education Faculty of Social Sciences Teaching Department during the spring semester of the 2011-2012 school year. The experimental and control group students were distributed to two groups in a fully random manner (using the Excel software Rnd function). 47.7% of the total students are women and 52.3% men. Additionally, 10.9% of the students in the experimental group and 10% of the students in the control group declared that they had not attended any other discussion environments.

Within the frame of the lesson "Teaching Principle and Methods," the researcher involved the experiment and control group students in developed environments over six weeks. For every student lesson presentation that students receive from an individual instructor/tutor in a traditional class environment, the lesson's instructor requested that in the lesson's remaining time that the students attend online learning environments. In other words, a blended learning environment is the goal. Students attend learning environments from their houses, student dormitories, school computer laboratories, and with their mobile devices.

Research Instruments

Variables this research has taken into account include learning perceptions, usefulness perceptions, participation levels in discussion environments, participation qualities, and students' learning styles inside the discussion environments. The utilized scales can be classified as the learning perception in discussion environments scale, usefulness perception in discussion environments scale, and contribution quality analysis scale (degree assessment type).

First of all, Wu & Hiltz (2004) developed a scale for learning perception in discussion environments, and this research uses the validity and confidentiality studies they executed. The learning perception scale is a 5-point Likert type consisting of 20 papers and two factors; these factors comprise the cognitive dimension of students' learning perceptions in online discussions as well as the affective dimension. While initial the 11 papers address the cognitive dimensions of learning perceptions and the remaining eight deal with the affective dimensions, the final paper considers perceptions about the teacher's role in online discussions. The researcher found the internal consistency as 0.88 by Cronbach's alpha value (for full scale), an alpha value of 0.79 for learning perception's cognitive dimension, and an alpha value 0.76 learning perception's affective dimension.

The second scale the researcher used, the usefulness perception scale, was developed by the researcher and is a scale that measures student perceptions related to the discussion environment's usefulness. More specifically, the usefulness perception scale measures student perceptions about the usefulness of discussion environments involved in online learning environments. The five papers deal with getting lost in the learning environment, navigation, and descriptions related to learning atmosphere.

Thirdly, to extract the quality of messages posted in discussion environments, the researcher used the contribution quality scale. The contribution quality scale is a performance observational scale and a graded assessment scale type related that assesses messages students post in discussion environments. The scale is designed according to seven sub-scales and each message is graded in a range from 0-4. The design of this scale, which aims to measure sent messages' quality of contribution to the discussion environment, is structured through a review of the literature in this field and is inspired by the existing work (Marra et al., 2004; Rovai, 2007). Contribution quality is evaluated in a rubric-type scale and adopts seven dimensions: knowledge validity, cognitive attempt, understanding of the subject, sample reference, understandability, cooperation, and orienteering. Every message posted in the discussion environment is assessed on these seven dimensions. Two observers with field expertise assessed every dimension within the scale range of 0-4.

The fourth and last utilized scale is the learning style scale. This scale aims to describe the learning style of students who participated in the learning experiment about discussion environments. To choose this scale that orders and integrates learning style in the scale, the researcher's criterion was that it claims something other than an ordered hierarchical structure discussion environment: an integrated

structured discussion environment. In this study, Felder and Soloman's learning style index was applied to the participants. Only one dimension from the learning style index was considered: the sequential-global dimension. This dimension is intended to explain how and with what type of process students make sense of knowledge. Students who make sense of knowledge with a sequential process understand things with a logical procession of tiny steps that follow one another, and students who make sense of knowledge through a global process consider knowledge integrally and make sense of knowledge as independent large parts.

Results

This section attempts to compare the performance and perception of students in discussion environments using CFDE and TDE and to extract differences between both discussion environments. First of all, the study has attempted to review the period of time that learners spend within the discussion environment of learning management systems, but since CFDE is structured with an integration of content and discussion environment, a direct comparison is not possible. That is why the study instead provides the period of time that the learners spent on the learning management system overall. According to this data, in the CFDE LMS users spent an average time of 393 minutes; in the TDE LMS environment, they spent an average of 508 minutes. With this data, one must consider that these experiences are executed in homogeneous environments for TDE LMS, with its modular structure and hierarchic threaded structure implied. However, this result is not a final finding as an annex analysis, and the study reviews performances by CFDE and TDE learners who were in experiment and control groups.

Table 2.

