ISTANBUL JOURNAL OF INNOVATION IN EDUCATION

Special Issue Nº 1

"Future Learning 2014"

5th International Conference on Innovation in Learning for the Future 2014: e-Learning

Istanbul University Institute of Educational Sciences

Volume 1 Issue 1

January, 2015

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İstanbul Üniversitesi Eğitim Bilimleri Enstitüsü
İstanbul Eğitimde Yenilikçilik Dergisi

EDUCATIONAL SCIENCES INSTITUTE
ISTANBUL JOURNAL OF INNOVATION IN EDUCATION

Sahibi/Owner
I.U. Eğitim Bilimleri Enstitüsü adına
Enstitü Müdürü Prof. Dr. Fatma Gülay KIRBAŞLAR

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Yönetim Yeri: İstanbul Üniversitesi Eğitim Bilimleri Enstitüsü
Yayın Türü: Yılda en az 3 kez yayınlanan akademik hakemli dergidir.
Yönetim ve Yazışma Adresi: İstanbul Üniversitesi Eğitim Bilimleri Enstitüsü Besim Ömer Paşa Caddesi Devlet Arşivleri Binası A Blok No:39 2. Kat Fatih İstanbul.

SUNUŞ

Öncelikli olarak eğitim alanında yüksek lisans ve doktora çalışmalarını sürdüren veya tamamlamış olan genç araştırmacıların tez bulgularını, bilim dünyasına sunmalarına olanak sağlamayı amaçlayan İstanbul Üniversitesi Eğitim Bilimleri Enstitüsü Eğitimde Yenilikçilik Dergisi (Istanbul Journal of Innovation in Education) aynı zamanda bu alanda yenilikçi bakışasıyla bilim dünyasına katkıda bulunan tüm araştırmacılara ve akademisyenlere de açıktır. İstanbul Üniversitesi Eğitim Bilimleri Enstitüsü bünyesinde yayın hayatına başlayan dergimiz, İngilizce ve Türkçe yayınlara yer veren ve yılda 3 kez yayınlanacak hakemli bir dergidir.

Dergimizin başlıca ilkesinin araştırmada bilhassa Yenilikçi yaklaşımları destekleme oluşu nedeniyle bu ilk sayımızda eğitimde yenilikçi yaklaşımlar ışığında gerçekleştirilerek sunulmuş olan çalışmalara yer vermenin gururunu yaşamaktayız. Bu bağlamda dergimizin ilk ve ikinci sayısı 2014 yılında İstanbul Üniversitesi bünyesinde gerçekleştirilen "5th International Future-Learning Conference on Innovations in Learning for the Future 2014: e-Learning" isimli konferansta sunulmuş olan çalışmalardan oluşmaktadır. Dergimiz bundan sonra da yenilikçi yaklaşımlarla elde edilen araştırma ve bulguların sunulduğu konferans, seminer ve sempozyumları desteklemeye devam edecektir.

Editör

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Istanbul Journal of Innovation in Education

Volume 1 Issue 1 January, 2015

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Cynefin Framework for Decision Makers for Information Systems Security in the face of Information Asymmetry

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Abstract: This conceptual paper examines the dichotomy of IS decision makers as both being the client to security systems providers and provider of security for the established platform and offers Cynefin framework for sense-making in guidance for management decision making landscape. Cynefin framework which was developed in knowledge management context provides a suitable tool of sense-making for decision makers in use of security systems governance whom must both be able to select the right mindset, systems and tools, and also facilitate security using these systems in many cases without adequate knowledge about their internals as well as the environmental factors.

Keywords: Cynefin framework, information asymmetry, complexity, Information Systems, IS security, management ontology, epistemology

Introduction

In the novel Perfume: The Story of a Murderer by Patrick Süskind the protagonist Jean-Baptiste Grenouille murders virgins in search of the "perfect scent", which he finds in a young woman named Laure, whom his acute sense of smell finds in a secluded private garden in Grasse (Süskind, 1985). Following a series of murders which totals to 24 before Laure, Laure's father pieces together the pattern of murders and realizes that Laure who is the most beautiful and beloved young woman in the city is most likely to be the next victim. He flees with Laure to hide and protect her. Using every kind of precaution and diversionary tactics he can think of, changing schedules in the last minute, announcing that they are going to someplace and diverting to another, changing disguises he tries to outsmart the murderer. However, since it never occurred to him that the murderer would be using his nose to track them down, every precaution in the end is for nothing and Laure is killed; her scent is captured.

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Providing security for IS systems is like securing a beloved treasure from a band of bandits whose modus operandi is in many times a mystery to the guardians. Cybersecurity which is a relatively new concept in security has less regard to traditional forms of threats and methods of protection is the new landscape, which even the most able bodied institutions and experts have difficulty to comprehend. The recent leak of NSA files (Greenwald, 2013) from the best protected IS of the intelligence agency and the revelation of Turkish Prime Minister's phone taps from the secure government telecommunication systems (Ajans, 2014) shows the size of the problem which in many cases goes beyond the capabilities of best sourced national institutions.

Cybersecurity is expensive. In a survey of 172 of Fortune 500 companies, it was understood that, by spending $5.3 billion per year on cyber security only 69% of attacks were stopped. In order to increase the rate of success in diverting the attacks to 95%, the spending should be raised to $47 billion (Bloomberg, 2012). Malicious hacking, computer viruses, spyware, phishing, and security backdoors providing unauthorized parties full access etc. are issues that any computer used faces in a daily fashion (Hasan & Kazlauskas, 2009). With all the effort, research, huge budgets of governments and corporations, high alert levels, and highly trained security professionals it is accepted that no human designed system is "secure".

Lack of high-level overall understanding of the human and cyber systems within security is an issue makes it impossible to attain the level of security which ensures the survivability and effective working of human designed systems in many cases. In the core of designing security systems and providing security or lack of thereof is understanding the nature and reality or ontology of such systems. The security of information systems is a "wicked problem" (Chang, 2013). This means that it is a problem, which is ill-defined, difficult, or impossible to solve, because of the incomplete, contradictory, and continuously changing requirements which even makes recognition of the issue problematic (Rittel & Webber, 1975). Since the contingencies which designers and security experts face have no definitive formula and no stopping rule, most of them are unique leaves even the

most well-known threats go unnoticed and unchallenged. There are no immediate or ultimate test of the developed solutions, no true or false, and each solution may have unintended consequences, which may lead to more severe problems, further in time and space. Furthering the problem, there are many times strict political, social, time, and cost constraints (Ackoff, 1974).

This paper approaches the problem of IS from the decision makers perspective and provides a unifying framework to the ontology of the governed systems, both as a customer for security systems whether it is obtained from outside vendors, or developed within and as a service provider for its service users thus becoming the responsible for the security. As a theory for explaining (Gregor, 2006) this paper uses Cynefin framework for making sense through haze of complexity and incomprehensibility in this kind of state within which decisions makers must continuously ensure survival and goal attendance.

Noticing Information Asymmetry Inherent in the Management Landscape

Information asymmetry exists in transactions, where one party has more or better information than the other. Neo-classical approach to economics assumes perfect information for both parties, which means they know everything required in making a rational or profit-maximizing decision. In actual cases there are things that we don't know and things that we don't know that we don't know (Epstein, 1984). What we don't know creates a power imbalance in transactions and whereas many times the contracts fail and sometimes the market fails; meaning goods and services are not efficiently served in free market. Some consequences of information asymmetry in contracting can be given as adverse selection, moral hazard, winners curse, and information monopoly.

George Akerlof in his paper "The Market for Lemons" discussed the information asymmetry in the context of used car market (Akerlof, 1970). A lemon is an American slang term for a cart that is found to be defective, only after it has been bought and cherry for a good used car. The quality of the car, which we can define as "known unknown", is not known by the

buyer. Since many important mechanical parts are hidden from the view and are not easily accessible by the buyer, the buyer doesn't know whether the car is a cherry or a lemon. So all the buyer has as the idea about the car is, it is of average quality, so he is willing to pay only the price for a known average quality car. Since owners of high quality cars know the quality, they rightfully demand a higher price but this means that the best cars don't get sold because, buyers who are unable to distinguish a quality and not so good cars are unwilling to pay the higher price. So the quality cars are no longer offered for sale. Markets get into a vicious cycle, since the average quality of the cars falls down the amount customers are willing to pay fall down and the upper quality of existing market is pulled from the market and so on. At the end, only the lemons are left at the market. So it can be summarized that in a market where the seller has more information about the product than the buyer, bad products can drive the good ones out of the market. In many cases the information asymmetry between the decision makers and the vendors is enough to prevent the decision maker to distinguish a functionally secure product from an insecure one. How can one distinguish the better of two computer security systems, which are marketed with the assertion of having same features? Information asymmetry is not restricted to contracts and can be applied to other aspects of life.

Owner of the IS as the customer

A cyber-security problem is a conflict-resolution scenario that typically consists of a security system and at least two decision makers – the defender and the attacker – that can have competing objectives (Jones, 2013). The defender is interested in the performance of the system security over time, for example ensuring that the system operates at or above some threshold level of performance. The attacker may aim ensuring the system operating below that threshold, but also to access systems undetected and to provide restricted information etc. The aim of cyber-attack may be fear factor aiming to create fear, spectacular factor creating negative publicity for the defender or positive publicity for the attacker, or exploiting vulnerabilities to serve purposes of the attacker.

The methods and technologies available to attackers are almost endless. They can be in the form of physical attacks, social engineering attacks (Murphy, 2011), Denial of Service (DoS), spoofing, sniffing, cookies, viruses, worms, Trojan horses, buffer-overruns, password-thefts, information leaks, zero-day attacks, etc. The cyber threats are unlike any stereotypes of past threats and cyber-attacks are increasing threat to sovereign ability "to pursue national security objectives at both the strategic and tactical levels" (USNI, 2010). Sun Tzu recommends "know thy enemy" but decision makers in many cases are no longer dealing with a known enemy or even a group of known enemies on known battlefields or security domains. The cyber actors which can be found in a wide spectrum from individuals to nation states can be corporations, criminals and criminal enterprises, terrorist and also thrills, or fame seeking parties. The increasing pressure to enlarge the cyber presence for organizations also increases the "surface area" which is exposed to threat.

The status-quo in the security community is observed to have a reactive mindset. Meaning a method of attack is developed and performance of counter-measure is developed to that particular or similar attack generally only after the defending parties notice that something is wrong within the system. Even in this kind of security scenarios the shortcomings of the reactive mindset is evident, when the attacker party uses more advanced and persistent approaches the reactive mindset becomes the constraint on behalf of the defenders. Proactive approaches with actionable cyber-attack forecasting is developed (Jones, 2013) with the objective or learning an attackers behavioral models, to predict future attacks, and selecting appropriate countermeasures, to prevent future attacks using modeling attacker intrusion-detector interaction (Alpcan & Başar, 2006) using stochastic (Markov) game, Nash and Bayesian Equilibria (You & Shiyong, 2003) the issue with depending on prediction and forecasting still remains.

The Cynefin Framework

Cynefin (pronounced kun-ev'in) framework developed by Dave Snowden is a holistic sense-making framework (Kurtz & Snowden, 2003). Cynefin is a Welsh word which is almost impossible to translate into

English. Roughly, it means a passionate connection with a particular place (although commonly it is translated as 'habitat'). Cynefin consists of five domains (Snowden, 2013) that are epistemological paradigms representing various states of reality-sensing. The domains are separated by the way of cause and effects are related or separated.

