Analysing Issues for Applying E-learning to the Subject of Electricity in Higher Education in Turkey

**1Dursun Akaslan, 2Effie L-C Law, 3Sezai Taşkın,**

University of Leicester, Leicester, United Kingdom, info@kesfedici.com1;

University of Leicester, Leicester, United Kingdom, elaw@mcs.le.ac.uk2;

University of Celal Bayar, Manisa, Turkey, sezai.taskin@bayar.edu.tr3

Abstract

The age consists of the usage of Information and Communication Technologies (ICTs) widely in Higher Education Institutions because ICTs offer many opportunities for organizations and individuals as e-learning. HEIs are highly interested in integration e-learning to take the benefits of it. However, there are several barriers that aggravate the integration of e-learning into HEIs. Hence, the purpose of this study is to find out about how to implement e-learning in HEIs in the field of electricity in Turkey by benefiting from our previous research conducted to measure individuals' readiness for e-learning in those HEIs. To address this objective, two techniques were used: interview and survey. The findings from interviews and survey are categorized around four main concepts: first, current issues in education and training in those HEIs; second, the perceptions of academic staff regarding e-learning; third, the advantages and disadvantages of e-learning as a solution for the respective issues; and fourth, a strategy to implement e-learning. Overall, the research revealed that e-learning will bring an innovation into the respective HEIs and e-learning should be implemented using blended learning approach to support face-to-face education and training.

1. Introduction

ICTs especially the Internet and computers have revolutionized education and training. These technologies are a common multimedia delivery method for education and training named as e-learning. Higher Education Institutions (HEIs) are interested in implementing e-learning as it offers many opportunities for organizations and individuals, namely enhancing reputation, developing information skills, widening access, supporting disabled students, improving quality in education and training, reducing cost, increasing flexibility, and saving the planet and resources. Rutkowski and Moscinsca (2011) say that it is not necessary any more to gather in front of an instructor at the same time because instruction can be take place across thousands of miles. This provides flexibility for delivering education and training from anywhere and at anytime. In addition, there is no need for students to commute from residences to colleges. This freedom helps students to cut their education and training cost.

However, several barriers hinder the integration of e-learning into HEIs. Amongst them, the first major concern is to develop a strategy to implement e-learning and then comes to the second concern of whether individuals in HEIs are prepared mentally and physically to adopt and implement e-learning. Hence, the purpose of this study is to find out about how to implement e-learning in the HEIs associated with the subject of electricity by benefiting from our previous research conducted to assess teachers' readiness for e-learning. To address this objective, semi-structured interviews and a survey were conducted. Interviews are based on four main concepts: firstly, the current issues in both education and training namely theoretical and practical issues in the respective HEIs were discussed; secondly, the perceptions of Turkish academic staff about the definition of e-learning were examined; thirdly, the advantages and disadvantages of e-learning were discussed to find out whether e-learning tends to be a solution for issues or whether it can create new issues in those HEIs. Fourthly, the way e-learning should be implemented to solve actual issues in education and training in those HEIs. By following these four concepts, a model for e-learning as a solution for issues in the HEIs related to electricity in Turkey are generated. Additionally, the model is supported using findings comes from open-ended questions in the survey.

**2. A Model for Clarifying differences between Education and Training**

It is redeemed relevant for us to clarify differences between education and training and between theory and practice because our research focus is to apply e-learning as a potential solution for some of the issues in education and training in the respective HEIs. It is appropriate to start looking at the etymology of the words “education” and “training”. The word “education” is derived from the Latin “educare” which means to rear, to lead forth, to draw out something potential or latent and the word “training” is also derived from the Latin “traginare” which means to undergo instruction, discipline or drill (Adonyi, 2010). The terms training and education are , today, frequently used interchangeably, ignoring the distinction between them (Kline, 1985). Schier (2006) simply defines education as giving out information and communicating to individuals and training as about practice and building skills. Moore (1998) says that training prepares a student for one particular job or activity enabling the student to attain high proficiency in a specific skill, but providing him neither a broad perspective nor the flexibility of the approach taught. However, Moree (1998) says that education prepares a student to deal with and solve a broad range of problems and to choose which problems are important and which are not. It seems clear that education mostly focuses on theories and training mostly on practices in HEIs. Theory is defined as where people know everything but nothing works and practice as where everything works but nobody knows why. Apparently, theory exists mostly for answering questions *what* and *why* and practice for *how* and *where*. Additionally, the outputs of education are likely to be more abstract whereas those of training to be more concrete.

