INTEGRATING ICT AT THE FACULTY LEVEL: A CASE STUDY

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ABSTRACT
ICT integration can be realized at various levels: It can be at a state level (central government); at an institutional level (Higher Education Councils); at an organizational level (universities and schools); at a faculty level; at a department level, or at an individual level. Thus, ICT integration can be studied at macro level as a system, or it can be studied at micro level or can be studied together. In this study, ICT integration is studied at macro level which covers the ICT integration both at administrative and instructional levels. Although each level is interrelated with each other, the aim of this study is to investigate how ICT is integrated at the faculty level in an institution.

Since ICT integration is a multi-faceted process and related to many factors, a qualitative case study is applied in order to understand this process in a holistic way with different angles. Data were collected through observations, official documents, individual semi-structured interviews and focus group interviews. Data were analyzed by using content analysis. Finally an ICT integration model is suggested.
Keywords: ICT, Integration, Integration Process, Technology, leadership

INTRODUCTION
Information and communication technology (ICT) is defined by Berce, Lanfranco and Vehovar (2008) as "a mixture of hardware (equipment), software (operating system, applications, etc.) and communication facilities (Local area Networks, wide area and backbone Networks, communication protocols, etc.)" (p, 190). Wang and Woo (2007) also defined ICT as a tool. They stated that "*ICT* can be hardware (such as computers, digital cameras), software (such as Excel, discussion forums) or both. In the educational context, it mainly refers to various resources and tools (software) presented on the computer" (p. 149).

ICT integration is defined as a "…process of using any ICT (including information resources on the web, multimedia programs in CD-ROMs, learning objects, or other tools) to enhance student learning (Wang & Woo 2007, p.149). ICT is not particularly reserved for education. The common point in ICT definition is that ICT is a tool to realize learning objectives (Koçak-Usluel, Mumcu-Kuşkaya & Demiraslan, 2007).

Many researchers examine the ICT integration process with various variables at the class level (micro level), at a national level (macro-level), or at the local school level (meso-level) (Tondeur, Keer, Braak & Valcke, 2008). To put it another way, ICT integration efforts can be examined at the state level, such as examining the –central-government ICT policies and its integration efforts; another one is at the institutional level, like the efforts of Higher Education Councils on the way of integrating ICT policies. The third one is the organizational level, like universities and schools do; finally, it can be at a faculty level, at a department level, or at an individual level indicating the integration of ICT into the instructional process. Thus, ICT integration can be studied at macro level as a system, or it can be studied at micro level. Also, it can be a mixture of the both as displayed in figure 1.
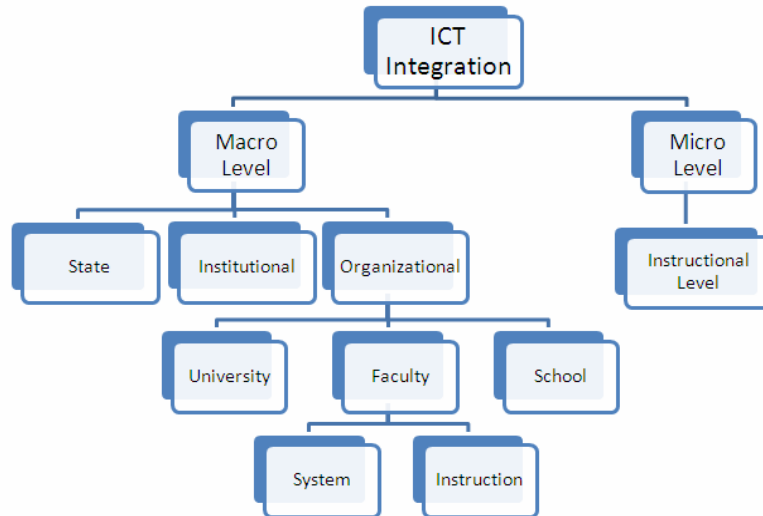
Figure 1. *Levels of ICT Integration as a Process*

ICT integration in education in Turkey had been studied with different dimensions: Factors that affect ICT integration (Koçak-Usluel, Mumcu-Kuşkaya & Demiraslan, 2007 & 2008; Demiraslan & Koçak-Usuel, 2005; Usluel, Aşkar, & Baş, 2008; Aşkar, Usluel & Mumcu, 2006; Özdemir & Kılıç, 2007), ICT integration at the system level (Akbaba-Altun 2006), and administrative dimensions of ICT integration (Akbaba-Altun, 2004; Toprakçı, 2006; Akbaba-Altun & Gürer, 2008).