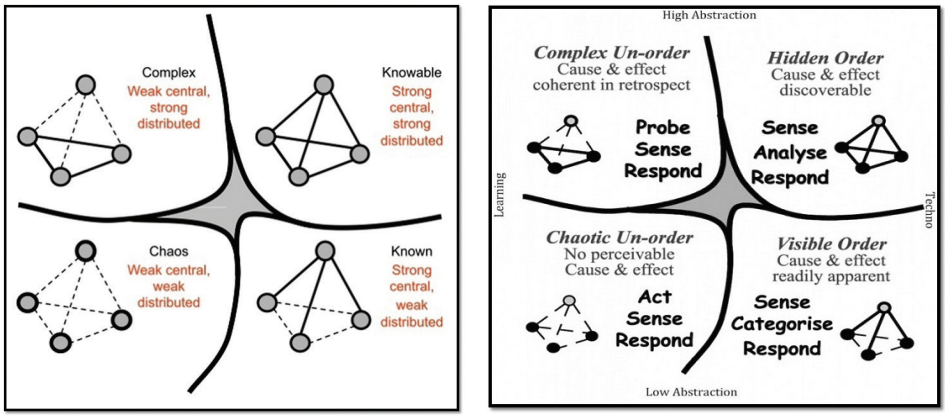
- Simple (known) domain: This is the domain within which the cause and effect relationships are obvious to all. It is presumed that if cause A exists, effect B will certainly be observed. The approach used for decision making and action is Sense- Categorize-Respond which consists of sensing the situation, categorizing the state with a previously developed or learning categories, and responding in a predetermined way.
- Complicated (knowable) domain: In this domain the cause and effect are separated by time and space but through investigation and expert knowledge these relations can be revealed. An example to this domain would mostly be scientific research or complicated machinery, which requires an expert for intervention. The approach best suiting is Sense-Analyze-Respond. After the relationships are well understood, "good" practices are applied.
- Complex domain: The cause and effect relationships in this domain can only be perceived in retrospect or hindsight. They are unknown in advance, thus making planning useless. A model for this domain can be a jungle with thousands of different organisms, their subsystems, systems, complex relationships, dynamic balance, and interactions. No amount of research or exploration can surface all the workings and dynamics of the system, making expertise on the system impossible. One can learn to survive in the system but system dominance impossible without destroying the balance. The proper approach is Probe-Sense-Respond and uses multiple safe-to-fail experiments to allow emergent practices. Complexity Adaptive Systems Theory developed in Santa-Fe Institute, which examines the "complex macroscopic collection" of "similar and partially connected micro-structures", is an example for the systems in complex domain. These systems are complex because they are

dynamic networks of interactions and their relationships are not aggregations of the individual static entities.

- Chaotic Domain: When there is no system level relationship between cause and effect, the domain is called chaotic. This is the domain of novelty within which the best approach is Act-Sense-Response. The chaos theory which originates from the work of Edward Lorenz and examined in great detail especially in mathematical disciplines are relevant in this domain (Kellert, 1993). Organizations in the chaotic state have weak connections with the individuals and social artifacts.

Other than these four main domains there is also a domain named Disorder. Within this domain there is no way to infer the causality type, thus there is no best approach. The interesting aspect of the disorder domain is that every individual tries to apply the approach he is most comfortable within this domain. Whereas those who are "comfortable with stable simple domain try to create or enforce rules, experts seek to conduct research and accumulate data, politicians try to increase the number and range of their contacts, and the dictators eager to take advantage of a chaotic situation seek absolute control. The stronger the importance of the issue the more people seem to pull it towards the domain, where they feel most empowered by their individual capabilities and perspectives" (Kurtz & Snowden, 2003).

Figure 1: Representations of the Cynefin framework domains. (The shaded area in the middle representing the disorder. Strengths of cause-effect connections are shown on the left and proper approaches for domains on the right.)



An example on Mapping Security Issues on Cynefin; The Case of Passwords

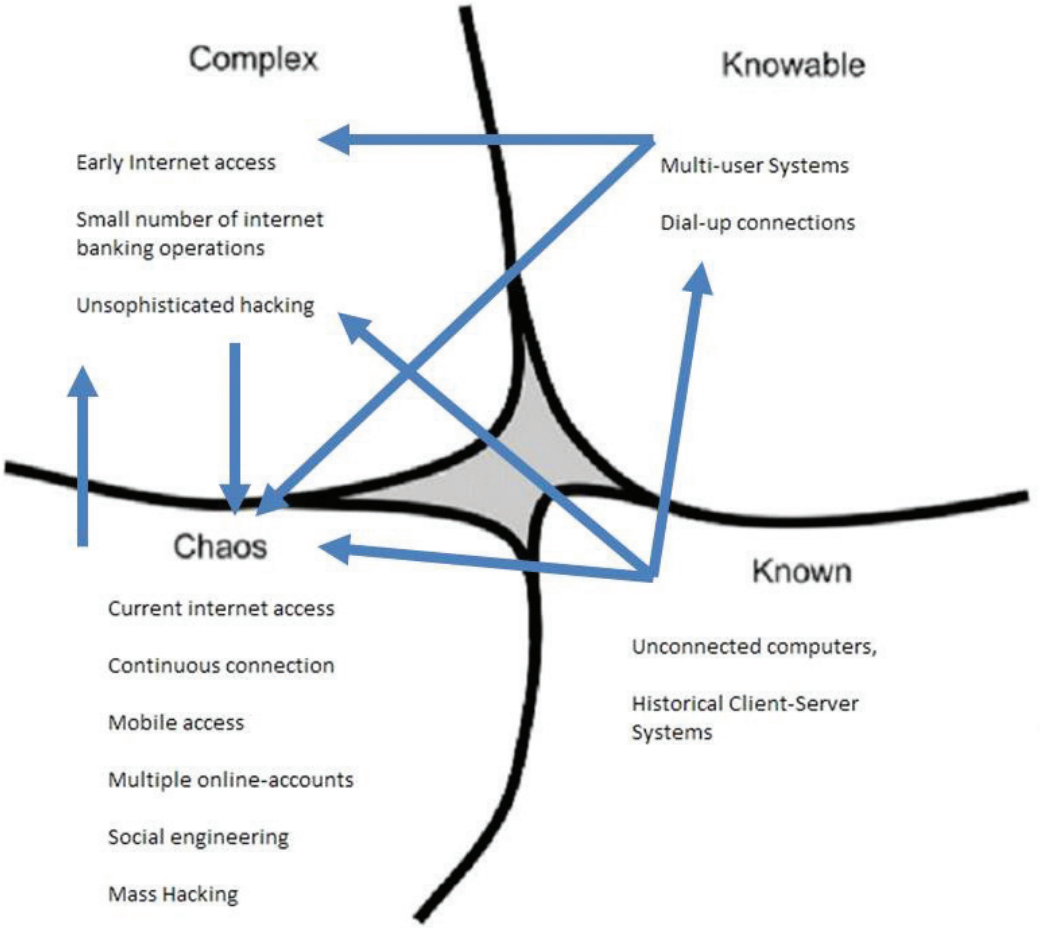
As the framework indicates the issues considered in any concept of system has the perspective of space, time, and connectivity. Here the use of passwords as a tool for providing security in computers and the information systems are provided as an example of issue mapping on Cynefin Framework.

It is known that a link is as strong as its weakest link (Goldratt, 1997) when considering the password based securities which are the "keys to the network kingdom" (Burnett & Kleiman, 2005). Whereas a simple alphanumeric combination was secure enough for the protection of information in the personal computers fifteen years ago, when internet connectivity was rare, today with being online is the blood of daily work life a more rigorous approach to passwords is required. The security issue revolving around passwords can be thought as the polio pandemic (Honan, 2012). Altough it has been a disease found in many civilizations for thousands of years, polio became one of the most dreaded epidemics in the 20th century (Trevelyan, Smallman-Raynor, & Cliff, 2005).

In the course of password use in early systems, direct physical access to the computer of interest had to be accessed directly by the attacker and the password had to guess the password with available personal information about the habits of the system owner or knowledge of that particular system. With the rise of internet the necessity to have access to personal information has changed into access to connectivity time. Using random number generators and dictionary attacks, it became a matter of time to break into the system. While in the early development phases of such attack, methods used required specialized programming techniques and encryption methodology with the rapid diffusion of information and availability of purpose build software any willing party currently has the possession of this capability independent of their level of expertise.

Although it is regarded as an outdated mode of security, established habits and lack of viable alternatives make password usage the default method of security. For example, with 10000 most common passwords representing the passwords of 99.8% of all users (Burnett, 2011) pass the security of an ordinary user's computer in a matter of minutes. Moreover with the current level of connectedness and interdependence of human and information systems the security domain is much more open to manipulation through social engineering attacks, which almost makes all the deliberate systems of security obsolete.

Figure 2: Shifts of issues over ontological domains



As illustrated in Figure 2, issues shift in the ontological domains even before related parties are able to get a comprehensive understanding on the subject let alone develop solutions. One critical aspect of Cynefin framework can be illustrated with the necessity of meta-thinking about the nature of the issues and circumstances, required before diagnosis and solution development. Whereas it would be enough to classify and respond in known domain now that the issues have shifted to Chaotic and Complex domains, it is far from a valid approach.

Conclusion

People make decisions not as a result of consideration and deliberate cognitive processes but as a way of being (Keen & Morton, 1978). The simple and complicated domains represented in the Cynefin framework can be epistemologically classified ordered domains within which a desired output can be determined in advance (Snowden D. J., 2005). Complex and Chaotic domains are in the same sense unordered domains. This means decision makers trading ordered systems or managing the systems in ordered states have the luxury to define goals into the future. Plans that draw the path to achievement of these goals can be made, and through good data capture, analysis can be executed. The unordered systems make determining the output or end-state impossible since the 'relationships between cause and effect are not repetitive except by accident' and the great number of interacting agents and interactions prevent prediction by use of outcome-based models. In that case the right approach would be controlling or manipulating the starting conditions, the containers of the system, significant differences, and the exchanges happening in the system (Eoyang, 2004) to influence the system so that a desirable outcome can be achieved or a failure can be avoided.

Thinking and using right paradigms when approaching issues are critical for the governance of IS security, especially in today's environment where social, business, and cyber are inseparably intertwined. Cynefin framework can in such a time used for sense-making and a foundational framework for decision makers.

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Istanbul Journal of Innovation in Education
Volume 1 Issue 1 January, 2015 pp. 15-27

Problem-Driven Approaches in Consumer-Targeted Informative E-Health

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Abstract: Problem-driven approaches such as problem-based learning (PBL) and its hybrid extensions have been widely used in medical and health-related training among health professionals. Do such approaches give added value for consumer-targeted informative e-Health design? PBL approaches may be rewarding at higher cognitive levels; however, too extensive orthodox modeling or format recommendations may be a threat to innovative product design and new insights. The main ideas of PBL-connected ideologies may be useful in the health sector and in consumer-targeted digital applications: constructive, self-directed, collaborative, and contextual learning represent aspects that are plausible in consumer-targeted eHealth area. Creative problem-solution scenarios require intellectual activity and may hence attract consumers and increase customer activity if the substance knowledge frame is supported, appears well-known, and is understandable for the consumers. This study considers these items in a theoretical problem analysis as part of a design science approach with contextual literature.

Keywords: Instructional digital media, problem-driven approach, health care

Introduction

Instruction models that emphasize problem-solution structures are well known and actively applied in medical training among health professionals and these approaches take also some place in e-Health design. The designer often develops problem and solution spaces in parallel with creative design (Dorst & Cross, 2001). There are different strategies for problem-solving algorithms. Some problem-based design approaches rely on the principles of problem-based learning (PBL) (e.g., Walker et al., 2010). PBL has gained popularity in medical schools (e.g., applications targeted for health professionals or students) but has also moved into other disciplines (Johnson & Finucane, 2000). In the medical field, not all PBL-connected programs follow the principles of the pure, original PBL model

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and emphasis in health care is more focused on prevention, health care delivery, and "wellness" instead of problems (Camp, 1996). Today, many training programs or informative online solutions are targeted for health service users and PBL-emphasized techniques are offered also for these target groups. Hence, reconsideration is needed in terms of in which way applied problem-driven approach could be of added value in consumer-targeted applications. This research consists of a contextual literature review and critical analysis and focuses on this question: In which way and in which areas could problem-driven approaches such as PBL and its hybrids be useful in consumer-targeted informative applications in e-Health? This article focuses on the different cognitive levels of learning, adaptation possibilities, and challenges within, and comprises design-based research that concentrates on the questions of the theoretical design phase, its methodology choices, and connected creative insights.

The problem-driven approach in learning and connective design

PBL strives for a proper understanding of phenomena, effective problem-solving and collaboration skills, enhanced motivation, self-directedness, and flexible knowledge-capturing (Hmelo-Silver, 2004). PBL underlines student activity and students' reasoning iterations done by themselves or in small collaborative groups (Hmelo-Silver, 2004; Knowlton, 2003). It is claimed that even if in PBL it is tried to handle process and content as equal aspects, students do not always master needed theoretical knowledge on the substance task in question. However, problem-solving ability requires relevant factual knowledge base (Gwee, 2009; Norman, 1997). Different specialties and individual products have their own integrated missions in e-Health design; problem-solving processes are not straightforward even in a same specialty area. "Problem-solving is domain-specific" (Knowlton, 2003), personal control comprises typically problem-solving styles (Wu et al., 1996), and different types of problems require different kinds and levels of knowledge and capabilities (Savage, 1990). Evidence-based instructional strategies are needed to show "which facets of PBL are important for particular kinds of outcomes" (Hmelo-Silver, 2004). There are pure and hybrid PBL models, and different institutions have

their own variations (Pawson et al., 2006). Problem-solving techniques in the health sciences utilize also other approaches, like e.g., case-based reasoning (e.g., Bichindaritz & Marling, 2006). To select the best PBL-approach, it is essential to evaluate who the students and the main learning tasks are (Takahashi & Oku, 2009). However, there is no evidence that PBL improves knowledge base or performance (Colliver, 2000; Newman, 2003), and measurement procedures suffer from problems of validity (Belland et al., 2009). There is little or no difference between knowledge acquisition among students from a PBL curriculum and from a traditional approach (Cunnington et al., 1996). "The impact of PBL depends on the tutors' quality and the students' motivation"; often, blended PBL is more successful than simply a traditional PBL course (Woltering et al., 2009). Students may feel stressed until they are familiar with the PBL process (Wood, 2003). Under some circumstances "PBL may do best outside of medical education and allied health" (Walker & Leary, 2009). PBL belongs to "minimally guided techniques," which are less effective than direct instructions, and novice learners are not always able "to integrate the new information with their prior knowledge" (Kirschner et al., 2006). Self-directedness may be demanding for younger users; hence, PBL should be tailored to the developmental level of the learners (Hmelo-Silver, 2004). PBL techniques are typically resource-intensive and require prioritizing (Wood, 2003). Healthcare practice needs, no doubt, other options for adult education as well (e.g., Pijl Zieber, 2006).

