Paper presented at the 8th *International Educational Technology Conference*, Anadolu University, 6-9 May, 2008, Eskişehir, Turkey.

# A STUDY TO COMPARE CURRICULUM OF COMPUTER INFORMATION SYSTEMS AND COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGIES

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## ABSTRACT

Today, developments of information and communication technologies have been developing very fast all over the world. These new technologies were taking an important place in education like other sciences. For this reason, education was developing parallel to new developments on the new technologies. Departments which cover curriculum of new technologies, contribute educational technologies in different directions. From this point, the aim of this study is to reveal the contribution of Computer Education and Instructional Technologies (CEIT) and Computer Information Systems (CIS) to educational technologies. Curriculums of CEIT and CIS departments' of Near East University in North Cyprus are covered in this study. The results obtained were analyzed using descriptive methods and construed. In the directions of obtained results, contributions of both departments to the educational technologies were manifested and both departments' similarities and differences were uncovered. Furthermore, suggestions were made that include how do departments increase their efficiency and effectiveness in educational technologies.

**Keywords:** Curriculum, Information Systems, Computer and Educational Instructional Technologies, educational technologies, programming languages, web-based programming, database, authoring tools.

## INTRODUCTION

The information society is characterised as a society in which low-cost information is in wide and general use. It is also referred to as the knowledge (-based) society, to emphasise the fact that the most valuable asset is investment in intangible, human capital and the key factors determining growth and development are knowledge and creativity (DESIDOC, 2007). Yücel (1997) suggested that information society defines a person having the attributes of being able to do: analysis, synthesis, research, objectivity, practical innovative thinking, problem solving and decision making abilities, able to do collaborative group work, influential speaking, report writing and presentation. Information society ensures that a knowledgeable generation is raised; level of education is increased and broadened. The mature human effort, which forms the main basis of development, can only be created with education. The future of a nation is characterised by its educated human force.

There is the view that the idea of a digital divide is irrelevant because those who need information and communication technologies (ICTs) in the more developed countries already have them, and those who do not have access do not really need them (Warschauer, 2004). There are anecdotal evidences however, that access to ICTs can make a difference to people who have been deprived of it (Goldstein and O'Connor 2000, Chiung 2003). Furthermore, there is clear evidence that such a divide exists between and within countries (Campbell, 2001).

### Information Society and Information Technologies

There is a paradigm shift in the ways in which information is generated, published, accessed, communicated, disseminated and utilized. New information technologies are playing a central and key role in the emergence of a range of mechanisms (with a wider range of labels that include libraries and other memory institutions, digital libraries, institutional repositories, digital archives, open archives, knowledge management systems, learning resource centres, knowledge resource centres, to mention a few); a range of careers and a new industry centred on information.

All the technologies used in the storage of data, processing of data, sending data from one place to another place using network, and all these services offered to users are known and named as information technologies (ITs) (Tonta, 1999). ITs enable the fast movement of data, and the delivery of the right information to the right destination in the shortest possible time, and with reliability. Also, as a result of the development in the ICTs, dependency on time and place no more exists. The need to reach useful information in the shortest possible time and with accuracy has become one of the necessities and the requirements to compete in the national and international markets.

The ITCs also provide a hint for being an information society. The number of devices used in the ICTs and their usage ratio gives us an indication on whether or not a country is ready for the new economies. Information is the most fundamental milestone of development. People with knowledge of the ITs are being sought everyday in the job market. The countries that develop strategic plans and use politics in the way for becoming information societies have stronger competition powers and also they are more respected by other countries (Karadag, 2005).

### Information Society, Universities and Human Training

Use of Information technologies appears to be an essential requirement at all levels and for all positions and need to examine manpower development programmes for information professionals is required. It does indeed appear that there is a profound gap between the course contents, the knowledge and the skills most students learn in

universities and the knowledge and skills they need to work effectively and efficiently in typical 21st century communities. Today, developments in ICTs have been changing very fast all over the world. These new technologies were taking an important place in education like other sciences. For this reason therefore, education was developing parallel to new developments on the new technologies. Departments which cover curriculum of new technologies, contribute educational technologies in different directions.