To conclude, ICT integration is a complex process and happens at different levels. Although each level is interrelated with each other and ICT integration is a process rather than a product (Wang & Woo 2007), the aim of this study is to investigate how ICT is integrated at the faculty level. What kind of processes have participants gone through? What were the steps? Who is/are the leader/ leaders? What kind of problems and issues they faced during this process? Can all those experiences take us to a workable model?

METHODOLOGY
Since ICT integration is a multi-faceted process and related to many actors, a qualitative case study is applied in order to understand this process in a holistic way. In this research how, what and why questions are posed in order to understand how ICT is integrated at the faculty level. Yin (1994) reports that case studies are preferable when "how" and "why" questions are being posed; the investigators have little control over events; and focus is on a contemporary phenomenon within some real-life context (p, 1). Berg also (1998) claims that "case study methods involve systematically gathering enough information about a particular person, social settings, event, or group to permit the researcher to effectively understand how it operate or function" (p, 212). It was decided that case study was an appropriate method for this study because it was focused on a real-life situation, and the researchers had no control over the events.

Research Setting
This research was conducted at a faculty of education which was established in 2001. In the faculty, there are seven departments and nine programs under those departments. There are 48 faculty members and there are 974 students at that faculty. In the faculty, there are five electronic classrooms, two computer labs, four overhead projectors, and personal projectors. Most of the faculties have desktop computers at their offices. The faculty has its own web site and there is a link from this web site to faculty's information service. Student information system, student affairs control system, university dormitory control system, control system for graduates, and e-mail services are all available services from the university web site. In addition, there is a learning management system (LMS) that can be used by academic staff when requested. It has begun to build up in 2002 and in 2009 it has 4th version of it. During the data collection process, despite 74 academic members were enrolled to use this system, only 42 academics were actively using it. As of to date, 1736 students were enrolled in LMS and 138 courses have been offered in LMS.

Participants
The selection of the participants was based on purposeful sampling. According to Patton (1990) people can learn a great deal about the issues of central importance to the purpose of the research with purposeful sampling. Qualitative research focuses in depth on relatively small samples, which are selected purposefully. This faculty

was chosen because it is in the process of ICT integration both macro and micro level. The participants of this research were faculty dean, head of computer center (head of IT department), the department of Computer Education and Instructional Technology 's (CEIT) chair, three academics who are at CEIT department and uses LMS, and one volunteer academic, one technique personnel, and seven research assistants. The faculty dean and other participants were asked individually to participate in this study. They were reminded that they could refuse to participate or discontinue at any time without any further questions. In addition, they were also assured that their confidentiality would be kept and no real names would be used.

Data Collection
The data were collected at the beginning of winter of 2009. The primary sources of data were semi-structured interviews, focus group interviews, documentation, and participant observation. The researchers participated in faculty training programs related to ICT integration and worked together with the faculty. They observed their all experiences and reflections during the training and took notes of their questions during the meetings. Faculty training had been done two times for the faculty and research assistants separately.

The semi-structured interviews are conducted with the deans, academics, head of IT department, and one technique personnel. This interview technique is also called a standardized open-ended interview by Patton (1990). The basic characteristics of the semi-structured interview questions were prepared beforehand (Berg, 1998). Since faculty of dean and four academics from CEIT department who are supporting the faculty's ICT integration with technical, administrative and educational dimension for understanding ICT integration in faculty level, they were included in the interview. Also an academic volunteer member participated in the interview. In addition to those participants, another interview was conducted with the head of IT department to understand the effects of HEC's ICT policy on university or faculty, university ICT policy and its effect on faculty of education and also how ICT policy at the faculty of education has an effect on the university.