The problem-driven approach in e-Health environments

E-PBL is PBL in an online environment (Wheeler, 2006). Technology plays a role in adapting PBL for specific disciplines (Hmelo-Silver, 2004). PBL as a learner-centered approach has also been successful in digital educational applications (e.g., Sayed et al., 2012) and in consumer-targeted e-Health. Chan et al. (2009) noticed that the PBL approach motivated critical thinking in a health information promotion project among students. There are PBL-led game applications for younger user groups (e.g., Farrell et al., 2011). In health related consumer-targeted design, problem-driven approach may however be a suitable option for the following reasons:

- Consumers have their own health-related interest areas, questions, and problems (real problems exist),
- Customers often have previous knowledge of their problems, which increases their sophistication level,
- Digital applications often support self-directness and independent learning in this field.

The problem-driven approach and cognitive levels in digital instruction

Levels of knowledge acquisition; knowledge frames for problem solving

Informative e-Health consists of domains from which users typically seek answers to their health problems. Developing problem-solving abilities requires a relevant knowledge base (Norman, 1997). In knowledge acquisition, the major challenge is to find the proper information about the task in question (West, 2009). Often the main problems are connected with quality or clarity of given information; the offered information domain may be too huge, too detailed, or on the other hand too superficial or unclear. When the main purpose of the application is information delivery, clarity, trustworthiness, and optimal information richness are essential features for success. Novice learners can feel overloaded by PBL in an online environment (Jung et al., 2011). Many health consumers are novices in health affairs when it comes to information gathering and filtering; hence direct instruction and presentation may be the most useful ways at this level. This means that problem-driven approaches are not very suitable for this stage in consumers' health training and management, whereas the product quality — the content quality of given information — is critical.

Levels of knowledge processing; problem-solving

In this context knowledge processing means the need for an intensive support in knowledge management. Ill-structured cases require applications that could offer intensive guidance and support in the upper cognitive skills and connected thought processes. The user has to analyze the given

information when trying to apply it and needs space for one's questions (symptoms, optional treatments, and interventions). Such analytical steps prompt self-diagnostics and problem-solving. PBL techniques attempt to foster higher-order cognitive thinking skills (Weiss, 2003) and inspire to creative idea communication (Starko, 2005). Solutions that support upper cognitive levels are e.g., applications that deal with a challenging, specific disease, or problem area (e.g., diabetes, musculoskeletal disorders). In addition to method selections there is also need for creative design insights when planning efficient process support. Several products designed for patients' self-health management contain aspects that are typical for PBL approaches: peer support (small groups), online consultation with health professionals (tutors), and problem-solving toolkits for self-paced learning (self-directedness). Building online teams, however, requires more effort than building face-to-face teams (Savin-Baden & Wilkie, 2006). Process quality is critical in this step (access and quality of consultancy or tutoring). Many informative e-Health domains have a peer group support option (i.e., patients with the same health problem). However, expert tutors are generally more effective than non-expert tutors (e.g., Eagle et al., 1992). The impact of PBL, depends on the tutors' quality and the students' motivation (Woltering et al., 2009). Hence, in the health sector, peer support should always be complemented by professional expertise. Blended models with self-regulative online training periods and traditional consultancy with health professionals are natural choices in this area (e.g., patients with chronic diseases typically have ongoing consulting interventions with professionals). Digital products may intensify these consultancy appointments by enhancing patients' knowledge processing with problem-solving toolkits and offer in this way equity for communication processes, which is one aim of PBL-connected philosophies. PBL-connected ideology underscores intense self-management (self-regulation) and cooperation. If solutions and training formats generally offer more space for customers' own thinking and questions, this may also promote more balanced communication between health professionals and consumers. PBL approaches emphasize connected training programs. These should also cover health professionals, just to motivate them to accept the idea of more dialog-emphasized communication. Problem-driven approaches or

their hybrids may work well in levels, which require more sophisticated thinking procedures, but only if patients' knowledge level of substance area is intensively supported. Also, following an orthodox PBL approach too intensively may only give designers an extra burden as a necessary frame or method to follow. It is important for the designer to have the freedom to test also all kinds of new ideas in a novel design area. The design environment is more constructive if there is enough flexibility for all kinds of hybrids; for example, blended PBL may be better than traditional PBL courses (Woltering et al., 2009). In PBL, there are many models for the actual problem-solving process. In the health area, the process from the initial problem to the completed problem may be less straightforward. Hence, every case needs a problem-solution process that is contextual enough, meaning that general guidelines may offer only a rough idea as a foundation and require validation of its specific purpose.

Levels of creating and evaluation; creative problem-solving

The level of "creating" requires support systems that can enhance one's health status in the long view (efficient decision-making, discipline strategies, motivational aspects). The customer has to define how to develop new kinds of self-curative practices, how to change health-related behaviors, and how to self-evaluate progress. This level of continuity requires professional help, but also eagerness for intense personal considerations and interventions which require intellectual activity and creative problem-solving. When service users realize that their active undertakings and creative inputs are wanted aspects, this may motivate them towards better customer activity. Thus, problem solution at this level, means striving for better health status with more balanced cooperation accentuating, however, the customer's role and independent contribution in the process. This requires as well solid substance knowledge and its support, but especially, "enough space" for consumer's own opinions and insights.

Taxonomical stage (Newcomb-Trefz)	**Activity/emphasized PBL element, PBL intensity recommendation (-, +)**	**Applicative support/task** (instructional responsibility)
Remembering (knowledge)	*Health information acquisition* (substance knowledge domain) **(-)**	Content quality of information/ substance knowledge of prevention, curative actions; prerequisite for PBL-approaches
Processing (comprehension, application, analysis)	*Contextualization to health status* (problem-solution domain)/ authentic tasks, problem-solving skills, real problems **(++)**	Professional tutor support, individual processing/tools for interaction and self-processing
Creating (synthesis)	*Changes in health-related behavior* (solution domain)/learner activity & commitment, goals & creativity **(++)**	Professional tutor support, individual processing/tools for discipline techniques and space for consumer's contributions
Evaluating	*Progress in self-evaluation* Ownership & development **(+)**	Tools for self-evaluation, feedback system

Table 1: Examples of the supporting tools' functions and intensity in PBL emphasized design

Table 1 gives an example of the functions an application could offer in each cognitive category. An emphasized PBL element is also mentioned in each category using taxonomy by Newcomb-Trefz (1987). The usefulness of a problem-driven approach is estimated as most rewarding in areas of knowledge processing (contextualization or problem-solving) and creating (changes in self-health management or creative problem-solving) because in these levels, problem-solution scenarios may support ideology and connected plans in a plausible way. However, at the beginning, intense substance knowledge is needed as a requirement for problem-solving procedures in general and this knowledge acquisition is most successful using direct instruction methods (level of knowledge).

Discussion

The ideology behind the PBL approach contains aspects that are aligned with common targets in health care. In PBL, learning is a constructive and active process with purpose to foster self-directed learning skills and "learner ownership of the process" (e.g., Hmelo, Silver, 2004, Pijl Zieber, 2006). Problem solving in general makes activities interesting and intellectually challenging, but problem solving which allows or requires also creative contributions, is more interesting. Creative contributions require enough independency. In health sector, independency in problem-solving is possible if it is connected with more intense substance knowledge base and this knowledge is likely more understandable if it is presented for consumers using direct instructional methods. Hence, problem-driven approaches in consumer targeted applications may be rewarding if designed in a way which attracts users, allows possibilities for creative and independent procedures, and supports these activities by offering substance knowledge deep enough. These requirements make design efforts also in this area more challenging but may mean also more customer activity when it proceeds successfully. Design that supports consumers' abilities for independence and intense cooperation with health professionals is welcome, but also requires that health professionals understand and accept such ideas. Hence, effective training programs for health professionals and program members are required for success (e.g., Gwee, 2009). Health consumers need enough "space" for individual insights and opinions, but also a well-functioning feedback system. The idea of building "a problem-solution frame" for self-health management is not irrational. In curative processes, the question is also about realistic problematic scenario planning, especially in decision-making of upper cognitive levels. Health professionals or training consultants may work as tutors and peer groups with the same problem could offer motivating support. Blended models give many possibilities for traditional PBL elements (small tutored groups, collaborative peer support); therefore, models that integrate digital applications with different kinds of offline activities offer possibilities for these kinds of approaches. In addition, hybrids that combine PBL models and task-based learning (e.g., Takahashi, 2008) or case-based reasoning might offer useful combinations.

The overall strategic selections dictate which solutions work best. It is useful that "an innovation is not evaluated and understood in isolation, but rather as an integral part of the context" (Jacobs, 2000). Innovative product design means contextual considerations when it comes to design strategies and connective selections. "PBL can take many forms of both processes and products" (Knowlton, 2003). It is meaningful to consider case by case if a problem-driven approach is a useful starting point or frame model and to assess which kinds of good insights the PBL approach or related extensions may offer to a design strategy. Design-based research that in this context also "bridges theory and practice" (Dolmans et al., 2005) is also necessary in eHealth. The mission of the product dictates what kind of pedagogical approach makes sense and is of added value; too guiding models may frustrate designers as well as users, making designers blind to novel approaches and limiting their own insights. Also, in this way, "an overemphasis on rigor can lessen relevance" (Hevner et al., 2004) or too rigid methodology choices may disturb creative insights in design. It is important to assess which kinds of values will be selected as frame values to the design and connected training and how these values reflect to training process and evaluation. Following quality led questions are useful when evaluating design strategy choices. Do embed ideological aspects or techniques of the PBL approach enhance, support, or strengthen these areas and in which way implemented?

Mission view: How the training is targeted and what is its mission?

Process view: In which way does the planned training format fulfill its mission best?

Product view: What kind of toolkit or product supports the planned training in an optimal way?

Customer view: In which way are customers' needs and substance knowledge level supported?

Efficiency view: How the efficiency of the training campaign or format is guaranteed?

Ethical view: What kinds of ethical considerations should be undertaken?

Image view: In which way will connected image issues be evaluated?

Conclusion

Instead of problems, the new direction in health-related information delivery underlines terms such as prevention, health care delivery, and "wellness" (Camp, 1996). However, creative problem-solution approaches represent intellectual activity and can hence increase customer activity if the substance knowledge level of customers is supported at the same time. PBL is based on four insights on learning: constructive, self-directed, collaborative, and contextual learning (Dolmans et al., 2005) and these represent aspects that are also plausible in health related digital products. Also, the problem-solution approach is not illogical for use in health management. Constructivism contributes to the idea of a more equal learning process, learners' actions, and ownership of the learning process (Gijselaers 1966). Consumer-targeted e-Health applications are attempting to enhance customers' knowledge level and hence consumers can be more equal partners with health professionals when it comes to decision-making and problem-solving in their health processes. PBL lays emphasis on pragmatism and collaboration; "joint activity" in problem solving" (e.g., Hmelo-Silver, 2004, Pijl Zieber, 2006). These ideas bring more equity to health communication between health professionals and consumers when customers' ideas and concerns get more weight in communicative processes, producing more patient-focused health care. When applying these ideas to digital design, the designer has to ensure enough space for his or her own ideas even if PBL would be the selected, inspirational source for design. In spite of that inspirational problem focused model frames are welcome to the area.