ANOVA Results Related to the Number of Sent Message

	Groups	*N*	*Mean*	*Std. deviation*	*F*	*p*
Message Number	Experiment	46	9.87	14.69	0.01	0.91
	Control	44	9.55	10.72		
	Total	90	9.71	12.83		

Table 2 displays the average number of sent numbers among learners who used CFDE in the experiment group and learners who used TDE in the control group; there is no statistical significance (P>0.05). The study aims to provide more detailed information by examining the contribution styles in both environments, and the findings in terms of these factors are provided in Table 3.

Table 3.

Contribution Styles

	Experiment group (CFDE)	*Control group (TDE)*	*General*	
Contribution style	*Frequency (F)*	*Frequency (F)*	*Frequency (F)*	*Frequency (%)*
Initiating discussion	40	40	80	9.1
Instant contribution to discussion	261	287	548	62.1
Insistent contribution to discussion	154	101	255	28.8
Total	455	428	883	100
Only reading	3	4	7	-

Within this discussion environment, different performances can come into question. Performances that students prefer are described as contribution styles and are termed "initiation of discussion," "instant contribution to discussion," "insistent contribution to discussion," and "only reading" styles. Instant contribution and posting a message once to the environment are mentioned; insistent contribution refers to posting repetitive replies to a message. Accordingly, as seen in Table 3, when students' contribution styles in discussion environments are examined, it emerges that the experiment group students initiate discussion the same number of times as control group learners. In terms of instant contribution to the discussion, the experiment group students posted fewer messages than control group students. On the point of insistent contribution, a concept is considered as a reference, and the CFDE students enter discussion in an integrated environment; consequently, the experimental group students made more insistent contributions. Only three students from the experiment group and four from the control group only browsed the learning environments (only read without sending messages). According to these findings, learners using TDE are prone to send instant messages, but learners using CFDE are more likely to discuss instead of sending instant messages.

At the next stage, the study examines the learning perception differences between learners using CFDE and learners using TDE, and a test of the H1 hypothesis is executed. Accordingly, the students' learning perceptions about discussion

environments are obtained from students in the experiment and control groups, and Table 4 provides the ANOVA results regarding the differences in learning perceptions.

Table 4.

Learning Perceptions

	Group	*N*	*Mean*	*Std. deviation*	*F*	*P*
Learning Perception (Cognitive)	Experiment	46	33.63	6.06	8.68	0.00
	Control	44	29.50	7.21		
	Total	90	31.61	6.93		
Learning Perception (Affective)	Experiment	46	29.57	5,95	3.62	0.06
	Control	44	27.09	6.38		
	Total	90	28.36	6.26		

Table 4 includes cognitive learning perception average scores from learners from the experiment group (using CFDE) (33.63) and learners from the control group (using TDE) (29.50); this difference is calculated to be a highly significant ($P \leq 0.05$) finding. The average scores related to the learners' cognitive perceptions was 29.57 for learners in the experiment group that used CFDE and 27.09 for learners in the control group that used TDE. However, this difference to the advantage of the experiment group is not found to be statistically significant ($P > 0.05$). Based on this finding, despite the fact that students will have similar affective perceptions of both discussion environments, it can be stated that students who have their learning experience in CFDE experience more cognitive perceptions.

At the next stage, the study examines the difference in usefulness perceptions between learners using CFDE and learners using TDE, and a test of the H2 hypothesis is executed. Accordingly, the students' usefulness perception of the discussion environment are obtained from the students in the experiment and control groups, and Table 5 provides the ANOVA results regarding the usefulness perceptions differences.

Table 5.

Usefulness Perceptions

Usefulness perceptions	*Group*	*N*	*Mean*	*Std. dev.*	*F*	*P*
I found myself lost in the learning environment.	Experiment	46	2.17	0.85	2.18	0.14
	Control	44	2.45	0.95		
I had the chance to navigate to subject expressions easily.	Experiment	46	4.33	0.70	7.14	0.01
	Control	44	3.86	0.93		
Without losing motivation from the subject related expressions, I had the chance to easily pass to the discussions.	Experiment	46	4.02	0.75	5.20	0.03
	Control	44	3.61	0.95		
I had the chance to return to discussion from subject related expressions easily.	Experiment	46	4.15	0.67	9.96	0.00
	Control	44	3.59	1.00		
I had the chance to return from discussion to the subject related expression easily.	Experiment	46	4.09	0.72	10.72	0.00

Table 5 includes usefulness perceptions findings about feeling lost within the learning environment; students involved in CFDE experiment groups had an average perception of (2.17), while students involved in TDE had a higher average perception of (2.45); when this difference to the advantage of the experiment group underwent variance analysis, it was not revealed to be statistically significant ($p>0.05$). In both environments, it can be stated that students did not feel lost.