The generation of information is important in an information society. The most important institutions generating knowledge in an information society are universities. This is because the universities are the main establishments generating and distributing knowledge that is the raw material of the knowledge economy.

ITs are radically affecting the universities. Internet is a technology which most university students and instructors don't know about a couple of years ago. If we think about its' place today education and research world, its effects on the universities can be appreciated easily. Tsichritzis (1999) stated that information technologies are affecting the core of universities that is the process of creating and extending information.

Developing information (research), packing information (courses), delivering (publishing) information technologies which are the basic functions of universities have caused a big change can be called revolution. Power, in information society, is in the hands of those who have information. In information society, expertise is a necessity in collecting, operating, arranging, sharing, serving information. Tom Peters suggested that success in information management is 5% technology and 95 % psychology. His aim is to underline the importance of human in information society (Davenport, 1997). The reason of problems 80% in information society is not from technology, based on manpower. It is necessary to provide workforce, both convenient and possible to accord to new growing and developing conditions.

Accordingly, demand of workforce can be interpreted as the demand of productivity which is in particular to educational features. At that point, it is seen that all productive qualities of workforce can be developed by the help of education. Professional qualities must be developed in accordance with the technological changes. ITs are containing the whole applications which enable to reach, share, and use of information in order to benefit from electronically devices. Uzay (2001) suggested that ICT is the combination of technologies which enable to gather, access, save data and if necessary it enable data to access another network and vice versa. The effect of Its to real economy in United States of America (USD) 35%, 19,3 in Canada and 25% in France (DPT, 2001). It can be said that education has a strategically place among of nations.

Necessary to generate manpower appropriate to the changing and developing conditions, and to deploy the existing manpower accordingly. Universities have the responsibilities to train individuals by considering the properties of the information age and in particular by taking into account the information societies. As one of the aim of education is to train individuals for the requirements of the society, it has become necessary to train individuals by considering the properties of information societies and appropriate to the information age. The individuals trained nowadays have the need to access information, prepare information, present information, and be able establish communication (Aydin, 2003). It is therefore true to say that the CIS and CEIT are at the top of the departments that will train students who has required capabilities for information society.

**Purpose of the Study**

The purpose of this study is to reveal the contribution of Computer Education and Instructional Technologies (CEIT) and Computer Information Systems (CIS) to educational technologies. While evaluating data to realize this aim, following research questions will be scrutinized:

1. What are differences of CIS and CEIT departments?
2. What are the similarities of CIS and CEIT departments?
3. What are contributions of CIS and CEIT departments to educational technologies?

## METHOD

**Research Model**

The study, which was conducted to reveal the contribution of CIS and CEIT to educational technologies, was in the form of a descriptive research model. A descriptive approach was followed to analyze the data.

**Data Collection**

In order to collect data addressing the research questions of the study, curriculum of CIS and CEIT departments' of Near East University in North Cyprus were covered in the study. Each curriculum checked carefully and was analyzed by using descriptive methods and construed.

## DEPARTMENT OF COMPUTER INFORMATION SYSTEMS (CIS)

The aim of this department is to provide a solid foundation in managerial and technological challenges of computer information systems for students interested in a career as a system analyst, senior programmer, and system management, as well to give a solid foundation for further studies at a doctoral level. The vision is to prepare and equip future generations to effectively and competently use information technology within different business sectors and educate students to be life-long learners so that they can be adaptive to the changing demands in their workplace. Graduates are prepared for career-entry positions in areas such as: Systems analysis and design, applications software support and maintenance, applications software consulting, web application development, database design, database programming, web programming, business applications programming and technical and application support. Courses in CIS curriculum divide to three main groups. Following tables shows detail information about courses.