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Istanbul Journal of Innovation in Education
Volume 1 Issue 1 January, 2015 pp. 29-38

Free Drops from Cloud in Bioinformatics

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Abstract: The need for the benefits of the cloud technology is in almost every discipline, which data size is gradually increasing. Bioinformatics is a field that can produce more data every passing day as a result of emerging scientific advances (high-throughput technologies, etc.). Processing and sharing data is as much important as storing data which can produce results affecting all creatures, particularly human being. In today's technologies, the road to the light passes through cloud. It is seen that many cloud solutions special to bioinformatics have been created in recent years. These can emerge as software, platform, or infrastructure solutions. In this study, it is aimed to determine positive and negative sides by comparing free cloud infrastructure systems used for bioinformatics data. For this purpose, cloud solutions that can meet the needs of bioinformatics field will be briefly mentioned by giving information about cloud information technologies and free infrastructure solutions will be compared. Consequently, the infrastructure to be established should have support through web in order to make a selection between compared systems. Apart from this, if the software needed in bioinformatics is found as predefined, this will be seen as an important reason for preference for the cloud infrastructure system to be used.

Keywords: Cloud Computing, Bioinformatics, Cloud Biolinux, Cloudman CloVR.

1. Introduction

As information technologies evolve, the needs are increasing and a cycle encouraging development will be created. Growth rate of the amount of the data that is produced, resulting in the need of further improvement in data processing and storage capacity of computers. When these needs are evaluated from different perspectives (like financial, place, etc.), it will be seen that Cloud Computing-based solution systems are offered. There are some alternative cloud structures in bioinformatics as one of the

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areas where these systems are used. Some of these are software solutions, platform solutions, or infrastructure solutions.

In the field of bioinformatics, different data types and data analysis may require different compute need. For example, while analysis of next-generation sequencing (NGS) requires more RAM, CPU can be a more important limit for search with BLAST (Afgan et al., 2012). There are cloud infrastructure systems offered free (Cloud Biolinux, CloVR, etc.) or paid (Amazın EC2, Windows Azure, etc.) for meeting infrastructure requirements. In this study, information regarding cloud computing technologies is provided, cloud solutions that can meet the needs in the field of bioinformatics are briefly mentioned, and free infrastructure systems are compared.

2. Cloud Computing

In recent years, large-scaled projects can be carried out with super computers having high computing capability. High performance computing can be made with less expensive methods known as commodity cluster or grid in contrast to high costs of super computers. Although it doesn't have a standard definition, Cloud Computing is a datacenter hardware, software, and systems distributed for massive data processing (Armbrust et al., 2009). Cloud computing provides computing alternative to the researcher without the need to establish a physical infrastructure. Cloud computing offers less expensive alternative to super computer and customized clusters, a more reliable platform compared to grids and more scalability compared to biggest commodity cluster or weld pools (Ostermann et al., 2009).

Grid computing, the data processing structure before the development of cloud computing, can be considered as a revolution coming after internet and World Wide Web. Grid computing provides a combination of sources (super computers, storage systems, data sources, and devices customized for different fields) distributed geographically (Chetty & Buyya, 2002). Cloud computing, which is a reliable service distributed with new generation data centers based on virtualized computing and storing technologies, has emerged. Users can access data and applications from a cloud in any part of the world (Weiss, 2007). Security and privacy

are important issues. Interoperability, multi-platform, multi-application, and multi-provider support services are also important.

Building and operating of cloud systems can be possible with expensive ventures. Since the beginning of 2000s, with the development of web services, important internet companies like Amazon, eBay, Google, and Microsoft using these systems have developed scalable infrastructure software (such as MapReduce, the Google File System, BigTable, and Dynamo) (Armbrust et al., 2009).

Cloud computing provides the most appropriate use for many computers in terms of offering proper and optional access to the sources (computing, storing, serves, and etc.) offered with Web Application Programming Interfaces (API) (Buyya et al., 2009). Cloud computing has a computing infrastructure accessed with a network like internet or where some actions such as managing, sharing application, or developing platform (McDonald, 2010). Cloud is seen as a single access point for the computing need of the user and the most widespread services are as follows (Rimal et al., 2009):

1) Software as a Service (SaaS): It is a multi-tenant platform. It uses object code sample under database that supports common sources and a large number of customers simultaneously. SaaS is generally defined as ASP (Application Service Provider) model. Examples for important providers: SalesForce.com (SFDC), NetSuite, Oracle, IBM, Microsoft.

2) Platform as a Service (PaaS): Cloud system provides a platform developer covering all system and environments in improving, testing, applying, and hosting the last life cycle of web applications developing service from end to end. Google App Engine GAE and Microsoft's Azure can be given as examples.

3) Hardware as a Service (HaaS): It offers service to users without forcing them to make building and datacenter management investment.

4) Infrastructure as a Service (IaaS): IaaS distributes the computer infrastructure. Its high flexibility is its most important benefit. It has a user-based payment structure. Customers pay as much as they use. It always uses the latest technology. Customers gain faster service distribution and

more time. GoGrid, Flexiscale, Layered Technologies, Joyent, and Mosso/ Rackspace can be given as examples.

3. Cloud Systems in Bionformatics

The developments occurring in science world trigger each other. Therefore, in today's world where interdisciplinary studies are becoming more important, bioinformatics includes all processes such as storing data in the fields of biology and especially molecular biology and converting them into information in cooperation with disciplines such as computer sciences, mathematics, and statistics. Thanks to technological advances, sequencing is becoming faster, less expensive, and produced data size is rapidly increasing. However, analysis rate of these data is limited with the capacity of computers. Cloud service solutions are useful in removing this limitation. There are many free or paid cloud resources developed for bioinformatics in recent years. These services are given in Table 1 by combining from Dai et al. (2012) and Lin et al. (2013)'s reviews.

Resource	Description	References
	Data as a Service (DaaS):	
AWS Public Datasets	Cloud-based archives of GenBank, Ensembl, 1000 Genomes, Model Organism Encyclopedia of DNA Elements, Unigene, Influenza Virus, etc.; http://aws.amazon.com/publicdatasets	
	Software as a Service (SaaS):	
BGI Cloud	Cloud-based implementations of various genomic analysis applications; http://cloud.genomics.cn	
CloudAligner	Fast and full-featured MapReduce-based tool for sequence mapping; http://cloudaligner.sourceforge.net	Nguyen et al., 2011
CloudBLAST	A cloud-based implementation of NCBI BLAST; http://ammatsun.acis.ufl.edu/amwiki/index.php/CloudBLAST_Project	Matsunaga et al., 2008
CloudBurst	Highly sensitive short read mapping with MapReduce; http://cloudburst-bio.sourceforge.net	Schatz, 2009
Contrail	Cloud-based de novo assembly of large genomes; http://contrail-bio.sourceforge.net	Schatz et al., 2010
Crossbow	Read Mapping and SNP calling using cloud computing; http://bowtie-bio.sf.net/crossbow	Langmead et al., 2009
EasyGenomics	Cloud-based NGS pipelines for whole genome resequencing, exome resequencing, RNA-Seq, small RNA and de novo assembly; http://www.easygenomics.org	
eCEO	Cloud-based identification of large-scale epistatic interactions in genome-wide association study (GWAS); http://www.comp. nus.edu.sg/~wangzk/eCEO.html	Wang et al., 2011

FX	RNA-Seq analysis tool; http://fx.gmi.ac.kr	Hong et al., 2012
Gaea	Cloud-based genome re-sequencing assembly; http://bgiamericas.com/data-analysis/cloud-computing	
Hecate	Cloud-based de novo assembly; http://bgiamericas.com/data-analysis/cloud-computing	
Jnomics	Cloud-scale sequence analysis suite based on Apache Hadoop; http://sourceforge.net/apps/mediawiki/jnomics	
Myrna	Differential gene expression tool for RNA-Seq; http://bowtie-bio.sourceforge.net/myrna	Langmead et al., 2010
PeakRanger	Cloud-enabled peak caller for ChIP-seq data; http://ranger.sourceforge.net/	Feng et al., 2011
VAT	Variant annotation tool to functionally annotate variants from multiple personal genomes at the transcript level; http://vat.gersteinlab.org	Habegger et al., 2012
YunBe	Pathway-based or gene set analysis of expression data; http://tinyurl.com/yunbedownload	Zhang et al., 2012
Cloud-Cofee	Multiple sequence alignment http://www.tcofee.org/	Tommaso et al., 2010
SEAL	Short read mapping and duplicate removal http://biodoop-seal.sourceforge.net/	Pireddu et al., 2011
Quake	Quality-aware detection and correction of sequencing errors http://www.cbcb.umd.edu/sotware/quake/	Kelley et al., 2010
ArrayExpressHTS	RNA-seq process and quality assessment http://www.ebi.ac.uk/services	Goncalves et al., 2011
BioVLab	A virtual collaborative lab for biomedical applications https://sites.google.com/site/biovlab/	Lee et al., 2012
Hadoop-BAM	Directly manipulate NGS data http://sourceforge.net/projects/hadoop-bam/	Niemenmaa et al., 2012
SeqWare	A scalable NoSQL database for NGS data http://seqware.sourceforge.net	O'Connor et al., 2010
GATK	Genome analysis toolkit http://www.broadinstitute.org/gatk/	McKenna et al., 2010
	Platform as a Service (PaaS):	
Eoulsan	Cloud-based platform for high throughput sequencing analyses; http://transcriptome.ens.fr/eoulsan	Jourdren et al., 2012
Galaxy Cloud (CloudMan)	Cloud-scale Galaxy for large-scale data analysis; http://galaxy.psu.edu	Afgan et al., 2010 Afgan et al., 2011
	Infrastructure as a Service (IaaS):	
Cloud BioLinux	A publicly accessible virtual machine for high performance bioinformatics computing using cloud platforms; http://cloudbiolinux.org	Krampis et al., 2012
CloVR	A portable virtual machine for automated sequence analysis using cloud computing; http://clovr.org	Angiuoli et al., 2011

Table 1: Cloud resources in bioinformatics (Dai et al. 2012; Lin et al., 2013)

4. Comparison of Free Cloud Systems in Bionformatics

There are Linux-based operating systems called Cloud BioLinux and CloVR as infrastructure systems offered with free software licensing in order to carry out the analyses of bioinformatics data on Cloud (Dai et al. 2012; Lin et al., 2013). Receiving a free or paid web service is necessary in order to use these infrastructure services. Amazon (free or paid) or Eucalyptus (free), web services found in market, can be used in order that infrastructure systems, which are the subjects of this study, can operate. Eucalyptus is an AWS compliant service that can be used to create our own cloud. Within the scope of this study, Amazon which is an installed system has been used because of hardware limitation. Cloud BioLinux was developed by J.Craig Venter Institute. CloVR is a Linux distribution developed by Maryland University. It has been stated on the websites of the two systems that the both infrastructures can be downloaded through internet. However, in the period in which the study was being carried out, virtualbox image couldn't be reached because of an error message appearing on the link of the related website of Cloud BioLinux virtual box version (Cloud BioLinux 32-bit VirtualBox appliance). Therefore, Image was established by signing up to Free Usage Tier service of Amazon Web Services (AWS) through Machine Images connection found on the same website. Amazon Company offers this service freely within the limitations specified on their websites (AWS Free Usage Tier, 2014).

On CloVR website, there are both virtualbox and vmware images. By following the route map found on the website they can be run on CloVR AWS. In this study, the two infrastructure systems are compared.

Cloud Bio Linux runs on more current Ubuntu 12.04, 12.10, or 13.04 distributions, while CloVR runs on Ubuntu 10.04 Linux distribution, which doesn't have an updating support by Ubuntu and has also lost its currency.

Both systems prefer offering their documents through web environment. CloVR offers more understandable and well-coordinated information to its end users. Communication between users and developers is provided via e-mail lists. On Cloud BioLinux, Documentation is carried out through the direction of different websites and the communication between users and developers is provided through Google groups.

Both systems have different software apart from the software they use commonly for bioinformatics researches. Systems can be compared from many aspects but in the comparison made in this study it is thought that issues such as installation difficulty or difficulty in accessing support can be solved by spending more time and effort. It is also thought that whether having the needed bioinformatics analysis tools or not is the key point.

5. Conclusion

Cloud systems offer different drops just like rain about the requirements of bioinformatics data. These drops can sometimes be used together. However, choosing the drops to be used can be a problem. From an external perspective, all drops resemble each other and it can be difficult to find the right drop without getting wet. In this study, a few drops offered freely are examined and it has been aimed to show the way to researchers which have hesitation about choosing the right cloud system for bioinformatics data set. Consequently, the infrastructure to be established should have a support through web in order to make a selection between compared systems. In addition, it can be seen as an important reason for preference for the cloud infrastructure system to be used if the software needed in the field of bioinformatics is predefined.

6. Acknowledgements

This work was supported by Research Fund of the Istanbul University. Project number UDP-27318.