Figure 1: A Model for Clarifying Differences between Education and Training

In summary, we assign the following meanings to education and training. The word “education” is the process of gaining knowledge mostly for answering the questions what and why through theories which are mostly abstract. The word “training” is the process of gaining skills mostly for answering the questions how and where through practices which are mostly concrete. The above citations roughly tells us what education and training as well as theory and practice are but not sufficient. As the objective of both education and training is teaching which should result in learning, they can help us clarify differences better. The purpose of learning is mainly identified in three parts which is usually known as Bloom’s Taxonomy: cognitive, affective and psycho-motor domains (Kline, 1985) as detailed in the Fig 1. Kline (1985) says that training emphasizes the psycho-motor domain of learning. Training that involves cognitive domain of learning is usually at the knowledge level and lower part of the comprehensive level. However, education teaches a minimum of psycho-motor skills but concentrates on cognitive domain of learning which is especially at a higher part of the comprehensive level or above. With regard to affective domain learning, he says it may be a focus of both training and education. Thus, a model for clarifying differences between education and training is illustrated in Figure 1. This model is used to analyze issues in education and training, which come from the interviews.

**3. Methodology**

**3.1 A Method for Analyzing Qualitative Data**

Generally speaking, there are two reasoning methods: induction and deduction. Inductive approaches work from specific observations to broader generalizations or theories. In contrast, deductive approaches work from more general to more specific. Inductive reasoning rather than deductive allows for the modification of the concepts and relationships between concepts occur throughout the process of doing research, which aims to represent the reality of a situation in most accurately (Ratcliff,1994). Glaser and Straus (1967) emphasizes that inductive approach involves generating theory as well as testing theory. However, they mainly focus on generating theory without testing, which is termed “grounded theory” (Ratcliff,1994). Grounded theory is now one of the most influential and widely used modes of conducting qualitative research when generating theory is the principal aim of researchers (Strauss and Corbin., 1997). Grounded theory is still theory but it is derived from data rather than a theory which is derived by putting together a serious of concepts based on experience or solely through speculation (Strauss and Corbin). They also highlight that grounded theories, as they are drawn from data, are more likely to resemble the reality, to offer insight, to enhance understanding and to provide a meaningful guide to research. Grounded theory analyzing involves four basic steps:

**Figure 2:** A step-by-step Model for Analyzing Qualitative Data

**Coding.** Coding text is beginning to search for theory (Charmaz, 2006; Bernard and Ryan., 2010). Coding text begins with a line-by-line analysis to identify potentially useful concepts. The goal of coding is the segmentation of text into concepts. This is also known as open coding or initial coding. The important thing is to get impressions about concepts and to give the concepts descriptive names (Bernard and Ryan2010). There are many techniques for coding such as “repetitions”, “metaphors and analogies”, “transitions”, “similarities and differences”, etc. The technique we use to identify concepts in this paper is the “similarities and differences” with the aim to find out what a line, statement or paragraph is about and how it is similar or different from the preceding or following lines, statements or paragraphs (Bernard and Ryan2010).

**Theorizing.** It is to integrate concepts together. It aims to find out about how each concept identified in coding text might be related to some larger, more inclusive concepts. Put simply, it is to group similar concepts together. Bernard et al. suggest theorizing alongside continuous coding. This is also known as focused coding, axial coding or theoretical coding. Grounded theorists mostly consider theorizing as a part of coding (Charmaz, 2006). However, we separate theorizing from coding because the research we conducted are semi-structured interviews, which transitions or shifts in thematic content are naturally occurring. That is to say, it is easy for us to identify categories that similar concepts belong to because interviewees are forced to change themes after they complete their sayings.

**Memoing.** Memoing involves hypothesis about how the concepts may be related when running notes on how each of the concepts identified (Bernard and Ryan, 2010). It is the intermediate step between coding and the first draft of the completed analysis. Memoing begin the first concept identified and continues right through the process of defragmenting the text and of building theories. In other words, the relationships between concepts are identified via memoing.

**Building and Refining Theories.** After identifying categories to integrate related concepts, it is important to link the categories together in to construct a central model, which holds everything together and is applicable for every interview. In summary, the above mentioned four-stepped approaches are used to analyze data obtained from the interviews as illustrated in Figure 2.