The interview is conducted with one of the technical personnel who was responsible for solving the computer-related problems that faculty might have experienced either at the laboratory or in the electronic classrooms. *The Focus group discussion* is conducted with seven research assistants who had participated faculty training programs related to ICT integration.

*B*ogdan and Biklen (1992) describe documents as personal (intimate diaries, personal letters, and autobiographies), and official (internal documents, external communication, students records and personal files). According to Yin (1994), documentation sources can also include memoranda, announcements and minutes of meetings, proposals, progress reports, internal documents, newspaper clips and articles. Patton (1990) is accepted that answers of open-ended question in survey so the result of survey is accepted as documentation in this survey. In this research, NIC Regulations quality documents, information on faculty of education's web site and the result of survey about using materials in faculty were gathered as documents.

Data Analysis
Interviews were audio taped and transcribed regularly. Field notes were written on a daily base and indexed. As Berg (1998) emphasized well that "the most obvious way to analyze the interview data is content analysis" (p. 9), the data were analyzed by content analysis. In order to make data systematically comparable, an objective coding schema applied to the data that is at the heart of content analysis (Berg, 1998). In content analysis, researchers examine the communication in a systematic way based on coding schemas. Finally, findings were visualized with figures in a model. In order to provide reliability and validity, data were analyzed at different times with different researchers. In addition, findings were supported by participants' self-report statements.

FINDINGS
One of the initial questions was to explore whether the faculty and faculty members had ICT related or ICT integration goals /Objectives. The findings revealed that the faculty as an institution did not have written ICT policies on the web site and there is no any written goal in the quality documents of faculty of education. The dean of the faculty of education had his goals in his mind. He said that *"there should be top down and bottom up integration. We should train all faculty members about ICT use in their classes. But especially research assistant will be locomotive of this movement. In near future we all should use LMS and extend distance education for some courses. We should create common organizational culture. We should have standards together"*.

The head of the IT department mentioned that the ultimate goal is to benefit from technological opportunities. The department of IT tasks has written in their homepage the following: *"The department of IT provides quality service to all units with advanced technology, research and continuing employee trainings, strategic applications"*. To sum up, there are no specific integration goals or objectives.

Although there is no written ICT objectives for the faculty, academics talked about their personal objectives. The faculty coordinator said that *"there should be objectives at National Informatics Committees (NIC) regulations and also there should be some written objectives at Quality documents".* Another academic from CEIT department said that *"integration is a must. So, it is late to say there should be integration. Because it is everywhere. Everybody must use it. There should be teaching and learning everywhere. There is official goals at least national informatics committee has to use technology. There are LMS projects prepared by CEIT department to be use by all faculties.*

The volunteer participant also mentioned about what kind of goals should be. He said that " *I do not know politics about extending e-learning. If I know that faculty has objectives or goals I can have strategies align with those objectives. There should be individual objectives also in order to realize organizational objectives and vice versa. Right now I have personal objectives about using LMS for my measurement and evaluation courses. Those seminars triggered my attitude to use LMS. My colleagues had a positive role in changing my opinion."*

Since there is no written ICT related objectives, in practice there are ICT related objectives in minds. There are some attempts to realize those objectives. One of them is to give seminars about ICT integration. Those objectives seem to be in align with NIC and university objectives. It was found that there were task definitions in peoples' mind; yet, no written objectives about ICT integration existed.

Another inquiry was related to explore what kind of processes had participants gone through on the way of ICT integration. ICT integration policy had been composed at the university level for administrative purposes in 1997. ICT integration at the course level, on the other hand, had been started at the departmental level and extended to the faculty level. In the Faculty of Education, computers had already been used for administrative purposes, especially in the students' affairs. After the establishment of CEIT department in 2004 within the faculty of education in mentioned university, CEIT had a pioneering role in integrating ICT at the course level. The dean of the faculty said that "*this duty has given to head of CEIT Department. She prepared an integration program. We will continue based on that program.*" But, at the faculty level, the integration process had started in 2007 by the help of CEIT. One of the participants said that *"integration has been realized since 2004 at CEIT department."* Another participant from CEIT said that "*first we started with e-learning than we continue with LMS."*

