

University Students Assess the Achievement of the E-Learning Outcomes of Disasters and Mitigation and Disaster Management Courses

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ABSTRACT In 2009, Kocaeli University entered the process of educational reconstruction. Since 2012, all students have been able to choose two separate courses under the name of university electronic elective course (E-course) within the scope of these changes if they want. These courses are Disasters and Mitigation and Disaster Management courses. In these courses, it is tried to increase disaster awareness in as many students as possible and to ensure that they learn, think about and discuss both what they can do individually and the social contribution they can offer in this regard. The students assess these learning outcomes at the end of the term. In this study, to what extent the 3,302 students, who had taken these courses in the past three years, thought they had achieved the e-learning outcomes of these courses and the relationship between the academic achievement they showed in the courses and the achievement of the learning outcomes have been examined. The results of the study show that the e-learning outcomes of these courses have been achieved "above the expected level". No relationship has been found between the academic achievement and the achievement level of the learning outcomes for the Disaster and Mitigation course. This result shows that as the content of this course is for individual achievements, these achievements are believed to be more effective and important than the academic achievement by the students.

Keywords :Disaster, Mitigation, Disaster management, e-Learning outcomes, E-course, Kocaeli, Turkey

Üniversite Öğrencileri Afetler ve Zararlarının Azaltılması ve Afet Yönetimi Derslerinin E-Öğrenme Çıktılarının Gerçekleştirilmesini Değerlendiriyor

ÖZ Türkiye’de 1999 yılı afet zararlarının azaltılması ve afet yönetimi açısından bir milat olarak değerlendirilmekle birlikte 2009 yılından itibaren gerek resmi kurum ve kuruluşlar gerek sivil toplum örgütleri ve özel sektörde önemli çabalar sarfedilmekte ve toplumun tüm katmanlarında bu alanda bir duyarlılık oluşturulmaya çalışılmaktadır. Milli Eğitim Bakanlığının ilk ve ortaokul programlarında yaptığı değişikliklerde de bu çabaların izlerine rastlanmaktadır. Ülkemizin en önemli kurumlarından biri olan üniversitelerde de bu çabanın filizlendiği ve önemli adımların atıldığı yadsınamaz. Üniversitelerde yalnızca jeoloji, jeofizik gibi alanlarda değil tüm alanlarda afet zararlarının azaltılması ve afet yönetimi konusunda derslerin yer alması konusunda birkaç üniversitenin girişimlerde bulunduğu bilinmektedir. Bunlardan biri de Kocaeli Üniversitesidir. Üniversitemiz bulunduğu coğrafi konum itibarıyla afetler konusunda yüksek riske sahip olması sebebiyle afet zararlarının azaltılması çabalarında destek oluşturmakta ve öncülük etmektedir. 2009 yılında Üniversitemiz eğitim öğretimde yeniden yapılanma sürecine girmiş ve 2010-2011 öğretim yılında kademeli bir şekilde program değişiklikleri sisteme yansıtılmaya başlamıştır. 2012 yılından beri bu değişiklikler kapsamında tüm öğrencilerimiz isterlerse, afet konularındaki iki ayrı dersi üniversite elektronik seçmeli ders (E-ders) adı altında seçebilmektedirler. Bu

dersler, Afetler ve Zararlarının Azaltılması ve Afet Yönetimi dersleridir. Bu derslerle mümkün olduğunca fazla öğrencide afet duyarlılığını arttırmak hem bireysel olarak yapılabilecekleri, hem de bu konuda sunabilecekleri toplumsal katkıyı öğrenmeleri, düşünmeleri ve tartışmaları sağlanmaya çalışılmaktadır. Öğrenciler, kendilerine bilgi sisteminden sağlanan ders izlencelerine ve bu izlenceler doğrultusunda gerçekleştirilmesi hedeflenen öğrenme çıktılarına ulaşabilmektedir. Öğrenciler, dönem sonunda da bu öğrenme çıktılarını değerlendirmektedirler. Bu çalışmada son üç yıl içinde bu dersleri alan 3.302 öğrencinin bu derslerle ilgili öğrenme çıktılarının ne düzeyde gerçekleştiğini düşündükleri ve derste gösterdikleri akademik başarıyla öğrenme çıktılarının gerçekleştirilmesi arasındaki ilişki incelenmiştir. Ayrıca öğrencilerin öğrenim gördükleri alanın ve cinsiyetlerinin bu değerlendirmedeki etkisi araştırılmıştır. Araştırmanın sonuçları, e-öğrenme ile gerçekleştirilen 2 derse ait öğrenme çıktılarının “beklenen düzeyin üzerinde” gerçekleştiğini göstermektedir. Derslerden biri olan Afetler ve Zararlarının Azaltılması dersi için akademik başarı ile öğrenme çıktıların gerçekleştirme düzeyi arasında bir ilişki bulunamamıştır. Bu sonuç, bu ders içeriğinin bireysel kazanımlara yönelik olması nedeniyle bu kazanımların öğrenciler tarafından akademik başarıdan daha etkili ve önemli olduğuna inandıklarını göstermektedir