**Table 1:** Field and Field Education Courses of Computer Information Systems Department

| COMPUTER INFORMATION SYSTEMS<br>FIELD AND FIELD EDUCATION COURSES | | | | | |
|---|---|---|---|---|---|
| **Courses** | **T** | **P** | **C** | **Hour** | **Lecture count** |
| Programming Languages (compulsory+tech. electives) | 10 | 10 | 15 | 20 | 5 |
| Database | 8 | 8 | 12 | 16 | 4 |
| Computer Network | 2 | 2 | 3 | 4 | 1 |
| Operating Systems | 2 | 2 | 3 | 4 | 1 |
| Internet-Based Programming Languages | 6 | 6 | 9 | 12 | 3 |
| Basic Courses (Computer and Information Systems/Technologies) | 25 | 4 | 27 | 29 | 9 |
| Mathematic | 21 | 2 | 18 | 23 | 6 |
| **Total** | 74 | 34 | 87 | 108 | 29 |

T:Theory, P:Practice, C:Credit

**Table 2:** General Knowledge Courses of Computer Information Systems Department

| COMPUTER INFORMATION SYSTEMS | | | | | |
|---|---|---|---|---|---|
| **GENERAL KNOWLEDGE COURSES** | | | | | |
| **Courses** | **T** | **P** | **C** | **Hour** | **Lecture count** |
| English | 3 | 0 | 3 | 9 | 3 |
| Principles of Atatürk's | 2 | 0 | 0 | 4 | 2 |
| **Total** | 13 | 0 | 9 | 13 | 5 |

T:Theory, P:Practice, C:Credit

**Table 3:** Management and Economic Courses of Computer Information Systems Department

| COMPUTER INFORMATION SYSTEMS | | | | | |
|---|---|---|---|---|---|
| **MANAGEMENT AND ECONOMIC COURSES (ME)** | | | | | |
| **Courses** | **T** | **P** | **C** | **Hour** | **Lecture count** |
| Management | 16 | 0 | 12 | 16 | 4 |
| Economic | 8 | 0 | 6 | 8 | 2 |
| Accounting | 8 | 0 | 6 | 8 | 2 |
| Marketing | 4 | 0 | 3 | 4 | 1 |
| **Total** | 36 | 0 | 27 | 36 | 9 |

T:Theory, P:Practice, C:Credit

**Table 4:** Department of Computer Information Systems Courses Categories

| COMPUTER INFORMATION SYSTEMS | | | | | |
|---|---|---|---|---|---|
| **Courses** | **T** | **P** | **C** | **Hour** | **Lecture count** |
| Field and Field Education | 74 | 34 | 87 | 108 | 29 |
| Management And Economic Courses | 36 | 0 | 27 | 36 | 9 |
| General Knowledge Courses | 13 | 0 | 9 | 13 | 5 |
| **Total** | 123 | 34 | 123 | 157 | 43 |

T:Theory, P:Practice, C:Credit

## COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGIES (CEIT)

Department aims particularly to equip students with up-to-date knowledge and practical skills required for computer teachers. An important objective given a high priority by the department is to provide its teacher graduates with relevant contemporary information, training, and prerequisite skills to enable them guide their students to the 21st century.

The graduate program of the department is designed to prepare graduate students instructional technology experts, and supervisors, curriculum consultants, test and evaluation specialists in instructional technology education. The graduates of the department are employed by CEIT departments of other universities as well as the Ministry of Education and private schools as academicians, teachers, supervisors, inspectors, curriculum consultants, test and evaluation specialists in computer education and instructional technology.

Courses in CEIT curriculum divided into three main groups. Following tables show detailed information about courses.