As to observe who the leader or leaders in ICT integration at a faculty level are, *o*ne of the participants from CEIT department defined the technology leader as a person who *"... uses technology effectively and productively, and who disseminate or diffuse it.* Participants have different views about who should be leader in integrating ICT at the faculty level. Most of the participants said that there should be *"Not a leader but leaders".* One of the female participants said that "*in this process, faculty dean and the vice dean should take roles because it is easy and fast to integrate ICT from top down. Absolutely there should be a leader. From bottom up it is difficult and hard taking a long process*". Another participant from CEIT department mentioned about the role of the leader. He said that "*leader should be genius, should facilitate knowledge sharing processes, to others."* He also talked about CEIT's pioneer roles**.** He said **"***Each person can lead in his or her field. Since CEIT department mainly deals with technology, CEIT department can have a pioneering role."*

The head of the IT department also said that *"Normally nobody or any department can say you should use this technology. So there could not be a leader".* Faculty dean also said that "*I gave ICT integration task to the chair of CEIT. But, I see no leader.*"

Our volunteer academic participant mentioned about how should be a leader. He said that *"there should be not one leader but there should be leaders. CEIT should be institutional leader. They should provide support to administrators and academic personnel. CEIT not only coach for today but they must help us develop objectives/goals for future."*

Another question in this study was to observe the patterns in the perceived problems of ICT integration process. Faculty in the department of the CEIT stated that ICT integration process had started with some problems. One of the participants said that "*there was no extra resource for integration and we started with whatever we had. More coercive power or official system can be established. There should be more personnel hired for integration. Students' participation can be encouraged. Briefly, ICT integration is a painful process."* Another participant from CEIT pointed out the need for awareness raising. How it should be done is to have them use ICT, it should be disseminated. *"Faculty development programs and in-service training should be given and conduct needs analysis. After determining all faculties needs, based on those individual needs, there should be technology planning."*

Another articulated problem was related to the faculty training/development problem. While a new technology becomes a part of the process, training and the process of informing others begin. According to the participants, there are some problems observed at this point. One of the participants said that *"training should be given for users to use a new technology and information process should be initiated. In this way problems can be solved."*

Participants also talked about the academics unwillingness and resistance. Mainly when academics have a lack of understanding on the usage of ICT tools, they become unwilling and reluctant to use the technology. Some of the participants said that:

> *"There is a negative attitude for technology. Some of them don't need more technology nor have an insufficient knowledge and necessary skills."*
> *"Faculty members except department of CEIT are unwilling at this point."*
> *"Some of the faculty members resist this integration process. But, they should improve themselves and be aware about their learning."*

These findings indicate that when starting for ICT integration, lack of resources, support from administrators, and felt needs are to be taken into consideration. Problems with the existence and use of hardware and software cause lack of motivation. In addition, there were staff development problem as well as academicians' unwilling and resistance to the integration.

From this point on, the inquiry was followed up with exploring the stakeholders' suggestions on what should be done for effective integration at the faculty level. Participants indicated that technology planning, coordination, providing facilitation, motivation, encouraging students, faculty training/development programs, ICT integrated curriculum, providing materials and maintaining equipment, full infrastructure, administration's commitment and leadership are needed for effective integration. The information of these requirements is presented in the relevant subtitles.

Leadership: According to participants, leadership is a very important component for effective integration; therefore, there should be more than one leader at the faculty level, especially within the CEIT department. As one of the participants claim *"ICT integration at the faculty level brings out the technological leadership roles. During the integration process, it is suggested that, there should be more leaders. But, CEIT department can take the pioneer role during this processes"* explain the leadership role.

Commitment of and support from the Administration: The support from administration has a primary role for effective integration. Administration should take pre-cautions whenever necessary. Administration and CEIT department should cooperate about the requirements and provide continuity of cooperation.