Anahtar kelimeler Afet, Zarar Azaltma, Afet Yönetimi, e-Öğrenme çıktıları, e-öğrenme, Kocaeli, Türkiye

Introduction

Following the adoption of the Hyogo Framework of Action plan, various printed educational materials such as coursebooks/handbooks, guidebooks and posters and non-printed educational materials including activities, games and practices were developed by several different institutions and non-governmental organizations in many countries. Since the turn of the Millennium, quite a variety of educational materials aimed at disaster risk mitigation have been developed for children as a result of the rapid development of internet and information sharing (Asharose, et al, 2015).

In one of his studies, Kitagawa (2015) highlights the importance of disaster trainings given both formally and informally in Japan, considers disaster safety as a part of safe education and emphasizes that disaster safety can be provided with disaster training, disaster management and disaster coordination. In the same study, it is also emphasized that contents of formal education and disaster policies are developed depending on the lessons taken from the experienced disasters (Kitagawa, 2015). In a study, Tanaka (2005) different approaches and information on disaster education are necessary for people to be motivated to take preparatory activities in different cultures (Tanaka, 2005).

In a study, Asharose et al. (2015) mention the requirements of execution of prevention activities by communities to minimize the disaster risk and damage mitigation and preparation activities to restrict the impacts of disasters. In the same study, the role of direct training given by institutions based on a curriculum and indirect training provided through a person's own daily activity in increasing the disaster awareness of the society is also underlined. These trainings play an important role in disasters and mitigation and provision of human safety as part of sustainable development (Asharose, et al, 2015). In a study Bansal and Verma highlights, since earthquake forecast is not yet possible, it necessitates better understanding of seismic hazard and an important programme, which goes hand in hand with disaster mitigation efforts, is the education and awareness. In addition, at the same study emphasis that interactive learning; creating an opportunity for students at the all level of education (Bansal and Verma, (2012).

Training programs were developed by several institutions such as the Ministry of National Education, Boğaziçi University, Kandilli Observatory and Earthquake Research Institute, Turkish Red Crescent, universities, municipalities and non-governmental organizations to reduce the impacts of disasters after the 1999 earthquakes, which wounded our country deeply, and develop the behavior pattern at the time of a disaster (MoNE, 2011; Sanduvac & Petal, 2010). Unfortunately, these trainings were continued for a short time after the great losses experienced and they could not go beyond social activities or be integrated into the education system. In a study carried out by Karancı et al. (2005), it was stated that such short disaster preparedness trainings increased the motivation of individuals; however they did not lead to lasting behavioral change. In the same study, it was also emphasized that education reduced anxieties about the potential disasters and the anxieties decreased as the education level increased (Karancı et al., 2005). Therefore, being aware of the existing awareness, attitude and individual priority levels in the society starting from individuals in order to develop community-based disaster trainings and programs and accordingly inclusion of disaster training courses in all levels of education will contribute to the development of social awareness. Upon the establishment of AFAD (Turkish Disaster and Emergency Management Presidency) in 2009, disaster awareness and disaster preparedness efforts gained speed. Certification Training Programs provided by AFAD, Local Authorities, University Research and Application Centers can be given as examples of these efforts. In some of these trainings, e-learning tools are used. The target group of these training programs generally consists of experts working in this field and no assessment is made on the achievements of the training.