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Istanbul Journal of Innovation in Education
Volume 1 Issue 1 January, 2015 pp. 39-69

Management and Information Systems in Special Provincial Administration: The Case of Ankara Special Provincial Administration

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Abstract: This study was conducted to investigate management information systems applied in special provincial administrations, in the case of the Ankara Special Provincial Administration, in accordance with the opinion of the employees. Six directors and 24 employees, for a total of 30 people, who participated voluntarily in the study out of 304 officers, worked in the Ankara Special Provincial Administration, constituted the sample of this study. The data collection tool consisted of the five open-ended questions regarding the opinions of the employees on the management information system. To analyze the data, of the qualitative research methods, the content analysis technique was used. The findings of the study revealed that, from the management information systems in Ankara Special Provincial Administration, the e-government applications of the Ministry of Interior, and the e-government applications not in the Ministry of Interior were used; however, the level of benefit was not sufficient according to the employees. Various problems were experienced, particularly in the operation of the management information systems; they were access sourced and were identified as an obstacle to the healthy functioning of the system. To take advantage of management information systems in Ankara Special Provincial Administration at high-level, employees made several recommendations, such as employee training and employment of qualified personnel, as well as simplifying the use of the program.

Keywords: Provincial Administration, Ankara Special Provincial Administration, Management, Management Information Systems, Information Systems

INTRODUCTION

Special Provincial Administrations in Turkey are institutions of local administration that have existed since the *Tanzimat* (The Reorganization) Period of the Ottoman State. The tasks and functions of these institutions have continuously changed over time according to new laws and practices, and have recently been reorganized in 2005.

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As is the case for all types of institutions and organizations, management plays an important role in the success and effectiveness of special provincial administrations. In the present-day world, adapting to change and new developments represents an indispensable aspect of effective management. An element of change that needs to be taken into account these days is management information systems. Owing to management information systems, the management of institutions/organizations can now access to the necessary information and data almost immediately, control all activities with greater ease, and perform many tasks simultaneously within a short period of time.

The aim of this study was to investigate the management information systems used in special provincial administrations by focusing particularly on the example of the Ankara Special Provincial Administration. To this end, the institutional past of this special provincial administration was first described, and its organs and structural organization were detailed along with its tasks and responsibilities as an institution. In the following sections of this study, the main concepts pertaining to management information systems are described, and the utilization of these information systems within the scope of managerial activities is explained. Following this, information is provided in the study regarding the principal components of information systems such as hardware, software and data, and information about the main information systems used for management purposes. Finally, the role and significance of the management information systems within the institutions/organizations are explained and the management information systems used in special provincial administrations are described by mentioning the types of management and information systems generally used to manage public institutions.

To render the theoretical information described within the study to be more concrete and specific, interviews were performed with employees at the Ankara Special Provincial Administration, and data from these interviews are evaluated through content analysis. The analysis results are interpreted using graphs, and are provided in the Results section of the study.

SPECIAL PROVINCIAL ADMINISTRATION

Special provincial administrations can be described as platforms characteristic to Turkey that unite public and local administrations. Special provincial administrations are generally defined as "administratively and financially autonomous public entities formed with the purpose of satisfying the common needs and demands of the people within a province, and whose decision-making bodies are determined through local elections" (Çetin, 2009, p. 251).

The Organs of Special Provincial Administrations

According to Law number 5302, provincial special administrations consist of three organs, which are: (1) the provincial council, the main decision-making organ; (2) the standing provincial committee, functioning as a consulting body; and (3) the governor, representing the executive organ of the provincial special administration (Aydın, 2008, p. 6).

Figure 1: The Organs of Special Provincial Administrations, According to Law Numbers 3360 and 5302 (**Çiftepınar**, 2006, p. 133)

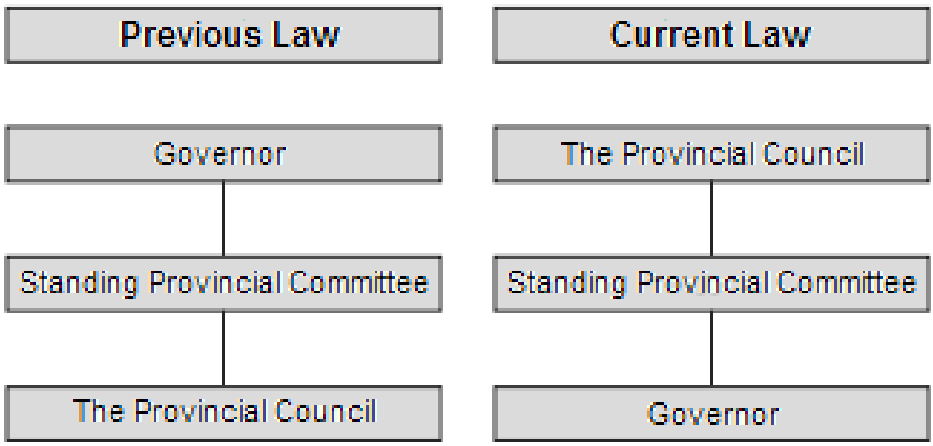


Figure 1 shows that while the governor was considered within the scope of Law number 3360 as being hierarchically above the two other organs of the special provincial administration, Law number 5302 now places these two organs above the governor. An evaluation of these two laws

reveals that, while the governors were initially considered to be the most important figure and organ within special provincial administrations, they now assume a more secondary role. With the current Law number 5302, the general secretary of the special provincial administration now assumes the role previously accorded to the governor. There are two aspects that further illustrate the secondary role currently assumed by the governor: the first of these is Article 32 of Law number 5302, concerning the "delegation of authority by the governor." According to this article, "if deemed necessary and appropriate; the governor can delegate part of its duties and authority to the deputy governors, to officials with administrative duties in special provincial administrations, and to district governors." The second aspect is the second item of Article 35 in the same Law, concerning the tasks of the general secretary of the special provincial administration. This item grants the general secretary the duty and authority to organize and conduct the "the activities/services of the special provincial administration on behalf of the governor and according to his/her mandates." Based on these articles and items of Law number 5302, it is possible to state that "the governor still exists [within the organization of special provincial administrations], yet fulfills a non-essential role" (Kartal, 2010, p. 203).

The Organizational Structure of Special Provincial Administrations

The organizational structure of special provincial administrations is described in Article 35 of the Special Provincial Administration Law number 5302. According to this article, "The organizational structure of the provincial special administration includes the general secretariat and the units for financial affairs, health, agriculture, public works, human resources, and legal affairs." The special provincial administration's permanent staff, as well as the units that will be founded, closed or merged within these administrations, shall be determined through the decisions of the provincial council. Such decisions shall be made by taking into consideration the province's population, its geographical and topographical features, its social and cultural characteristics, and its potential for development. These units shall be organized under departments and directorates in provinces with metropolitan municipalities, and only under

directorates in other provinces (the Special Provincial Administration Law number 5302, 2005).

The Tasks and Authority of Special Provincial Administrations

The Special Provincial Administration Law number 5302 was enacted on February 22, 2005 and published in the Official Gazette on March 4, 2005. Article 6, entitled, "The Tasks and Responsibilities of Special Provincial Administrations," of the initial version of Law number 5302 defined the following areas of activity and responsibility for these local administrations:

- All services within the province related to sports, health, agriculture, industry, commerce, youth, the provincial environmental plan, public works and settlement, soil protection, erosion prevention, culture, arts, tourism, social services and aid, the provision of microcredit for the poor, nursery schools and orphanages, the provision of land to elementary and secondary education institutions, the construction/ maintenance/repair of buildings, and any other service that might be necessary to satisfy the needs and demands of the people; and
- All services in areas outside the municipal boundaries related to construction, roads, waterworks, sewage, environmental aid and rescue, the supporting of forest villages, forestation activities, and the building of parks and gardens.

The activities and responsibilities initially defined in Law number 5302 were later subject to certain amendments. These amendments have generally expanded the scope of special provincial administrations' activities and responsibilities. For instance, according to the initial version of the Law, special provincial administrations were responsible for activities and services related to "youth, sports, culture, and tourism" only in areas of the province that were outside of municipal boundaries. In later amendments of the Law, the scope of the special provincial administration's responsibilities was amended from "youth, sports, culture, and tourism" to "youth, sports, culture, tourism, *and the arts*," and the area in which these administrations were responsible for these subject was expanded to

include the entire provincial area, rather than only the areas outside of the municipal boundaries (Koçak & Kavsara, 2012, p. 73; Kartal, 2010, p. 195).

Another important task and responsibility defined for special provincial administrations by Law number 5302 is the organization of the provincial environmental plan. The special provincial administration prepares the provincial environmental plan together with the metropolitan or provincial municipality (whichever one is present in the relevant province) and under the coordination of the governor. The abovementioned provisions regarding special provincial administrations are expected to ensure unity in administration and effective cooperation/interaction between local administrative institutions (Parlak, 2005, p. 186).

The services to be performed are prioritized by taking into consideration the special provincial administration's financial status, the urgency of the needed/required services, and the level of development of the relevant location in need of services. Services by special provincial administrations are provided by using suitable methods, and at locations that can be easily accessed by the citizens. Services are also provided by using approaches that make them easily accessible for those who are disabled, elderly, poor, or in need of medical care/assistance. Consistency and coherence between the services provided by special provincial administrations and the services provided by other local administrations and public institutions are ensured through the coordination of the provincial governor (Koçak & Kavsara, 2012, p. 73).

MANAGEMENT INFORMATION SYSTEMS

The last quarter of the 20th century was a period of profound changes in social and economic life, which were further magnified by the process of globalization that began in the 1980s. One of the most important developments associated with these changes was the transition of industrial societies – which was the dominant form of society for the past three hundred years – into information societies. In this process, standard economies transformed into technology-based information economies and organizations began to abandon their traditional approaches in favor of

strategies mainly based on information and technology. This led many organizations to place greater emphasis on research and development activities and on the development of innovative technologies (Şahin, Çetin & Yıldırım, 2009, pp. 548-549). During this period, science and technology became the key component of competition and success. The increasing prominence of science and technology in management processes led to the development of management information systems.

Management Information Systems

Information systems are "human resources, computers, and methods that gather, process, store, report, and distribute all information necessary for the decision-making processes of managers." (Tekin et al., 2000, p. 83). With the aid of computers and communication tools (which are collectively called "information technologies"), information systems allow managers to be aware of events, opportunities, and unexpected developments both in their internal and external environments with greater ease (Anameriç, 2005, p. 20).

These days, information systems are as important as information itself; in fact, they have even become prerequisites for the effective and timely utilization of information. Thus, information technologies have provided managers the ability to utilize information whenever and wherever it might be necessary.

Management Information Systems (MIS) is a concept mainly used in industries and businesses, and involves the close interaction between the computer, management, and accounting systems. As a result of this feature, MIS does not represent singular or isolated systems, but rather large and multi-component systems. As computers are nowadays used extensively in almost every type of organization, MIS has also become more widespread (Aktan & Vural, 2005, p. 146). Four different types of MIS (listed below) are currently used in organizations (Yılmaz, 1988, p. 64; Özkarahan, 1981, p. 51 as cited in Şahin, 2006, pp. 114-115).

- **Official and Structured Systems:** These represent systems in which information from within and outside the organization are

gathered and then conveyed to the relevant locations or parties. Such systems encompass the entire organization and are generally open only to those with the necessary access authorization (or clearance). Regularly organized reports and meetings are indications of official and structured management information systems.

- **Unofficial and Unstructured Systems:** These represent systems that are open to the use and access of all, with no access authorization (or clearance) required. These systems have no database or access-related restrictions and they are not dependent on a particular time or location. Unofficial and unstructured systems include telephone meetings, newspaper articles, and journals, which are accessible to all. The managers' access to information in this context is neither regular nor structured.
- **Special Structured Systems:** These represent systems that are developed to meet the special needs and demands of managers, in addition to the already existing official systems that support decision-making processes. These systems are designed according to the working processes and habits of managers. Thus, they depend largely on the type, level, and nature of the work performed by managers, as well as their character. An example of such systems would be the personal information systems formed by the managers themselves by recording some of their frequently-visited Internet sites, based on their personal interests and needs.
- **Special Unstructured Systems:** These represent systems, which rather than presenting a flow of information directly and openly to all relevant parties, provide information to the private contacts of the manager through his or her personal communication channels. Such systems can vary depending on the structure and size of the organization and on the number of managers and employees.

Information Systems in the Management of Public Institutions

There is nowadays a rapid increase in the number and variety of activities conducted by public institutions and organizations, as well as in the amount

of information they are required to store and process. For this reason, there is a parallel increase in the expectations and pressures on public institutions and organizations to perform their activities more rapidly, and to make decisions within shorter frames of time. Such developments have further increased the importance of acquiring and managing information to achieve institutional objectives. During the decision-making processes, those who are responsible for managing public institutions and resources require accurate and timely information regarding the applicable processes and available resources (Polat, 2007, p. 187). To ensure that the information required for management activities are reliable, accurate, and obtained in a timely and manageable way, many organizations are currently in the process of developing dynamic systems that encompass all of their functions, departments, and employees. Such systems are designed to allow management to fulfill its tasks and responsibilities in the most effective way possible (Mataracı, Sert & Duvarcı, 2011, p. 2). Such developments have rendered the use of information systems in the management of public institutions almost obligatory. This is because the effective provision, processing, and organization of information required by managers is only possible through the use of information systems (Güneş et al., 2013, p. 6).