Students who were involved in the CFDE experiment group, compared to students in the TDE control group, could easily browse within learning environments during the lecture, could easily transition to discussions without losing motivation from the content within the learning environment, could easily return to discussion, and could easily return to content. In terms of usefulness perceptions, these differences are determined to be statistically significant to the advantage of the experiment group environment CFDE ($P\leq0.05$).

At the next stage, the study investigates the differences in the quality of the messages posted in the discussion environments among learners using CFDE and learners using TDE, and a test of the H3 hypothesis is executed (Table 6).

Table 6.

Qualities of Messages

	Group	*N*	*Mean*	*Std. dev.*	*F*	*P*
Message Number	Experiment	46	9.87	14.69	0.01	0.91
	Control	44	9.55	10.72		
	Total	90	9,71	12.83		
Knowledge Validity	Experiment	46	2.00	1.40	10.61	0.00
	Control	44	1.16	1.01		
	Total	90	1.59	1.29		
Cognitive Attempt	Experiment	46	2.13	1.44	12.93	0.00
	Control	44	1.18	1.02		
	Total	90	1.67	1.33		
Understanding the Subject	Experiment	46	1.80	1.29	5.18	0.03
	Control	44	1.25	0.99		
	Total	90	1.53	1.18		
Sample-Reference Showing	Experiment	46	1.74	1.12	6.31	0.01
	Control	44	1.18	0.97		
	Total	90	1.47	1.08		
Being Understandable	Experiment	46	1.85	1.25	4.63	0.03
	Control	44	1.34	0.96		
	Total	90	1.60	1.14		
Cooperation	Experiment	46	1.07	1.12	6.23	0.01
	Control	44	0.59	0.58		
	Total	90	0.83	0.93		
Orientation	Experiment	46	1.02	1.02	4.51	0.04
	Control	44	0.64	0.65		
	Total	90	0.83	0.88		

The contribution quality analysis related to the messages students posted in the discussion environments initially accounts for the average numbers of message posted in both environments. There is no significant difference between the posted messages in CFDE and TDE environments ($p>0.05$). It can be stated that students post messages in similar numbers, and the number of messages does not vary depending on the environment.

According to the findings in Table 6, through going out from a concept students in an integrated environment more intentionally try to express themselves instead of transferring thoughts from other sources when using messages. Also, students from the experiment group that uses CFDE share less erroneous or wrong knowledge in their messages, and students in traditional discussion environments generally share more erroneous knowledge and show less cognitive effort. According to another finding, students in the experimental group that uses CFDE understand the discussion subject better than students using TDE.

According to the findings in Table 6, students participating in discussion of a concept in an integrated environment support their messages with more examples and references, write in a more logical way, cooperate more to contribute to the discussion environment, and their social attempts and orientations are more meaningful.

The sequential and global learning style dimension is taken into account to reveal the students' learning styles on the Felder and Soloman's scale. Students who possess a global learning style generally prefer making sense of the knowledge process, and students who possess a sequential learning style proceed with small steps that follow each other logically to make sense of the knowledge.

Table 7.

Learning Perceptions and Learning Styles

	Changing source	*N*	*Mean*	*Std. dev.*	*F*	*P*	*Duncan test*
Cognitive learning perception	Experiment group – Sequential	34	33.74	5.72	3.00	0.03	B
	Experiment group – Global	12	33.33	7.23			B
	Control group – Sequential	31	29.94	7.40			AB
	Control group – Global	13	28.46	6.92			A
	Total	90	31.61	6.93			
Affective learning perception	Experiment group – Sequential	34	29.29	5.90	1.67	0.18	AB
	Experiment group – Global	12	30.33	6.30			B
	Control group - Sequential	31	27.74	6.72			AB
	Control group – Global	13	25.54	5.41			A
	Total	90	28.36	6.26			

According to Table 7, cognitive perceptions differ based on students' learning choices and whether they used TDE and CFDE to an extent that is statistically significant ($F=3.00$; $p\leq0.05$).

According to the Duncan test, the highest perception about cognitive learning is among students that use CFDE in a sequential and global way.