**Table 5:** Field and Field Education Courses of Computer Education and Instructional Technologies Department

| COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGIES | | | | | |
|---|---|---|---|---|---|
| **FIELD AND FIELD EDUCATION COURSES** | | | | | |
| **Courses** | **T** | **P** | **C** | **Hour** | **Lecture count** |
| Programming Languages | 6 | 4 | 8 | 10 | 2 |
| Database | 2 | 2 | 3 | 4 | 1 |
| Computer Network | 2 | 2 | 3 | 4 | 1 |
| Operating Systems | 2 | 2 | 3 | 4 | 1 |
| Internet-Based Programming Languages | 5 | 4 | 7 | 9 | 2 |
| Instructional Technologies Courses | 24 | 22 | 35 | 46 | 11 |
| Mathematic | 4 | 4 | 6 | 8 | 2 |
| Physics | 6 | 0 | 6 | 6 | 2 |
| Electives | 10 | 4 | 12 | 14 | 4 |
| **Total** | 61 | 44 | 83 | 105 | 26 |

T:Theory, P:Practice, C:Credit

**Table 6:** Teaching Profession Courses of Computer Education and Instructional Technologies Department

| COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGIES | | | | | |
|---|---|---|---|---|---|
| **TEACHING PROFESSION COURSES** | | | | | |
| **Courses** | **T** | **P** | **C** | **Hour** | **Lecture count** |
| Compulsory | 26 | 12 | 32 | 38 | 11 |
| Electives | 3 | 0 | 3 | 3 | 1 |
| **Total** | 29 | 12 | 35 | 41 | 12 |

T:Theory, P:Practice, C:Credit

**Table 7:** General Knowledge Courses of Computer Education and Instructional Technologies Department

| COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGIES | | | | | |
|---|---|---|---|---|---|
| **GENERAL KNOWLEDGE COURSES** | | | | | |
| **Courses** | **T** | **P** | **C** | **Hour** | **Lecture count** |
| Foreign Language (English) | 6 | 0 | 6 | 6 | 2 |
| Principles of Atatürk | 4 | 0 | 4 | 4 | 2 |
| Turkish | 4 | 0 | 4 | 4 | 2 |
| Basic Sciences Research and Application (History of Sciences, Application of Serving to Society, Scientific Research Methods) | 5 | 2 | 6 | 7 | 3 |
| Electives | 4 | 0 | 4 | 4 | 2 |
| **Total** | 23 | 2 | 24 | 25 | 11 |

T:Theory, P:Practice, C:Credit

**Table 8:** Department of Computer Education and Instructional Technologies Courses Categories

| COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGIES | | | | | |
|---|---|---|---|---|---|
| **Courses** | **T** | **P** | **C** | **Hour** | **Lecture count** |
| Field And Field Education Courses | 61 | 44 | 83 | 105 | 26 |
| Teaching Profession Courses | 29 | 12 | 35 | 41 | 12 |
| General Knowledge Courses | 23 | 2 | 24 | 25 | 11 |
| **Total** | 113 | 58 | 142 | 105 | 49 |

T:Theory, P:Practice, C:Credit

**FIELD AND FIELD EDUCATION COURSES**

If we generally look at the field and field education courses of the CEIT and CIS departments, we see that while there are Physics courses (2 off) in the CEIT department, there are no such courses in the CIS department. Also, while the courses in the optional group in the CEIT department are based on educational technologies and field education, the optional courses in the CIS department are in the field of information technologies/systems and most of them are on programming languages and databases. Also, while some of the courses in the CEIT department are in the educational technology group, CIS department has corresponding courses in information technologies/systems.

While the theoretical lecture hours of the courses in this group are 74 hours, those in the CEIT department are 61 hours. Similarly, while the practical teaching hours of the courses in this group are 34 hours, those in the CEIT department are 44 hours. While the field and field and field education lecture hours are 108 in the CIS department (29 courses, 87 credits), those in the CEIT department are 105 hours (26 courses, 83 credits). As it is clear from above, there are no significant differences between the total course hours between the courses in the two departments.

**Table 9:** Total Number of Lecture Hours for Both Departments' Curriculum

| | **CIS** | **CEIT** |
|---|---|---|
| Theory (hour) | 74 | 61 |
| Practice (hour) | 34 | 44 |
| Lecture count | 29 | 26 |
| Credit | 87 | 83 |

**TEACHING PROFESSION COURSES**

The teaching profession courses are only available in CEIT curriculum and unavailable in CIS curriculum.