One of the participants explained the situation as *"administration must be committed to this process. Administration would know the needs of personnel and support budget, facilities of inventories and policies against problems."*

Full infrastructure: Some participants mentioned about the importance of technical infrastructure. According to them, technical infrastructure should be improved to overcome hardware and software problems and the faculty should allocate additional resources. Some of them said that:

> *"Integration process has been initiated without an additional source. Therefore there are some problems about hardware and software"*
> *"Technological infrastructure (both as software and hardware) is provided for effective integration. All of the classrooms must be technologically equipped. "*
> *"Limited resources should be improved."*

Providing materials and maintaining equipments: Participants emphasized the importance of providing necessary materials and equipment for effective integration. They also emphasized their problems as *"there is a money problem. There should be allocated budget for integration. Many of the existing hardware and software aren't up to date or out of order. Maintenance should be done."* and *"we need various materials and equipments for using in courses. But we don't know how we can provide these materials"*.

ICT integrated curriculum: Participants indicated that integration of technology must be done in parallel with curriculum spreaded to all classes. One participant brought this issue with the following statement **"*curriculum must be reviewed. It is decided that technology can be integrated which course and how can be done with*

program development." Another participant said that "*course contents must be transferred to digital media and by this way must be opened for distance access."*

Continuous faculty training/development programs: According to the participants, in-service training should be organized for all faculty members for integrating ICT to their curriculum and courses in order to benefit from online environment. As a result, faculty members should be motivated in this regard. The following statements mention what kind of training the participants expected.

> *"In-service training should be organized for adapting to technology integration and using technology effectively."*
> *"In-service training and development programs are insufficient".*

Encouraging students: The integration process should be enriched by students. In addition, students should be motivated to take part as a volunteer for the integration process. Two of the participants said that:

> *"Academics as well as students must attend this process."*
> *"Students should be encouraged to use technology. Also different projects should be given to students outside the curriculum."*

Motivation: According to the participants, not only students but also faculty members need to be motivated. This motivation can be achieved by reward mechanisms.

One of the participants said that *"establishing rewards and incentive mechanisms, faculty members should be encouraged to use the technology."*

Facilitation: Providing facilitation: There is a technical personnel for helping both faculty members and students in electronic classrooms and computer laboratories. Participants all agree on this issue. Some of the participants said that:

> *"Faculty members are worried about if there is a problem using the technology what am I doing? So technical support would be given them."*
> *"There is at least a technique personnel for helping us when a technical problem occurs This personnel helps not only faculty members but also students."*
> *"We consistently encounter the situation as my computer is broken down, I can't enter students' grades to the database"*

Coordination unit: A coordination unit must be responsible for the integration process, providing technical, educational and motivational support to the academicians. One of the participants said that *"there is at least a coordinator for maintaining material, training, coordinating between departments."*

Technology planning: According to participants, a technology plan is an important component for using technology in institutions effectively. Thus, ICT integration process can be planned in the long range. This need was raised by one of the participants as *"The 5-year technology plan should be established for this prediction and the annual assessments should be done for the continuity of this plan."*

Having stated the patterns in explaining the required components of ICT integration as a process, researchers revisited the data to observe how this process could be realized. In order to integrate ICT at the faculty level, first, departments and faculty members are to be informed about this process. The steps emerged from the data were displayed in figure 2. In the next section, these steps will be defined briefly.
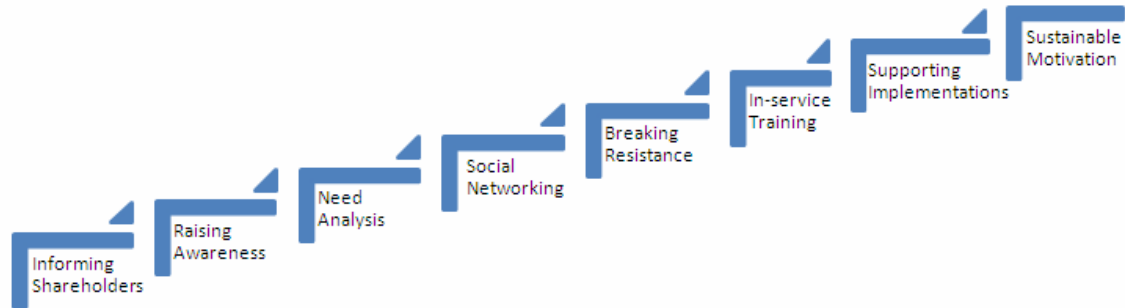
Figure 2. Steps in ICT Integration Process