**3.2 Procedure**

417 departments/programs in the respective HEIs in Turkey were selected for the study. The participating institutions were determined by considering whether they were associated with the subject of electricity according to the official data in 2010 provided by the OSYM (the Student Selection and Placement Centre) in Turkey. Two techniques namely survey and interviews were selected for the study. For the survey, an eight-section questionnaire, which includes 39 quantitative and 8 qualitative items, to measure teachers' readiness for e-learning in the respective HEIs were prepared. For the interview, a semi-structured questionnaire including 4 questions were prepared. More than 1206 academic staff (e.g. researchers, strategists, lecturers, and administrators) was invited to participate in the survey and to conduct an interview between 16 March and 16 April 2010. For the survey, 424 individuals participated in the survey with 289 answering all items, 53 some of them and 82 invalid participants. For the interview, 66 participants wanted to conduct an interview whereas only 18 participants attended in interviews. The findings from quantitative items (39 items) in the survey were already analyzed and published. The qualitative items (8 items) in the survey will be used to support the model to implement e-learning.

**3.3 Research Group**

The number of the participants in the survey and in the interview is illustrated according to their characteristics such as gender and institutions in which they were working at the time which the research is conducted in the Table 1. The distribution of participants was placed according to their full or partial respondents. The respondents who answered all items in the survey and interview were accepted as full participants.

Table 1: Number of Participants in the Survey and Interviews

|  |  |  |
| --- | --- | --- |
| *Gender* | *Survey* | *Interview* |
| *Full* | *Part* | *Full* | *Part* |
| Female | 43 | 6 | 1 | 1 |
| Male | 246 | 47 | 16 | 0 |
| *Institutions* | *Survey* | *Interview* |
| *Full* | *Part* | *Full* | *Part* |
| Aircraft Electric and Electronics | 6 | 1 | 0 | 0 |
| Avionics | 1 | 0 | 0 | 0 |
| Electrical and Electronics Engineering | 161 | 30 | 5 | 1 |
| Electrical Education | 32 | 6 | 3 | 0 |
| Electrical Engineering | 25 | 1 | 0 | 0 |
| Electrical Energy Generation, Transmission and Distribution | 2 | 1 | 0 | 0 |
| Electricity | 61 | 14 | 9 | 0 |
| Rail Systems Electrical and Electronics Technology | 1 | 0 | 0 | 0 |

**3.4 Items**

Table 2 indicates the items in the survey and interviews and the number of respondents for each item. It shows that there are 4 items in the interviews and 8 qualitative items in the survey. Firstly, self-reports of participants in the interviews will be analyzed for each item using the method mentioned in the Fig 2. Then, findings from interviews will be supported using the items in the survey to generate a model to implement e-learning in the HEIs associated with the subject of electricity in Turkey.

Table 2: List of Item Identifier and Content

|  |  |
| --- | --- |
| *Interview Items* | **F** |
| **I1** | What are issues or inadequacies in your department / program you are currently working? | **18** |
| **I2** | What is the meaning of e-learning for you? | **16** |
| **I3** | How can e-learning solve or help to solve issues in your department or program?  | **16** |
| **I4** | How should e-learning be implemented in your department or program? | **16** |
| *Survey Items* | **F** |
| **I1** | What kind of ICTs do you use in confidence or in difficulty? | **43** |
| **I2** | Can you elaborate your personal experiences and views on e-learning? | **55** |
| **I3** | Is e-learning applied in your department / program? | **24** |
| **I4** | Is e-learning applied in your faculty / high school? | **22** |
| **I5** | Is e-learning applied in your university? | **15** |
| **I6** | Can you elaborate how useful and how easy for you to use e-learning in your work? | **60** |
| **17** | Can you elaborate the types of training you have in mind before embarking on e-learning? | **95** |
| **18** | Would you like to express your ideas how e-learning can help to solve current issues in the science of electricity or to suggest anything to implement e-learning? | **56** |

4. Findings

The section aims to analyze the self-reported responses of the participants in the survey and in the semi-structured interviews based on four main concepts: issues, what is e-learning, e-learning as advantages and disadvantages and how to implement e-learning. Text obtained from open-ended questions in the survey and interviews will be analyzed using methods indicated in the Fig 1 and 2.

**4.1 Issues in Education and Training**

Table 3 indicates the name of issues obtained from 18 interviews and their frequencies to highlight. It also displays the relationships between issues. It shows that issues are mainly gathered around 9 categories. Relationships between concepts and their categories are shown numbering using family tree approach. In additionally, the significance of concepts and categories are illustrated giving a number between brackets.