In terms of cognitive learning perceptions, the lowest perception level is among students who prefer global choices and use TDE. According to this, learners who use CFDE in a sequential or global way profit from this environment in terms of cognitive learning perceptions, and for global learners who use TDE, TDE produces a negative effect that is stated with 0.05 confidence level. Additionally, TDE is advantageous for sequential learners and disadvantageous for students who prefer global learning.

Discussion and Conclusions

Discussions boards in traditional learning management systems (LMS) are usually formatted as threaded discussions. In a threaded forum, the user has a choice to reply to an existing topic or start a new topic for discussion, as all the posts in a forum thread are presented in chronological order (Gao et al., 2013; Loncar, Barrett & Liu, 2014). Previous research has reported that asynchronous threaded discussions have more advantages than TDE in terms of learning perception and satisfaction (Lin & Overbaugh, 2007; Chen et al., 2015).

This research, which provided asynchronous discussion boards associated with the content, found that students' learning perceptions and satisfactions are significantly increased in CFDE. In addition to this, while learning and satisfaction perceptions are differentiated and vary by learning styles in TDE, such differences are not in the new CFDE.

Since learners in e-learning have access to online systems from different times and locations, learner-learner relations are especially important. In Learning Management Systems, these interactions are experienced in an intensive way and are mentioned as online learning environment are widely used today. LMSs are systems that aim to present a structure similar to that of traditional physical classes but in a virtual form. LMSs contain different kinds of components such as content, presentation, file sharing, and discussion. These components of LMSs are structured as various modules, separate from one another. For example, a student executes the readings in the lesson content environment within LMS, and then when he enters the discussion environment, he separates from the content environment physically and transfers to the hierarchical threaded discussion environment. Under discussion titles that are provided in an integrated environment, it is possible to searching and reach related discussions. During this period, students are fully physically distanced from the learning content and separations occur. This period negatively influences the integrity and motivation of learning. Physical separations experienced at the point of usefulness have an effect in LMSs and the effective learning period users spend in

them. In order to avoid these negative effects, people are trying to modify the content environment in LMSs and discussion environments into an integrated state.

This study, inspired by wiki environments, provided connection to terms in the learning content considered significant via hypertext and located connection proposals that allowed users to remain on the same page during these connection, which offers discussion environments that are integrated with contents, aiming to provide a transition. This strategy intended that the learners discuss without losing motivation towards the learning content. For this environment that has a developing integral structure, the study provided the term concept focused discussion environment, and the study compared CFDE with traditional learning environments in terms of learning, usefulness, investigating, message qualities, and learning styles.

After six weeks during which the online systems were executed, the study examined and analyzed the resulting data. The learning perceptions in the cognitive dimension were relatively greater among students who experienced the concept focused discussion environment than among students who experienced discussion environments with a traditional structure; there was no difference in terms of learning perceptions in the affective dimension.

Students who experienced LMSs that involved CFDE had significantly greater usefulness perceptions compared to students who experienced LMSs that involved TDE. Entering discussion without losing motivation over learning content positively influences learners' usefulness perception. The related literature states that students are more focused on texts with links rather than on ordinary text. In CFDE, the situation that links offer and the fact that links are located on concept terms involved in learning the text contents means that students have more intensified attention on the contents and leads to greater browsing.

Similar quantities of discussion messages are posted in both CFDE and TDE environments, and the learners have similar levels of attendance. However, the messages sent in CFDE compared to messages sent in TDE demonstrate knowledge validity, cognitive attempt efforts, understanding of the subject, and sample reference and are understandable, involve cooperation, and reveal orientation skills to a significant extent.

Students' learning styles in learning management systems are direct factors that influence learning. In this study, learning styles and learning perception relationships are examined.

The concept focused discussion environment shows no differences in terms of ordered or integrated learning in learning perceptions; in contrast, traditional discussion environment create a negative effect for students who have a sequential learning style (according to cognitive and affective learning perceptions) in particular, leading to inequality. The case that CFDE removes this inequality is expressed in Table 7. It can be stated that TDE is advantageous for sequential learners and negatively influences global learning proposals. An ordered hierarchical structure in traditional discussion environments benefits the students who prefer a

sequential learning style, but it does not provide any advantages for students who prefer global learning styles.

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E-öğrenmede Kavram Odaklı Tartışma Ortamının Tasarımı ve Etkililiği

Atıf:

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Özet

Problem Durumu: Bu araştırmada öğrenme yönetim sistem içerisinde kavram odaklı bir tartışma ortamı geliştirilmiş ve bu ortamın kullanımının etkililiği deneysel bir çalışmada sınanmıştır.