Informing shareholders: All shareholders (including administrators, instructors, staff members, students, parents, community leaders, and technology experts) in institutions act together and share information with each other in ICT integration process, so rate of ICT integration process is accelerated. One participant said that *"the process of technology integration is important. Departments must be act together and all of them must be join this process. All staffs must be share their experiences. In addition, students should be involved in this process accompanied by academic staffs"*

Raising awareness: In order to integrate ICT into education process, individuals must be aware of all those technologies. This motto can be better understood by the following statement: "*raising awareness is the need to focus on technology integration. If diffusion of a technology is what is wanted, it should be introduced by using it.* "

Needs analysis: One of the prior conditions of ICT integration is to identify the problems and needs. Not only the needs of academic member but also student's needs are to be identified. One participant said that *"faculty members' ICT needs would be analyzed. After the needs analysis, a technology planning should be done."*

Social networking / social structure: Technology is utilized within a social system. While one faculty or a department decided to integrate ICT into their educational or administrative process, ICT integration process in other institutions must be reviewed. As one participant said that **"***to collect information through learning what is going on at different faculties and reviewing literature about what or how they do in the process of technology integration. We must examine our needs if they are similar to ours or not. We should communicate with them effectively."*

Breaking resistance: Some faculty members could reject using technology for their neither administrative nor instructional purposes. For those people, the institution must develop different strategies to break this resistance. One participant mentioned about this situation in her statement as *"there is a need to break resistance. Staffs, who want to maintain their earlier habits, consider that their work loads would increase. We should show them that it just happens the opposite. Their job would become easier with using technology. "*

In- service training: Institutions should provide staff development and in-service training for academic members and administrative personnel to change their knowledge, skills, attitude, and habits as participants claim that "*in-service training activities should take place in our faculty as well as applied in other faculties"* and *"administrators must decide the continuity of in-service training."*

Supporting implications: In order to provide continuity of using technology, individuals should be supported and motivated with various reward systems. In addition, administrators should take necessary precautions to support successful applications. Those expectations are mentioned in the statements below:

> *"Firstly, in service training and developmental training are supported by administration. And then departments must support each other mutually. "*
> *"There can be various training about how to I use or integrate. In this way I can develop my own method with using various technologies."*

Sustainable motivation: Resistance can have various reasons that are based on needs, attitudes and resources to adopt and use technology. If the institution wants to integrate the ICT in their programs, individuals must be motivated permanently. One participant mentioned in the following statement how his motivation is lessened

with lack of tools as "*Motivation is fallen as a result of lack of tools or access to technology. For instance, I haven't had a CD writer on my own PC.*"

Can all those experiences take us to a workable model?
Having considered the patterns in the data and the experiences of stakeholders during this process, a workable model which covers university, faculty, department and individuals, was proposed. The model and its components are shown in Figure 3. This integration model provides useful guidelines from top down to bottom up for incorporating ICT into teaching, learning and administration at the faculty level.
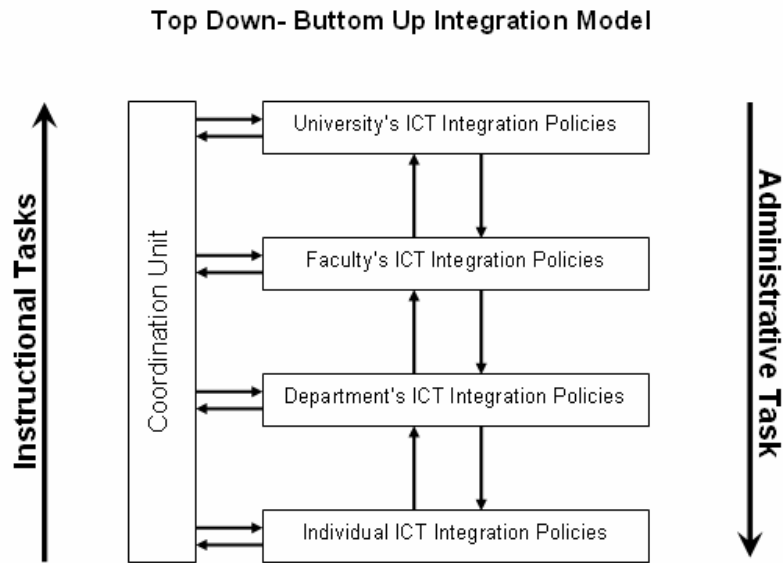