Educational institutions play an important role in disaster preparedness and community recovery after hazard events (Öcal and Topkaya, 2011). In the Department of Emergency and Disaster Management (college level) and Civil Defense and Firefighting programs (associate degree level) existing in a limited number of universities in our country, Civil Defense and Protection Information, Disaster Culture, Emergency Management and Civil Defense, Disaster Management, Disasters and Mitigation courses are taught. These departments train staff who will take an active role in the response stage of disaster management. On the other hand, unfortunately there are no courses aimed at the provision of disaster knowledge and creation of individual preparedness culture in most of the universities in our country. However, making a society prepared for disasters is possible through starting from individuals and reaching an institutional and social dimension. In primary and secondary school programs, disaster awareness and prevention culture is included in all levels even inadequately, however it is seen that these trainings are interrupted in higher education. Elective courses can be an alternative in the elimination of this deficiency in higher education level. Considering that fewer people can be reached in the elective courses which are taught face to face in a classroom environment, performance of these elective courses in an electronic media using e-learning tools will provide wider reach. E-learning is an educational activity performed using information and communication networks (Brooks, et al, 2006; Aytac, 2000).

It cannot be denied that such efforts have also begun to develop in universities, which are one of the most important institutions in our country, and significant steps have been taken. It is known that several universities have made attempts to include disasters and mitigation and disaster management courses in all fields, not only in the fields such as geology and

geophysics. One of them is Kocaeli University. Kocaeli University, has a high risk of disasters, due to its geographical position, it supports and leads the disasters and mitigation efforts. Through e-learning, information can be accessed from a desired place at a desired speed. Starting from this point of view, 2 elective courses designed with e-learning method as a means to disseminate disaster awareness and culture at the Umuttepe central campus of Kocaeli University regardless of branches were opened for all students in the electronic elective course package. It is observed that there has been a demand over the available placement quotas for these courses starting from the academic year of 2011-2012 up to the present. This demand demonstrates that young people living both in our province and in our country are aware of the disaster facts in our country and willing to access information on this issue.

Universities are institutions which have quite different student profiles and where technological developments were optimally put into practice and current technologies are utilized. As a matter of fact, enabling academicians to use the technology can also be stated as one of the priorities of higher education today (Marshall, 2010, p. 184). Both academicians and students can exchange information in the education process using the technological infrastructure and continue their educational activities without limitation of time and space (Browne et al, 2010; Laurillard, 2008). As well as these advantages, provision of the limits / learning outcomes of the information to be transferred to the students through e-learning beforehand, acquisitions of the transferred information and assessment of the extent of these acquisitions are also very important. The learning outcomes of these e-learning module courses taught in our university, which is the the subject of this study, are initially presented to the students. Learning outcomes is a clear definition of what a student needs to know, understand and can do at the end of the learning process (Bingham, 1999). The students were asked the achievement level of the learning outcomes of the course at the end of the term and allowed to evaluate the process from their own perspective. The information about to what extent the course outcomes were achieved by the students was obtained with the help of the collected data and whether this information was affected by the gender of the students and the field they studied and whether there was a correlation between the academic achievement of the students and the achievement level of learning outcomes were found.

The information about to what extent the individual has benefited from the trainings given on disaster awareness and consciousness no matter in what level is extremely important as it affects the development of the right behavior by the individual in case of a disaster or emergency. Moreover, performance of such assessments constitutes an opportunity for educators both to discuss and to improve the level and quality of the trainings provided.

The purpose of this study is evaluation of learning outcomes of Disasters and Mitigation and Disaster Management courses according to academic achievement, gender and branches of students. For this purpose, it has been tried to find answer to the following questions

To what extent do the students think they have achieved the learning outcomes determined in Disasters and Mitigation and Disaster Management courses?

Is there a relationship between the students' achievement level of the learning outcomes of Disasters and Mitigation and Disaster Management courses and their academic achievement in these courses?

Does gender have an impact on the students' achievement level of the learning outcomes of Disasters and Mitigation and Disaster Management courses?

Does whether the students are majoring in Social Sciences or Physical Sciences have an impact on the achievement level of the learning outcomes of Disasters and Mitigation and Disaster Management courses?

Method

This research has been organized according to the general screening model. As the subject of this research is e-courses, which is a product of an effort we try to create in our university to take disaster awareness a step further, and determination of to what extent the learning outcomes of these courses have been achieved, it describes a special case. Therefore, the student group constituting the sample of the study consists of students taking these courses. Table 1 and Table 2 show the information about the sample.