Although information management and information systems are being used effectively by the private sector in Turkey, public institutions have not demonstrated the same level of effectiveness in adapting to such systems. This has led most public institutions to remain behind the private sector in terms of information management and systems. However, an evaluation of current practices in developed countries shows that parallel to the novel approaches and perspectives in public management, new management information systems are in the process of being established in many public institutions (Polat, 2007, p. 190).

Thus, public institutions in Turkey have not been able to follow and adapt to recent technological changes as well as private organizations have. In fact, public institutions in Turkey are even facing difficulties in fully adapting to the changes of the past years. Decentralization, which is the product of rapidly developing and increasingly complex urban planning, is forcing managers to utilize information technologies to a greater extent

in order to be able to take accurate and effective decisions. The most important and noteworthy information systems of our day include the Management Information Systems, the Decision Support Systems, the Upper Management Information Systems, the Expert Systems, and the Geographical Information Systems. These systems not only contribute to management activities, but also provide useful information to managers of all levels, in a format that is suitable and relevant for their positions (Laudon & Laudon, 2002, pp. 370-430 as cited in Tecim, 2002, p. 142). It is known that individuals of different positions and levels also require different types of information for their activities. For instance, individuals at the lower levels of the organizational hierarchy employ computer systems, known as management information systems, which allow high levels of information exchange and sharing to be performed. Managers in the mid-levels of the organizational hierarchy employ computer systems known as decision support systems, which rather than presenting information on all aspects and details of a given subject, tend to provide summarized information. Managers in the upper levels of the organizational hierarchy employ upper management information systems, which process detailed information to present them in a very succinct and summarized format (Tecim, 2002, p. 142).

Information technologies have not only become indispensable components of daily and social life for individuals, but have also contributed in recent years to the development of new management and economic models. The most important of these models is "e-government." The e-government model is defined as "a new management model in which public institutions/organizations provide services to citizens partly or entirely through information technologies." Furthermore, information technologies have also highlighted the importance of approaches based on information and document management. As a result of all these changes, information has also become a basic and important requirement of all services and production/manufacturing processes. The basic principles of information management involve the storing, organization, and sharing of information; the transformation of information through feedback; and the utilization of new information to contribute to overall effectiveness and productivity. In other words, information management is based

on the identification of information sources and on the utilization of information in ways that are more effective and productive. As result of new applications related to e-government, the importance of information management in organizational life is continuously increasing with each passing day (Odabaşı & Polat, 2008, p. 236).

E-government is also defined as the use of technologies, and especially of web-based Internet applications, to present information regarding public institutions/organizations, for the provision of public services to citizens, to other institutions/organization, and to personnel working at other departments or institutions (Stowers, 2001, p. 7).

In Turkey, over the past 10 years, an increasing emphasis has been placed on the restructuring of public institutions. These restructuring activities focused particularly on the implementation and use of e-government applications. In this context, significant ground has been covered by the Ministry of Interior in the development of both e-government applications and information systems for public institutions. First and foremost among these new applications and systems is the Central Population Administration System (MERNİS), which has formed a comprehensive registry of all Turkish citizens and provided each one of them with its own citizen identity number. Following this, an address-based registration system was developed, which formed a registry of each citizen's residential address. As of 2009, comprehensive studies have been conducted within the scope of the "e-Interior Project" by public institutions in Turkey to effectuate a successful transition to the e-government system and to actively utilize information systems in public institutions.

The e-Interior Project is part of the "Turkey e-Transformation Project," which aims to facilitate the interaction of the private sector and of citizens with the government by transferring most processes and services related to public institutions into electronic environments. In this respect, the e-Interior Project represents the Ministry of Interior's "part" within the scope of the Turkey e-Transformation Project. The e-Interior Project was thus initiated in order to transfer the activities and processes of our Ministry's central institutions, governorships, district governorships, and special provincial administrations onto information-based electronic

environments and to ensure more effective sharing of information with other public institutions and organizations.

This project has in many ways facilitated the businesses and interactions of citizens with the institutions of the Ministry of Interior, and allowed governorships and district governorships to assume a pioneering role in the implementation of the "Turkey e-Transformation Project," especially in rural areas.

The e-Interior Project currently encompasses 21 Central Units, 81 Governorships, 81 Special Provincial Administrations, and 892 District Governorships.

Furthermore, within the scope of its citizen-oriented services, the project also provides services in areas such as the Right to Information, Human Rights, and One-Step Service Modules (https://www.e-icisleri.gov.tr/YeniYetki/Login.aspx).

In this context, all special provincial administrations in Turkey are within the scope of the e-Interior Project, and serve as platforms that implement the Project's e-government applications.

METHODS

Study Model

The content analysis technique was used in this study, which is a qualitative study method. A content analysis is an approach in which similar data are organized and classified according to certain concepts and themes, then interpreted in a manner that is understandable for the reader.

Study Sample

The study sample consisted of 30 individuals (6 directors and 24 employees) working at the Ankara Special Provincial Administration, which employs a total of 304 civil servants.

Data Collection Tools

Data were collected according to qualitative study methods. Qualitative studies involve the use of methods such as observation, interview,

and document analysis to collect data, as well as the use of qualitative processes to evaluate perceptions and events in their natural environments by following a realistic and holistic approach. Qualitative studies are based on defining concepts and evaluating social cases in their real environments (Yıldırım & Şimşek, 2005, p. 39).

The most important factor that determines the preference and selection of qualitative study methods is the nature of the study question/problem being investigated. For example, in the case that a study involves the analysis of the experiences, thoughts, and problems of individuals, the use of qualitative study methods would be more appropriate. A study that evaluates the social events in a particular environment many not be repeatable or reproducible; for this reason, it is not possible to determine the rules and standards for qualitative studies that are applicable in all environments. Qualitative studies generally assume a holistic approach. There are three main types of data collection techniques used in qualitative studies, which include: (1) open interviews, (2) direct observations, and (3) written document analysis. In these studies, it is possible to say that the researcher him/herself fulfills the role of a "data collection tool." Therefore, the expertise, knowledge, skills, and diligence of those conducting qualitative studies is very important since aspects of the study will be determined by the researcher's knowledge of the subject, as well as his/her own perspectives and approaches (Bernard, 2000).

Interview techniques used in qualitative studies should focus on effectively identifying the views and opinions of those being interviewed. For this reason, proper understanding of the interviewed individuals' views, semantic world, emotions, and thoughts requires – in contrast to quantitative study interviews – a deeper and more comprehensive approach to be employed during qualitative interviews (Karasar, 2009).

The interview technique was used in this study in order to converse directly with the study participants; to ensure that they understood the questions correctly; to allow them to provide honest and sincere answers to the questions; and to obtain more comprehensive information from the participants. During interviews, individuals had the opportunity to inform the interviewer about topics that were disquieting/troublesome for them

and to share their opinions on any subject they considered important. Although the interview technique might limit the number of cases that can be evaluated, they, nevertheless, allow more exhaustive and reliable study results to be obtained. The study questions were directed to the employees of the Ankara Special Provincial Administration and asked within the context of face-to-face interviews in order to obtain clearer and more accurate answers from them.

Data Analysis

In this study, the content analysis technique was used for data analysis purposes. "The main goal of content analysis is to identify concepts and interrelationships that explain the study data. Descriptive analysis involves only the summarizing and interpretation of study data; content analysis, on the other hand, evaluates study data in a deeper and more comprehensive way, allowing the identification of many concepts and themes that would normally be overlooked by descriptive analysis. In content analyses, data are classified and organized according to certain concepts, which are then used to determine the themes that explain and clarify the study data." (Şimşek, 2009, p. 45).

Throughout the study, data obtained from interviews performed with the employees of the Ankara Special Provincial Administration were subjected to a content analysis. In this context, 30 different responses were obtained from the study participants for the first question. These 30 different responses were then organized around eight different themes, and these eight themes were further classified into two main themes. The data obtained from the study participants are presented in detail in the Results section of the study.

For the content analysis of the second question, 30 different responses were obtained from the study participants, which were organized around three main themes. In the content analysis of the third question, 30 different answers were also obtained from the study participants, which were organized around five main themes. As the answers to the fourth and fifth questions were largely similar, content analysis was only performed for the answers of question four. In this context, 30 different answers were

obtained from the study participants for the fourth question, which were organized around three main themes.

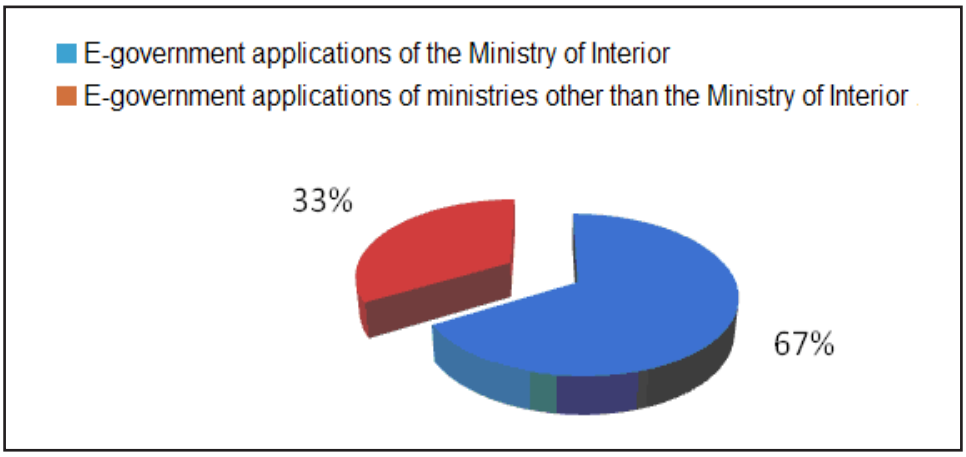
Study Results

This section of the study provides the results obtained through content analysis.

The Content Analysis of the Answers to the Question, "Could you please describe the Information Management Systems used at the Ankara Special Provincial Administration?"

The content analysis method was used to analyze the opinions of the employees regarding the management information systems used at the Ankara Special Provincial Administration. The question was answered by all 30 employees of the Ankara Special Provincial Administration who participated in the study. During the content analysis, themes were identified using a three-step process. In the first step for the first question, 36 items were identified in the answers from the 30 study participants. In the second step, these 36 items were classified under five categories. In the third step, some of these categories were merged to finally obtain two categories. Thus, two themes were identified concerning the management information systems of the Ankara Special Provincial Administration. These two themes determined by using the content analysis method are shown below in Figure 2.

Figure 2: "Could you please describe the Information Management Systems used at the Ankara Special Provincial Administration?"



According to the data in Figure 2, 24 (67%) of the study participants described the management information systems at the Ankara Special Provincial Management as being "e-government applications of the Ministry of Interior," while 12 (33%) of the participants described them as being "e-government applications of ministries other than the Ministry of Interior."

Answer: "E-government applications of the Ministry of Interior"

Some of the statements of the study participants who described the management information systems of the Ankara Special Provincial Administration as "e-government applications of the Ministry of Interior" are provided below:

- "The 'e-Interior' program of the Ministry of Interior is being used actively at our institution."
- "We are using the 'e-Interior' program prepared by the Ministry of Interior."
- "As management information system, we use the 'e-Interior' system."

- "As is the case in other institutions across the country, we also use the 'e-Interior' information system."

Answer: "E-government applications of ministries other than the Ministry of Interior."

Some of the statements of the study participants who described the management information systems of the Ankara Special Provincial Administration as "e-government applications of ministries other than the Ministry of Interior" are provided below:

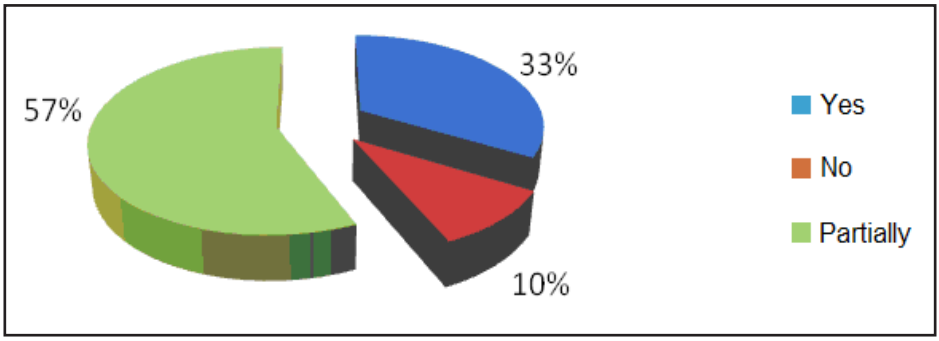
- "It is an information system based on the latest technologies."
- "It is part of the construction inspection system and the address-based registration system of the Ministry of Environment and Urban Planning."
- "The accounting and budget program we employ is a program that was specifically prepared according to our demands."
- "To benefit from the most advanced technologies at our administration, we employ information technologies to the fullest extent possible."
- "It is part of the construction inspection system of the Ministry of Environment and Urban Planning."
- "The special provincial administration employs a common accounting and budget program."
- "The program we use has been custom-designed according to our demands."
- "Our institution employs management information systems mainly for collecting and storing data."