Figure 3. *Top Down- Buttom Up Integration Model*

ICT in education is a domain in which many components (university, faculty, department and faculty members) play a role. Each of these components has unique policies which might affect ICT integration process. ICT integration is the interactional output of these components. It covers both administrative and instructional level interactions. ICT integration process can be examined both from the university perspective and from the perceptions of individuals. Interactive integration works best when the interaction is bidirectional from top down and bottom up. In order to perform effective and efficient ICT integration process, there must be a coordination unit which could function in two-way interaction with university, faculty, department and individuals. In this top down and bottom up integration model, mainly top down integration imply the administrative system and infrastructure, policies etc.; in the bottom up, on the other hand, the instructional issues are addressed. In order to benefit from this model effectively and efficiently, the objectives and implications should go hand in hand.

CONCLUSION AND DISCUSSION
Technological changes in the past quarter of the century have challenged professional educators to reevaluate their instructional skills and to reconstruct their delivery as they assist students in integrating new technology tools (Toledo, 2005). ICT integration is a complex process and it has many dimensions with various levels. There are many studies to investigate these dimensions in ICT integration.

In this study, during the data collection time, there were no written objectives about integrating ICT into educational processes at the faculty. Yet, while writing the report for the findings, it was observed that, ICT integration objectives are included in 2010-2015 faculty strategic plan. Couples of suggestions are needed when transforming those objectives into realization. First, these objectives should be as clear and as precise enough to be understood by all shareholders. Secondly, those policies should have a road map, indicating how to realize them. Based on those objectives, training personnel, providing the necessary materials, upgrading and maintaining of the equipment should be taken into account. In order to effectively integrate ICT at the faculty level, university, faculty, department and each individual should have ICT related objectives that those objectives should be in line with each other. Therefore, these objectives should be gathered and examined. Finally, realizations of those objectives need strong and committed leadership.

The educational policies for the integration of ICT can serve for different goals (Berrocoso, Meneses, and Melchor, 2009). These policies should be able to coordinate efforts of a very different nature and to focus them to deliver on objectives established at regional or national level. Within the context of this study, it was found that in order to integrate ICT effectively, first there should be ICT related goals or objectives to determine the institutional policies. According to the faculty members, the faculty does not have any written ICT goals or objectives. But there should be written ICT objectives which are influenced by the decisions of teachers working according to state regulations, that give them broad methodological freedom and by the expectations of the faculty management (Török, 2008). Then, in order to realize those goals or objectives, a strong committed leadership is needed.

A leader in ICT integration has a major responsibility for initiating and implementing educational environments change through the use of information and communication technology and can facilitate complex decision to integrate it into learning, teaching and administration (Schiller, 2003). Leader should motivate all educators, provide material and maintain equipment, and plan technology based on the felt or articulated needs. Therefore, at least one leader is needed for ICT integration process. Akbaba-Altun (2004 & 2006) found that leadership is an important dimension in integrating ICT into education process by providing support as in motivation, technical skills, coach, etc. Moreover, technological leader role is one of the roles of the dean at the faculty of education. Although others expect to see the technological leaders in an official position, in practice technological leaders can be different person. This person should have technique knowledge, interaction and communication skills. Thus, the group could perceive him or her as a leader.

ICT integration started with an administrative need and led to instructional issues. In order to integrate ICT effectively to the instructional process, first of all, administrative process should address the issues related to technical, legal and administrative infrastructure. Instructional integration can then takes place and spread to other courses, departments, whole faculty even to the university. In this research, it was found that, in order to integrate ICT effectively, there should be leaders from different departments, mainly from the CEIT department. In addition, it was observed that CEIT department has a pioneering role in instructional integration.