While the teaching profession knowledge courses in the CEIT department consists 29 hours of theory and 12 hours of practical, making a total of 41 hours (12 lectures, 35 credits), the CIS department instead has Management and Economic group of courses. The total number of lecture hours for these group of courses is 36 hours of theory (9 courses, 27 credits ).

**Table 10:** Teaching Profession Courses

| | **Teaching Profession Courses** |
|---|---|
| Theory (hour) | 29 |
| Practice (hour) | 12 |
| Lecture count | 12 |
| Credit | 35 |

**Table11:** Management and Economic Courses

| | **Management and Economic Courses** |
|---|---|
| Theory (hour) | 36 |
| Practice (hour) | 0 |
| Lecture count | 9 |
| Credit | 27 |

**MANAGEMENT AND ECONOMIC COURSES**

Management and Economic Courses are available in CIS curriculum but they are unavailable in CEIT curriculum.

**GENERAL KNOWLEDGE COURSES**

General knowledge courses in the CIS department have been divided in two groups: English language and Principles of Atatürk. However, in the CEIT department general knowledge courses have been divided into five groups: English, Principles of Atatürk, Turkish, Basic Sciences Research and Application and electives.

There are 5 general knowledge courses in the CIS department. These courses are theoretical and offered as 13 hours. On the other hand, courses in the CEIT department are 11, with 23 hours of lectures and 2 hours of practical sessions. Moreover, general knowledge courses in the CEIT department curriculum consist of more hours than the CIS department curriculum.

**Table 12:** Total number of general knowledge courses is given for both CIS and CEIT departments

| | **CIS** | **CEIT** |
|---|---|---|
| Theory (hour) | 13 | 23 |
| Practice (hour) | 0 | 2 |
| Lecture count | 5 | 11 |
| Credit | 9 | 24 |

**CONCLUSION AND SUGGESTIONS**

The increase of the information and communication technology in manpower efficiency has been 60% for the USA, and 40% for the European Community (Devlet Planlama Teskilati, 2006) in the second quarter of the 1990s. In the same quarter, 25% of the economic growth in the European Community has been in ICTs. Based on this point, the author thinks that higher education students should be made aware of the recent changes and developments in information and communication technologies, and their applications, and CIS and CEIT courses should continually be renewed by considering the developments in ICTs.

When the structure of the Turkish society is investigated it is believed that the 25-39 age groups will form the majority by

the year 2020. This young generation will provide the greatest contribution to the ICTs. Thus, it is the author's opinion that investment should be made to educate and train this young generation so that they become members of the information society. It is therefore true to say that the CIS and CEIT are at the top of the departments that will provide the manpower for the required information technology.

When the curriculums of the CIS and CEIT departments were investigated it was found that both departments offer similar courses. CIS department offers more specialised courses on information systems and information technologies. Thus, it is the author's opinion that the CIS department can provide support to the CEIT department with these information based courses. The CEIT department on the other hand is specialised more in the educational technologies and thus this department can provide support to the CIS department.

The curriculum of the CIS and CEIT departments include database, computer network, operating systems, internet-based programming languages, english, principles of Ataturk. These are the similarities of both departments. In other words, both departments have curriculum to train students with knowledge of the ITs.

In addition, we can say that both the CIS and CEIT curriculum offer very rich courses in educational technology, information systems, and information technologies courses. There seems to be no reason why the young students graduated from these departments could not compete with the students from other countries.

While the CIS department generates students with knowledge of business, information technologies, and information systems, the CEIT department can generate teachers with knowledge ICTs.

But both departments can provide support courses to each other in the subjects that they are well specialised, and this will give result in more efficient, advanced and technologically knowledgeable students to be generated.

As a conclusion, we can say that students in the CIS department can get the following optional service courses from the CEIT department:

- Distance learning
- Learning Management System (LMS)
- Web-based learning
- Development of education based lecture programs

Similarly, CEIT students can get the following optional courses from the CIS department:

- Programming languages
- database
- internet-based programming languages

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