* 1. **What is E-learning?**

Table 4 indicates the list of key words used by interviewees to define what e-learning is in terms of their perceptions. It also shows the frequencies of those words. It seems that participants mostly use the word “learning” to define e-learning. This reveals that there is a common agreement that e-learning is a learning approach or method.

Table 4: Keywords used by Interviewees to define E-learning and their Frequencies

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Key Words** | **F** | **Key Words** | **F** | **Key Words** | **F** |
| learning | 1 | Internet and computer-aided | 1 | electronic tools | 1 |
| method | 1 |  |  |  |  |

**4.3 How to Solve Issues in Education and Training using E-learning**

**Note Taking Anxiety:** It is believed that e-learning will help to solve issues related to note taking. Interviewee (0002) says that “*e-learning will save students from note taking or photocopy keeping anxieties*”.

Table 3: Issues in Education and Training

|  |  |  |  |
| --- | --- | --- | --- |
| **Main Category** | **Sub-Category** | **Concept** | **Sub-concept** |
| **1** | **Insufficient****Infrastructure (3)** | 1.1 | TheoreticalExcessiveness (2) | 1.1.1 | Insufficient Motivation (2) | **-** | **-** |
| 1.1.2 | Reality Check | **-** |  |
| 1.2 | PracticalInadequacy | 1.2.1 | Time Lag (2) | **-** | **-** |
| **2** | **Insufficient****Industry** | 2.1 | Qualified PersonalShortage | - | - | **-** | **-** |
| 2.2 | Unemployment | - | - | **-** | **-** |
| **3** | **Insufficient****Staffing (2)** | 3.1 | Qualified TeacherShortage | 3.1.1 | Insufficient Teacher Qualification | 3.1.1.1 | Unwillingness for Research |
| **4** | **Teaching-based****System** | 4.1 | Assessment-Oriented Education and Training | 4.1.1 | Assessment-Oriented Usage (2) | 4.1.1.1 | Assessment-Oriented Library and Photocopy Room Usage |
| 4.1.2 | Note-taking anxiety | - | - |
| 4.2 | Graduate-Oriented Education and Training (3) | 4.2.1 | Misconception for Industry | **-** | **-** |
| 4.3 | Easy-designexperimental Set-up | 4.3.1 | Lack of complete design (3) | - | - |
| 4.3.2 | Insufficient Challenging Learning (2) | - | - |
| 4.3.3 |  Lack of Competence Transfer | - | - |
| 4.3.4 | Role Learning,  | - | - |
| 4.3.5 | Lack of Workshop Design  | - | - |
| 4.3.6 | Lack of Tool Recognition | - | - |
| **5** | **Open-Admission System** | 5.1 | Incuriosity (2) | 5.1.1 | Lower Usage | 5.1.1.1 | Lower Library Usage |
| 5.1.2 | Insufficient Information Demand | - | - |
| 5.2 | Non-research Internet Usage | - | - | - | - |
| 5.3 | Unprepared Attendance | - | - | - | - |
| **6** | **Foreign Language Inadequacy** | 6.1 | Insufficient Translation | - | - | - | - |
|  |  | 6.2 | Insufficient U-to-dateness | - | - | - | - |
| **7** | **Insufficient Interuniversity Cooperation** | 7.1 | Insufficient U-to-dateness | - | - | - | - |
| **8** | **Insufficient Industrial Practice Period (2)** | 8.1 | Negative Industrial Attitude | - | - | - | - |
| 8.2 | Insufficient Learning Experience | - | - | - | - |
| 8.3 | High Industrial Accident Risk | - | - | - | - |
| **9** | **Inaccurate Curriculum Schedule (2)** | 9.1 | Lack of Cooperation (2) | 9.1.1 | Insufficient Learning Experience | 9.1.1.1 | Qualified Personal Shortage |
| 9.1.1.2 | Unemployment |
| 9.2 | Lack of Observational Tracking System | - | - | - | - |
| 9.3 | Excessive Theoretical Load | - | - | - | - |

**Reality Check Issue**: It seems that students in the HEIs associated with the subject of electricity are continuously asking the objectives and aims of theories taught in classrooms because they do not believe that those theories are not going to be helpful when they start to work in industries. Interviewee (0002) believes that e-learning will help to solve

**4.4 How to Implement E-learning**

Table 4: Keywords used by Interviewees to define E-learning and their Frequencies

|  |  |  |
| --- | --- | --- |
| **Key Words** |  | **F** |
| electronic tools |  | 1 |
| Internet and computer-aided |  | 1 |
| learning |  | 1 |
| method |  | 1 |

5. Conclusion

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