Table1. Distribution of students according to gender for lessons of Disasters and Mitigation and Disaster Management

Lessons	Gender	N	Total
Disasters and Mitigation	Female	1017	1777
	Male	760	
Disaster Management	Female	903	1525
	Male	622	

Table 2. Distribution of students according to field of study for lessons of Disasters and Mitigation and Disaster Management

Lessons	Field of study	N	%
Disasters and Mitigation	Sciences	925	52,05
	Social Sciences	852	47,95
Disaster Management	Sciences	736	48,29
	social sciences	788	51,71

Two separate courses on disaster training within University Elective Courses, which can be selected by all the students as of the 2nd grade starting from the academic year of 2011-2012 within the scope of the studies ongoing since 2009 as part of the process of Reconstruction and Quality Improvement in Education, are opened as e-courses at Kocaeli University. One of these courses is Disasters and Mitigation and the other is Disaster Management courses. The

main objective of Disasters and Mitigation course is to enable the students to know the types of disasters and understand what the individual protection methods are when they are exposed to disasters. The main objective of Disaster Management course is to provide the understanding of disaster related administrative and institutional activities required to be carried out in addition to the individual protection methods and awareness of their necessity.

Outcomes of lessons of Disasters and Mitigation and Disaster Management is given in Table 3.

Table 3. Learning outcomes of lessons of Disaster Management and Disasters and Mitigation

Disaster Management	Disasters and Mitigations
• Explains phases of disaster management system, emergency and risk management concepts • Recognizes the stakeholders in disaster management system, their jurisdiction and responsibilities • Verifies the risk transfer methods. • Practices the Incident Command System • Explains the legislation of disaster management system in Turkey • Makes SWOT analysis and their applications.	• Knows the types of disasters, samples and the distribution of disaster in the world and in Turkey, • Knows vulnerability, the relationship between urbanization and disasters, mitigation, Earthquake Hazard Hunt and Family Disaster Preparedness Plan, • Knows Earthquake Prediction Research, Early Warning and Rapid Response System, Seismic Structural Awareness and Non-Structural Hazards Mitigation • Knows the concepts of Fire-fighting and prevention measures Mitigation Measures, Community Disaster Volunteers and business continuity.

The achievement level of the learning outcomes given in Table 3 was tried to be determined with a single question. The answers of the students were obtained using the following 5-point likert scale.

5 Far above the level I have expected

4 Above the level I have expected

3 At the level I have expected

2 Below the level I have expected

1 Far below the level I have expected

The opinions of the students taking Disasters and Mitigation and Disaster Management courses about to what extent the learning outcomes of these courses were achieved are given in Table 4. Whether these opinion varied by gender was examined using a t-test and the results are shown in Table 5.

Table 4. Achieved the level of designated learning outcomes of lessons for Disasters and Mitigation and Disaster Management

	N	$\bar{X}_{ort}$	Ss
Disasters and Mitigation	1777	3,73	,95265
Disaster Management	1524	3,45	1,10547

Examining Table 4, it is seen that the students are of the opinion that the learning outcomes of Disasters and Mitigation and Disaster Management courses were achieved above the level they had expected (Disaster Mitigation $\bar{X}_{avg}$ =3.73, Disaster Management $\bar{X}_{avg}$ =3.45).

Table 5. T-test results of learning outcomes of lessons for Disasters and Mitigation and Disaster Management

Lessons	Gender	N	$\bar{X}_{ort}$	Ss	t	p
Disasters and Mitigation	Female	1017	3,75	,9346	,538	,590
	Male	760	3,72	,9766		
Disaster Management	Female	903	3,49	1,0808	2,008	,045*
	Male	621	3,38	1,1377		

In Table 5, it is seen that gender did not affect the opinions of the students about the achievement of the learning outcomes of Disasters and Mitigation course and the achievement level of the outcomes for both groups were above expected ($t=0.538$, $p>.05$). It was determined that female students taking Disaster Management course found their achievement level of the learning outcomes higher than male students with a significant difference ($t=2,008$, $p<.05$). While males thought that they had achieved their outcomes at the expected level, females thought that they had achieved their outcomes above the expected level.