Çalışmanın Amacı: Öğrenme yönetim sistemleri - ÖYS (learning management systems) içerisinde yaygın olarak kullanılmakta olan çevrimiçi tartışma modülleri, içerik ortamından farklı bir fiziksel konumda yer aldıkları için; öğrenen-içerik ve

öğrenen-öğrenen etkileşimleri boyutunda öğrenme bütünlüğünü ve motivasyonunu olumsuz etkileyebilmektedir. Bu olumsuzluğu ortadan kaldırmaya yönelik olarak öğrenme yönetim sistemlerinde yer alan ve bağımsız bir bileşen olarak hazırlanan, dağınık ve hiyerarşik yapıda olan geleneksel tartışma ortamlarına alternatif bir ortam geliştirilmiştir. Kavram Odaklı Tartışma Ortamı (KOTO) ismi verilen yeni yapıyla; tartışma ortamı ile içerik ortamının bütünsel hale getirilmesi ve bu ortamın etkililiğinin yaygın olarak öğrenme yönetim sistemlerinde kullanılan iplik yapılı tartışma ortamlarını da kapsayacak deneysel bir çalışma ile araştırılması amaçlanmıştır. Geliştirilerek öğrenme yönetim sistemi içerisine gömülen kavram odaklı tartışma ortamı ile bir diğer ortam olan ve öğrenme yönetim sistemi içerisinde bulunan hiyerarşik iplik yapısına sahip geleneksel tartışma ortamı (GTO) çeşitli boyutlarda karşılaştırılmışlardır. Öğrenme yönetim sistemi içerisinde bulunan kavram odaklı ve geleneksel yapıdaki tartışma ortamları; öğrenme algıları, kullanışlılık algıları, tartışma ortamlarına gönderilen mesajların nitelikleri ve öğrencilerin öğrenme stilleri gibi çeşitli boyutlarıyla karşılaştırılarak rapor edilmiştir.

Yöntem: Araştırmanın yöntem bölümü öncelikle (etkililik araştırmaları gereği olarak) deneysel ve tekrarlı ölçümlere (ön-test ve son-test gibi) dayalı olarak yapılması planlanmıştır. Ancak, ele alınan araştırma değişkenlerinin (öğrenme algısı, kullanışlılık algısı, öğrenme stili) daha çok durumsal özellikli (gelişim göstermeyen) değişkenler olması; bunun yanı sıra araştırmada iki tartışma ortamının karşılaştırılması amaçlandığından tekrarlı ölçüm yapısından vazgeçilmiştir. Buna göre araştırmanın deneysel tasarımı "uygulama ve sontest" şeklinde (Karasar, 2007) yapılandırılmıştır. Araştırmanın örneklem grubu Uşak Üniversitesi Eğitim Fakültesinde okumakta olan 90 lisans öğrencisinden oluşturulmuştur. Deney grubu öğrencileri (44) içerisine kavram odaklı tartışma ortamı bulunan öğrenme yönetim sistemine girerlerken, kontrol grubu öğrencileri ise (46) içerisinde geleneksel tartışma ortamının bulunduğu öğrenme yönetim sistemine katılmışlardır. Deney ve kontrol grubu öğrencileri tam rastgele olacak biçimde (Excel yazılımında Rnd() fonksiyonu kullanılarak) her iki gruba dağıtılmıştır. Deney ve kontrol grubu öğrencileri "Öğretim İlke ve Yöntemleri" dersi kapsamında 6 hafta boyunca araştırmacı tarafından geliştirilen ortamlara katılmışlardır. Uygulama sonrası tartışma ortamlarında öğrenme algısı ölçeği, tartışma ortamlarında kullanışlılık algısı ölçeği, öğrenci stilleri ölçeği, katkı nitelik analiz ölçeği (dereceli değerlendirme tipi) uygulanmıştır.