The Content Analysis of the Answers to the Question, "Do you believe that the Ankara Special Provincial Administration Benefits sufficiently from the Use of Management Information Systems?"

The content analysis method was also used to analyze the opinions of the employees on whether the Ankara Special Provincial Administration

benefitted sufficiently from the use of management information systems. The question was answered by all 30 employees of the Ankara Special Provincial Administration who participated in the study. During content analysis, themes were identified using a three-step process. In the first step, 30 items were identified in the answers of the 30 study participants. In the second step, these 30 items were classified under three categories. In the third step, the three main categories in the question were left unchanged, and a graph was drawn using the numbers and percentages related to the responses of the study participants. Thus, three themes were identified concerning the answers of the study participants on whether the Ankara Special Provincial Administration benefitted sufficiently from the use of management information systems. These three themes determined by using the content analysis method are shown below in Figure 3.

Figure 3: "Do you believe that the Ankara Special Provincial Administration Benefits sufficiently from the Use of Management Information Systems?"



According to the data in Figure 3, 17 (57%) of the participants answered the second study question as "Partially," ten (33%) of the participants answered the question as "Yes," and three (10%) of the participants answered the question as "No."

Answer: Partially

Some of the statements of the study participants who answered the question, "Do you believe that the Ankara Special Provincial Administration

Benefits sufficiently from the Use of Management Information Systems?" as "Partially" are provided below:

- "The institution does not fully benefit from these systems. The personnel do not follow or control their own information. It is not possible to access to the data statistics of previously performed activities. Sometimes, the program of the Ministry of Interior becomes congested. When this happens, we have to interrupt our work for some time."
- "We can say that we benefit approximately 75% from this system."
- "When we need to retrieve the past written documents/letters of our administration, the tracking and query application of the e-Interior system does not function as well as it should."
- "I believe that we are not able to sufficiently use and benefit from these systems. To ensure that they are used more actively, trainings should be provided on these systems and their use should become obligatory."

Answer: Yes

Some of the statements of the study participants who answered the question, "Do you believe that the Ankara Special Provincial Administration Benefits sufficiently from the Use of Management Information Systems?" as "Yes" are provided below:

- "We fully and properly benefit from these information systems. All incomes at the special provincial administration are closely followed and recorded using the package program. This allows accurate and unambiguous information to be available within the shortest period of time."
- "The institution sufficiently benefits from these systems. Systems allow the personnel to follow their own information and to retrieve their current studies and activities."
- "The institution benefits from management information systems to the fullest extent. In addition, thanks to the package program that allows the income of the special provincial administration to be

followed, we can access to concrete data in a very short period of time."

Answer: No

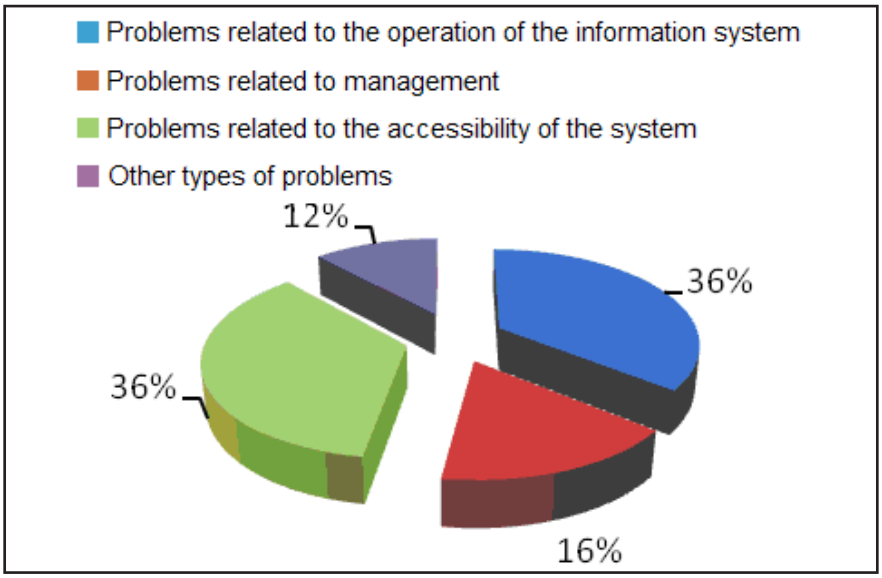
Some of the statements of the study participants who answered the question, "Do you believe that the Ankara Special Provincial Administration Benefits sufficiently from the Use of Management Information Systems?" as "No" are provided below:

- "I believe that the institution does not sufficiently benefit from these systems. Currently, the e-Interior system is not being used to share information; instead, it is being solely used to transfer documents to the computer environment."
- "The institution does not benefit from these systems."

The Content Analysis of the Answers to the Question, "What are the Problems Experienced during the Use of the Management Information Systems at the Ankara Special Provincial Administration?"

The content analysis method was used to analyze the opinions of the employees regarding the problems experienced during the use of the management information systems at the Ankara Special Provincial Administration. The question was answered by all 30 employees of the Ankara Special Provincial Administration who participated in the study. During content analysis, themes were identified using a three-step process. In the first step, 42 items were identified in the answers of the 30 study participants. In the second step, these 42 items were classified under seven categories. In the third step, some of these categories were merged to finally obtain four categories. Thus, four themes were identified concerning the problems experienced in the use of information systems at the Ankara Special Provincial Administration. These four themes determined by using the content analysis method are shown below in Figure 4.

Figure 4: "What are the Problems Experienced during the Use of the Management Information Systems at the Ankara Special Provincial Administration?"



According to the data in Figure 4, 15 (36%) of the participants answered the third study question by describing "problems related to the operation of the information systems," 15 (36%) of the participants answered by describing "problems related to the accessibility of the system," seven (16%) of the participants answered by describing "problems related to management," and five (12%) of the participants answered by describing "other types of problems."

Answer: Problems related to the operation of the information system.

Some of the statements of study participants who mentioned "problems related to the operation of the information systems" are provided below:

- "The e-Interior program prepared by the Ministry of Interior is rather complicated, and completing any process in the system involves many long and arduous steps. This not only leads to a loss of time, but also negatively affects the personnel's willingness to use the program. In addition, because the data and activities at the Ankara

Special Provincial Administration are not all computer-based, there are difficulties in retrieving the necessary information through this system."

- "Various problems are sometimes experienced in recording, classifying, and maintaining work and activities on the system."
- "The system cannot rapidly generate reports when requested and these system-generated reports often contain several minor numerical errors."
- "The interface of the program is unwieldy, which is one of the difficulties the users have to deal with."
- "As the systems are currently purchased as separate package programs, we sometimes encounter problems in the operating system."

Answer: Problems related to the accessibility of the system

Some of the statements of study participants who mentioned "problems related to the accessibility of the system" are provided below:

- "Users are generally knowledgeable about the system, but Internet connection problems often complicate its use."
- "In some of the applications, we often face internet-related problems."
- "Mainly due to the filtering system, we are sometimes unable to access the systems we need to access, which limits the extent to which we can benefit from the program."
- "Many useful sites are blocked and are rendered inaccessible by the system."
- "The e-Interior program does not function sometimes due to server-related problems."

Answer: Problems related to management

Some of the statements of study participants who mentioned "problems related to management" are provided below:

- "The management still has not adopted the system."
- "The management is not providing the necessary support for the implementation of information systems, nor do they seem to accord enough importance to them."
- "If the system is not implemented by all from the lower levels of the organizational hierarchy to its upper levels, then the system will not work."

Answer: Other types of problems

Some of the statements of the study participants who mentioned "other types of problems" are provided below:

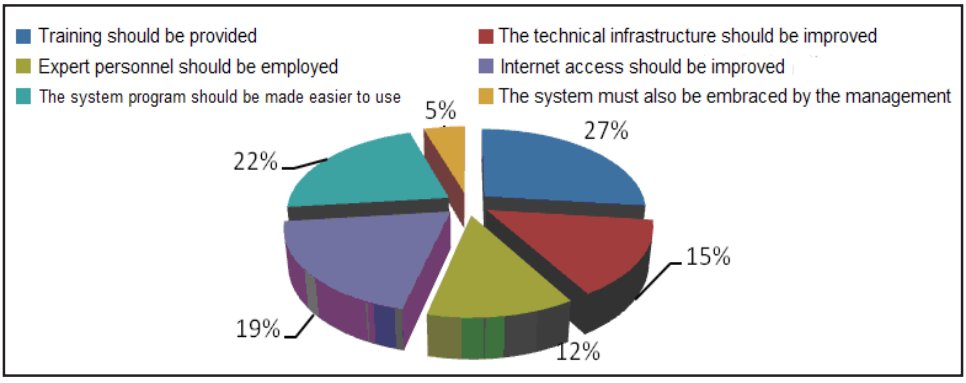
- "There are generally problems related to technical support. Because the personnel of the relevant information technology firm often have a busy schedule, they are sometimes not able to help us, which cause problems."
- "There are too many procedures."
- "There are inadequacies among the employees with regards to technology; some of the personnel do not even know what information technology is."

The Content Analysis of the Answers to the Question, "What Measures Can be Taken to Ensure that Employees Benefit the Most from the Management Information Systems at the Ankara Special Provincial Administration?"

The content analysis method was used to analyze the opinions of the employees regarding the measures that can be taken to ensure that employees benefit the most from the management information systems at the Ankara Special Provincial Administration. The question was answered by all 30 employees of the Ankara Special Provincial Administration who participated to the study. During content analysis, themes were identified using a three-step process. In the first step, 41 items were identified in the answers of the 30 study participants. In the second step, these 41 items were classified under six categories. In the third step, the six main

categories were preserved, and a graph was drawn using the numbers and percentages associated with the responses of the study participants. The themes identified based on the content analysis of the answers to the question, "What Measures Can be Taken to Ensure that Employees Benefit the Most from the Management Information Systems at the Ankara Special Provincial Administration?" is shown below in Figure 5.

Figure 5: "What Measures Can be Taken to Ensure that Employees Benefit the Most from the Management Information Systems at the Ankara Special Provincial Administration?"



According to the data in Figure 5, 11 (27%) of the participants answered the fourth study question by suggesting that "trainings should be provided," nine (22%) of the participants answered by suggesting that "the system program should be made easier to use," eight (19%) of the participants answered by suggesting that "Internet access should be improved," six (15%) of the participants answered by suggesting that "the technical infrastructure should be improved," five (12%) of the participants answered by suggesting that "expert personnel should be employed," and two (10%) of the participants answered by saying that "the system must also be embraced by the management."

Answer: Trainings should be provided

Some of the statements of the study participants who suggested the "trainings should be provided" are listed below:

- "Training seminars should be organized to ensure that employees can benefit the most from the system."
- "Trainings should be organized to ensure that directors and the personnel have adequate knowledge of the system, and know where to use it."
- "The trainings should be regularly repeated."
- "Usage of the system should be increased and improved through trainings and seminars."

Answer: The system program should be made easier to use

Some of the statements of the study participants who suggested that "the system program should be made easier to use" are listed below:

- "A common language can be used in all steps and parts of the system program, such as the archiving system. An infrastructure should be absolutely established to this end."
- "The use of the information systems should be rendered more practical."
- "The personnel should be informed of all work and activities conducted at the Ankara Special Provincial Administration and the full and continuous usage of the system must be ensured."
- "All system data should be merged within a single environment and the tracking and querying of data should be made easier."
- Answer: Internet access should be improved.
- Some of the statements of the study participants who suggested that "Internet access should be improved" are listed below:
- "If we start using the Wi-Fi system, we will no longer need to use connection cables."
- "Access to the Internet should be made more flexible."
- "Access to the Internet should be made easier, and the access restrictions should be eased."

Answer: The technical infrastructure should be improved

Some of the statements of the study participants who suggested that "the technical infrastructure should be improved" are listed below:

- "New advances in technology should be followed. New technologies should be adopted to the extent permitted by the available means and resources."
- "The different types of devices used at the institution must have the same technical characteristics."
- "The technical infrastructure should be improved."

Answer: Expert personnel should be employed.