ICT integration is not an easy process. It seems that when starting for ICT integration there can be some issues and problems that should be solved. Those mentioned problems are lack of resources and support from administrators, hardware and software related problems, equipment problems, lack of motivation, staff development problems and academicians' unwilling and resistance. One of the previous studies conducted by Akbaba-Altun (2006) also showed that ICT integration problems can be related to infrastructure, personnel, curriculum, administrators and supervisors. Ertmer (1999) and Sang et. al. (2010) mentioned two barriers restraining individuals using ICT efforts: external barriers and internal barriers. According to Sang (2010), external barriers are related to technology training and supports; internal barriers are related to individual's philosophy about teaching and learning. In order to overcome these barriers, certain support should be given from university to individuals. Since there is a continuous development in ICT, there should be continuous staff development or in-service training. Besides, infrastructure, support materials, hardware, and software support should be provided to encourage faculty members and students. Each faculty member has their own philosophy or policy to integrate ICT to their courses. They may have positive attitude but do not have technical skills to use ICT. They may need technical assistance. During this process, coordinators and facilitators can encourage, motivate and support them for their efforts.

This study proposes a model for ICT integration at the faculty level. Although a number of technology-integration models exists in the literature, most of them address the barriers of ICT integration faced by teachers or problems of introduction of new technology either into the classroom (Hinson et al. 2006; Friedrichsen et al. 2001; Whitehead et al. 2003) or into the curriculum (Wang and Woo, 2007). One of these models, for example, is proposed by Hinson et al. (2006). The researchers recommended that professional development planners use their five-step model of technology integration: planning, preparation, instruction, refinement, and evaluation (Hinson et al. 2005). Their model addresses the barriers that influence teachers' decisions to use technology, such as school culture and personal beliefs about teaching with technology.

Another model is proposed by Toledo (2005), who developed another five-stage developmental model of technology integration, which had Pre-Integration, Transition, Development, Expansion, System wide Integration. These stages contained themes of leadership, support, resources, and faculty and student technology use and integration.

Addressing the variables involved in an institution's decision to offer its educational program to its students, Collis and Wende (2002) suggested a model to study on these variables (Environmental Conditions & Settings,

Policy, Implementation, Practice, Experience & Effects) which are ought to influence an institution's dominant approach to educational delivery and their use of technology. According to the authors, these variables form a complex system, where each variable has an influence on the other and has a major impact on an institution's general approach.

The findings of this study confirmed that ICT integration is a multifaceted and complex process with various stages involved. The data revealed various steps which started with informing shareholders and continued with raising awareness, need analysis, social networking or understanding social structure, breaking resistance, giving in service training, supporting implications, and finally, finished with sustaining motivation. Individuals must become aware of the new technology. As Rogers (2003) once stated when a person decides to use a new technology, s/he begins with establishing the knowledge base as the first stage. This occurs when an individual is exposed to technology and gains an understanding of how it functions. ICT integration process should be performed in a hierarchical order and steps of this process should follow each other for effective ICT integration.

A model of technology integration is required for the effective and systematic ICT integration process at a faculty level. There should be certain policies in order to guarantee the establishment of the necessary conditions supporting the continuous change processes (Tondeur, Keer, Braak & Valcke, 2008) and these policies are able to influence practice (Kennewell, Parkinson, & Tanner, 2000). Individuals involved in this process are able to manage the barriers to effective ICT integration (Lim, 2007). With this study, a top down and bottom up ICT integration model is proposed. In order to benefit from this model effectively and efficiently, the objectives and implications should go hand in hand. ICT practice and integration efforts at the faculty and university level should be carried out in bidirectional communication. The faculty should benefit from what kind of services and opportunities that university provides. At the same time, the faculty may have certain practices that the whole university can benefit from. For those effective best practices, there could be bilateral interaction opportunities, which can be coordinated by the coordination unit. In addition, there should be a coordination unit working closely with(in) the university, faculty and across departments. In this unit, one of the employees may be an ICT specialist. In this unit, there should be a coordinator with intellectual and technical leadership with effective communication skills. In addition, this coordinator should provide a common language among departments and individuals by organizing seminars and trainings, as well as maintaining the high motivation. Moreover, this unit should work through at least with a five-year technology plan with a certain budget allocated to perform this technology plan. Finally, students must be encouraged to integrate ICT to their education process as lifelong learners.

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