Tartışma ortamlarında öğrenme algısı ölçeği Wu ve Hiltz (2004) tarafından geliştirilmiş ve bu araştırma kapsamında Türkçeleştirilerek gerekli geçerlik ve güvenirlik analizleri yapılmıştır. İkinci olarak kullanılan kullanışlılık algısı ölçeği araştırmacı tarafından geliştirilmiş, çevrimiçi öğrenme ortamları içerisindeki tartışma ortamlarının kullanışlılığına ilişkin öğrenci algılarını ölçmeyi amaçlayan bir ölçektir. Üçüncü olarak tartışma ortamlarına gönderilen mesajların niteliğinin ortaya çıkartılması amacıyla araştırmacı tarafından geliştirilmiş katkı nitelik ölçeği kullanılmıştır. Katkı nitelik ölçeği öğrencilerin tartışma ortamlarında gönderdikleri mesajların değerlendirilmesine ilişkin dereceli değerlendirme ölçeği türü bir performans gözlem ölçeğidir. Her boyut, alan uzmanı iki gözlemci tarafından 0-4

arasında derecelendirilmiştir. Dördüncü ve son olarak kullanılan ölçek öğrenme stili ölçeğidir. Bu ölçek tartışma ortamlarında öğrenme yaşantısı geçiren öğrencilerin, öğrenme stillerini ortaya koymaya yöneliktir. Felder ve Soloman (1994) tarafından geliştirilmiş, Samancı ve Keskin (2007) tarafından Türkçeye uyarlanarak geçerlik ve güvenirlik çalışması yapılmış öğrenme stili indeksi uygulanmıştır. Dört boyut içeren öğrenme stili indeksinden sadece bir boyut ele alınmıştır. Öğrencilerin öğrenme süreçlerinde bilgiyi nasıl anlamlandırdıkları ortaya konması amaçlandığı için sadece sıralı – bütünsel boyutu ele alınmıştır.

Araştırmanın Bulguları ve Sonuçları: Araştırma sonucunda, kavram odaklı tartışma ortamını kullanan öğrencilerin öğrenme ve kullanışlılık algılarının geleneksel tartışma ortamını kullanan öğrencilerden yüksek olduğu bulgusuna ulaşılmıştır. Kavram odaklı tartışma ortamına giren deney grubu öğrencilerinin, geleneksel tartışma ortamına giren kontrol grubu öğrencilerine göre; öğrenme ortamı içerisindeki konu anlatımları arasında kolayca gezinebildikleri, öğrenme ortamı içerisindeki konu anlatımlarından kopmadan tartışmalara kolayca geçiş yapabildikleri, sürdürdükleri tartışmalara kolayca geri dönebildikleri ve sürdürdükleri konu anlatımına kolayca geri dönebildikleri bulgularına ulaşılmıştır. Ayrıca tartışma ortamlarına gönderilen mesajların kalitesi bakımından katkı nitelikleri incelenmiştir. Kavram odaklı tartışma ortamına gönderilen mesajlar geleneksel tartışma ortamına gönderilen mesajlara göre bilgi geçerliği, bilişsel çaba harcama, konuyu anladığını gösterme, örnek referans gösterme, anlaşılır olma, işbirliği içerme ve yönlendirme yetenekleri bakımlarından anlamlı olarak daha nitelikli mesajlar olduğu sonucuna ulaşılmıştır. Araştırmada son olarak öğrenme stilleri ile öğrenme algıları arasındaki ilişkiler incelenmiştir. Geliştirilen kavram odaklı tartışma ortamı sıralı ya da bütünsel öğrenmelerde öğrenciler arasında öğrenme algısında farklılık ortaya koymaz iken; aksine geleneksel tartışma ortamının özellikle sıralı öğrenme stiline sahip öğrencilerde (bilişsel ve duyuşsal öğrenme algılarına göre) bir olumsuzluk ve eşitsizlik yarattığı bulgusuna ulaşılmıştır. Ayrıca kavram odaklı tartışma ortamının ise bu eşitsizliği ortadan kaldırdığı ifade edilebilir.

Öneriler: Günümüzde var olan öğrenme yönetim sistemlerinden yola çıkılarak tartışma ortamı ile içerik ortamını bütünsel hale getirici bir ürün geliştirilmiştir. Yeni geliştirilen bu ortamdaki öğrenme algısı ve memnuniyet algıları bakımından anlamlı olarak daha olumlu sonuçlar elde edilmiştir. Bu sonuçtan yola çıkarak, çevrimiçi öğrenme ortamlarında tartışma ortamı kullanılacak ise, bunun içerik ortamı ile bütünsel hale getirilmesinin öğrencilerin algılarını olumlu yönde etkileyeceği ve farklı öğrencilerin öğrenme stillerinden kaynaklı farklılıkları azaltabileceği ifade edilebilir.

Anahtar Kelimeler: Tartışma forumu, çevrimiçi öğrenme ortamı, öğrenme stilleri, öğrenme yönetim sistemi.