The relationship between the achievement level of the learning outcomes of Disaster and Mitigation and Disaster Management courses and the academic achievement level in these courses was examined and the results are given in Table 6.

Table 6. Investigation the relationship between the level of realization of the learning outcomes and the level of the academic achievement according to Pearson Correlation

Pearson Korelation	The level of realization of gains		The level of achievement
	Disasters and Mitigation	r	.012
		N	1777
	Disaster Management	r	.111**
		N	1524

** . $P<0.01$

Although there is a positive correlation between the opinions of the students taking Disasters and Mitigation course about their achievement level of the learning outcomes and their academic achievement in this course, the correlation was not found statistically significant (Pearson's $r = 0,012$, $p > 0,01$).

On the other hand, a positive correlation was found between the opinions of the students taking Disaster Management course about their achievement of the learning outcomes and their academic achievement in this course ($r = 0,111$, $p < 0,01$).

As the distribution of the students according to their grade and faculty or college was not homogeneous, their achievement levels of the outcomes were not examined according to these variables. However, the departments were grouped as social science and physical science fields and the achievement levels of the students in two different fields for the outcomes of these courses were examined and the results are given in Table 7.

Table 7. The level of realization of the learning outcomes of the lessons, independent t-test results of changing according to study field of students

Lessons	Field of study	N	X_{ort}	Ss	t	p
Disasters and Mitigation	Sciences	925	3,7514	,94480	.627	.531
	Social Sciences	852	3,7230	,96144		
Disaster Management	Sciences	736	3,4810	1,10640	1.05	.293
	Social Sciences	788	3,4213	1,10453		

In Table 7, it is seen that the field they were majoring did not affect the achievement level of the learning outcomes of the students taking Disasters and Mitigation and Disaster Management courses (Disasters and Mitigation $t = 0.627$, $p > .05$; Disaster Management $t = 1.05$, $p > .05$)

Results and Recommendations

The results obtained from this study, where the learning outcomes of Disasters and Mitigation and Disaster Management courses taught as electronic elective courses at the level of bachelor's degree at Kocaeli University between the years of 2012-2014 were assessed, are summarized below.

According to the results of the analysis, it is seen that the students taking these courses were of the opinion that they had achieved the learning outcomes of both courses above the expected level. It is a fact that larger masses can be reached through the electronic media with the developing technology. This result supports the fact that communication of information to individuals in the right way through electronic media is the shortest and fastest method. Quick

steps can be taken in building a society prepared for disasters with e-learning training modules to be adopted by the authorized bodies in this direction.

The achievement level of the learning outcomes of Disaster and Mitigation course did not vary by gender. This result shows that individuals need to know the potential disasters independently of gender and improve their knowledge level related to individual precautions.

The achievement level of the learning outcomes of Disaster Management course varied significantly by gender. The achievement of the outcomes was at the expected level for male students, whereas it was considered above the expected level for female students.

No significant relationship was found between the academic achievement of the students taking Disaster and Mitigation course and the achievement level of the learning outcomes of the course. This shows that the achievement of the course did not affect the achievement of the outcomes. No matter the students failed or passed the course, it can be said that the students believed these outcomes were achieved.

On the other hand, a significant relationship was found between the academic achievement of the students taking Disaster Management course and the achievement level of the learning outcomes of the course. The content of Disasters and Mitigation course contains information about the events which directly affect individuals when they experience disasters and how to maintain their safety against these events, whereas the content of Disaster Management course rather contains the functions of authorities and the responsibilities of the authorities in the precautions to be taken and things to be done at the time of disasters. It can be said that the students prioritized their academic achievement over the courses they thought they individually would not benefit from directly.

It is seen that the fields the students were majoring in did not affect the achievement level of the learning outcomes of the students taking Disasters and Mitigation and Disaster Management courses. This result can be interpreted as course preparation and presentation were organized in such a way that both physical science and social science students could understand. This result also indicates that whatever their major was, the students believed the necessity of such courses.

The fact that we live in a region of Turkey where many types of disasters frequently occur made us think the e-learning process as the lowest cost and shortest way to accelerate the process of increasing disaster awareness and disaster preparedness. The effectiveness of the courses prepared through e-learning is highly important. In the following process, studies can be carried out on the sustainability of these impact and outcomes achieved.

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