Some of the statements of the study participants who suggested that "expert personnel should be employed" are listed below:

- "As the special provincial administration, employing personnel who possess good knowledge of the technical aspects of the system, and who are capable of designing their own programs, will solve most of our current problems."
- "I believe that these programs should be designed and followed by our own personnel. If we do so, we will no longer need support from information technology firms and easily solve our own technical problems."
- "We should also obtain support for other programs (ERK, KKP, and etc.) from an information expert."

Answer: The system must also be embraced by the management

Some of the statements of the study participants who suggested that "the system must also be embraced by the management" are listed below:

- "The management should provide the necessary support regarding the system and must also accord the necessary importance to it."
- "To be able to better benefit from the system, it must also be considered important by the management."

In addition to the questions above, the study participants were asked, "Do you have any recommendations regarding the implementation of information technologies at the Ankara Special Provincial Administration?" The participants answered this question with the following recommendations:

- "The management information system should be designed such that it can readily provide the information and reports needed by the management and also possess the ability to perform data analysis."
- "When a report needs to be prepared, its preparation must start at the lower levels of the hierarchy and then 'proceed' towards the upper levels. In other words, reports must initially be prepared by those who conduct institutional activities, rather than those who manage them. This approach will be both more beneficial and more economic."
- "The management information system should be prepared such that it can provide the information needed by the management and also perform data analysis if needed."
- "Personnel capable of using all of the programs at the institution should be employed; in addition, the personnel should be able to take part in training seminars and to make effective use of the information systems."
- "The management information system should be designed such that it can provide the information and reports required by the management and also possess the ability to perform data analysis."

CONCLUSIONS AND RECOMMENDATIONS

Special provincial administrations are deeply-rooted, local administration institutions that have existed since the time of the Ottoman State, and have continued to exist after the founding of the Turkish Republic. However, the functions of these institutions have changed over time. Special provincial administrations, whose activities are defined by the applicable laws, have been subject to reorganization within the scope of broader changes effectuated in all public institutions in 2005. These new changes have rendered special provincial administrations even more important and

influential in local administration. As is the case with most institutions, information systems also play an important role in the effectiveness and management of special provincial administrations. This is because our present-day world experiences rapid changes and developments, thus, institutions need to implement efficient methods and information systems to be able to adapt to these changes.

In this study, the Ankara Special Provincial Administration was evaluated in order to investigate the management and information systems used by special provincial administrations in Turkey. Within the context of this study, data collected during the interviews with the employees of the Ankara Special Provincial Administration were subjected to content analysis. The results obtained based on this analysis are summarized below.

The management information systems implemented at the Ankara Special Provincial Administration can be divided into two groups: (a) the e-government applications implemented within the scope of the Ministry of Interior's projects, and (b) the e-government applications that are not within the scope of the Ministry of Interior's projects. The overall transition to e-government applications in Turkish public institutions has also led special provincial administrations to adapt this system and its applications. It was observed that these administrations also used budget and accounting programs, the construction inspection system of the Ministry of the Environment and Urban Planning, the address-based registration system, and other programs and systems depending on the technologies that were available.

Among the employees of the Ankara Special Provincial Administration, 57% expressed that they partially benefitted from the use of the management information systems, 10% expressed that they were not able to benefit from these systems, and 33% expressed that they fully benefitted from these systems. These differences in opinion between the employees are believed to be associated with the different units in which they worked. However, it is also possible to draw the following conclusion from this observation: although employees at the Ankara Special Provincial Administration were able to benefit from the management and information system at their institution, these systems were still not able to meet their expectations.

According to the Ankara Special Provincial Administration employees who participated in this study, various problems are encountered in the implementation and use of the institution's management information system. The first and foremost were the problems related to the accessibility and operation of the system, which was mentioned by 36% of the study participants. In addition, 16% of the employees described experiencing problems related to their assigned responsibilities, while 12% described other types of problems.

To identify potential solutions for the problems of the management information system used at the Ankara Special Provincial Administration and to determine the ways in which employees could benefit to a greater extent from this system, a content analysis was performed by using the employees' opinions. Based on this content analysis, the following recommendations can be made:

- Comprehensive trainings should be provided.
- Expert personnel should be employed.
- The system programs should be made easier to use.
- The technical infrastructure should be improved.
- Internet access should be improved.
- Management and information systems should be embraced and adopted by the management as well.

These results are based on the opinions of a limited number of employees regarding the management information systems used at the Ankara Special Provincial Administration. Consequently, these results cannot be generalized to all special provincial administrations and their employees. Nevertheless, the results of this study still provide a general and preliminary opinion regarding the systems used at special provincial administrations. To obtain results of a more general nature, it will be necessary to perform additional field studies in other special provincial administrations.

In conclusion, to ensure that employees at the Ankara Special Provincial Administration benefit, to a greater extent, from the management and

information systems at their institution, it will be necessary to revise these systems according to the opinions and views of the employees.

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Istanbul Journal of Innovation in Education
Volume 1 Issue 1 January, 2015 pp. 71-88

Global Understanding-Expanding Expectations

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Abstract: The concept of 'Distance Education' is a promising and important point shaping both the national and international educational standards. In this respect, there seems to be an urgent need to have a look at the past experiences and to re-structure the future applications. The expanding costs of face-to-face education, the lodging and transfer bills on the side of the students as well as teachers, the personal and institutional costs add too much to face-to-face education. Also the new education policies and social policies on the way to internationalization have a huge impact on distance education putting it into a more promising position. Istanbul University is a partner institution of the Project of "Global Understanding" run by the East Carolina University of the United States of America. Within the Project, university students are in communication with 40 universities in about 20 countries. The Project involves access to the universities of countries such as America, Brazil, Algeria, China, Ecuador, Ethiopia, Morocco, Gambia, India, Netherlands, Iraq, England, Japan, Lebanon, Malaysia, Mexico, Egypt, Moldova, Nigeria, Pakistan, Peru, Poland, Russia, Taiwan, and Turkey. The project provides a platform to more than 1500 students each year to meet with each other, communicate, and share with each other. In this respect especially the ones coming from more disadvantaged parts of the country would find an opportunity of intellectual mobility rather than physical, social, cultural, and emotional mobility. The participants are also provided an atmosphere to understand the culture of the others living in different societies. The courses provide intellectual, social, and virtual mobility chances for those who live in the disadvantaged areas of the world. These new type virtual classroom applications diminish the problems stemming from the socio-cultural environment or economic conditions. The project is one of the best examples of "Distance Learning in Higher Education Institutions". This paper attempts to explore the process of the project from the very beginning how the different decisions made during the applications, how careful steps improved the project, and how the courses are evaluated, assessed as well as how the participants were put in follow up activities. The concentration would be on the expanding period and its reflections on national and international level understanding. The paper is mainly dwelling on the qualitative and quantitative responses of the participants to evaluate not only the project itself but also the participants from various cultures and disciplines.

Keywords: Distance Education, Intercultural Communication, Awareness Rising, University Education, Future Expectations

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1. INTRODUCTION

In modern times, almost all students live in the Global World which has different kinds of cultures and customs introduced mainly through the mainstream media and technology. Today's students live in a global society of diverse cultures and customs. Mainly, their understanding of the other cultures is often limited to 30-second news-clips they see on television. Although students realize the importance of understanding other cultures, few of them actually study abroad.

The scientists of San Diego University proved that the normal human being is exposed to 100.500 new words and concepts per day that is equivalent to 2.3 words per second. Within such a hurry most of them have no time to decipher and classify what they really know and what they do not know. All the images and concepts mix with each other having no opportunity of proving themselves about their real meaning in real world. Thus, people, should think over and over when it comes to the prejudices, a priori information, and values to help them understand and judge the world.

Our age is characterized by the interconnection of peoples, cultures, technologies, markets, problems, and politics on a world scale. Understanding the world, people from other countries and their cultures, lives, and etc. is not a luxury or dream but it requires thinking everything deeply. To be a global citizen, one must try to understand what people are doing all over in the world. While doing that, first, one should not forget what we know about people, in other words, we have to eliminate our prejudices and stereotype ideas.

People just do not have enough time about the origin of these thoughts and values: They never think of who shaped them or what made them think or behave in such a particular way. They do not improve much of their mathematical skills such as compare and contrast, reasoning, identifying the objects, or making judgments. The decision making processes are usually headed by the second hand information, yet, we all know that nothing compares the importance of the firsthand experience.

Although students understand the meaning of other cultures just a few students have the opportunity of studying in abroad. 'Global Understanding Project' is an opportunity for students to raise their awareness on cultural issues and understand other cultures without traveling to other countries.

1.1. IT IN THE CLASS

Education all over the world is becoming more and more important, but also expensive. Especially, face-to-face interaction facilities are becoming rare, specifically in the more developed countries. Along with the development of the technical devices and communication technologies, the substructure of the education systems is changing. The changes and new applications in the education systems force the education centers to find new ways to make education more enjoyable and interactive.

In modern schools, the classroom setting where the lecturer is involved in face-to-face communication with his/her students has changed format even at the elementary level. Regarding the impact of multiculturalism and internationalization they have higher awareness, better standards, and more possibilities of meeting with the strangers or enlarging their social circles. Thus, the students attending to the university have higher expectations and deserve deeper experiences to enrich their philosophy, intellectual capacity, and cultural sensibility. They also need to understand themselves and the culture they live in. This understanding is much more different from the level of elementary or high school levels where they were with their families and got nothing more than studying for their classes.

Regarding the current numbers in computer and internet ownership in Turkey, the participants could be placed as the lucky ones.[1]

[1] http://www.tuik.gov.tr/VeriBilgi.do?alt_id=60

	Computer %		Internet %	
Age Group	**Men**	**Women**	**Men**	**Women**
16-24	81,1	56,4	80,6	55,4
25-34	70,0	48,1	69,6	47,2
35-44	54,3	32,7	53,3	31,8
45-54	36,3	17,0	34,8	16,2
55-64	19,1	6,1	18,5	5,6
65-74	6,9	1,3	6,4	1,3
TOTAL	59,0	38,5	58,1	37,0

When the percentages of Europe based countries are considered it is not that much different from Turkey, except Finland and Norway reaching to almost 100 percent. Anyhow, the videoconferencing event is not that common even in the European universities. Distant Education, among all the other education methodologies, is not a new method. That format can be re-created in videoconferencing as well. Video conferencing has its advantages and own limitations in the educational context. However, an innovative technology copes with the expectations of the 21st century. 21st century education is not limited to the classical classroom settings where the lecturer usually engages in a monologue. From the monologue period, the lecturers turn into an interactive course pattern where the education becomes more student centered, rather than teacher centered. That interactive discourse pattern allows dialogue and participation of students on a voluntary setting in the classroom environment. There are, however, responsibilities of the lecturer. From the monologue to the dialogue and later comes the empowered student. The student reaches information by himself/herself via Internet. S/he is overwhelmed with information, performs the judgments based on that information, in addition to the former knowledge or perceptions s/he has regarding various topics.

The advantages of videoconferencing are that it could communicate with people who may not physically be there or together. Videoconferencing is a tool that could be used in education. It may have various formats where, for example, the lecturer can make himself/herself visible independent of where s/he lives. Or video conferencing in education can be the whole program or if one course is offered, or it is just a part of the course within the curriculum. The videoconference may be synchronic or diachronic.

One other benefit of videoconferencing, is that, it allows you to stay where you are and still be accessible to information or filtered information in the newly designed classroom setting.

1.2. ISTANBUL UNIVERSITY

Istanbul University, as one of the oldest educational institutions, not only of Turkey, but also of the world, was founded when Mehmet the Conqueror conquered Istanbul. One of the main characteristics of Istanbul University is its leadership in higher education for centuries. It has played a guiding and influential role in the social and cultural life of our country. We can clearly see this when we trace the line of historical development of the University.

Today, Istanbul University provides a rich educational atmosphere with its 17 faculties, 5 departments, 13 schools, 15 institutes, and 26 centers situated in many districts of Istanbul. In the first years of its establishment, the university was based in Beyazıt, the historic area, but now many new campuses have been established throughout the city (Beyazıt, Avcılar, Çapa, Cerrahpaşa, Bahçeköy, and Kadıköy). Today, the University has 6 campuses scattered along the city. The university is unique for having two Faculties of Medicine. Istanbul University, as one of the leading education institutions both in the country and the world, is developing new applications and strategies to cope up with the expectations of the 21st century and leading innovative technologies.

In the past years, the evening or part time students were accepted to provide chances to those who are already at work but would like to continue their education. The university also provided opportunities of having a minor branch or another major to the graduate ones or to those who are still continuing their career at the university. Apart from this, the university also provides distance learning courses in many branches and disciplines. The online courses are conducted through live courses on internet and the participants have an equal diploma upon graduation.

1.3. GLOBAL UNDERSTANDING PROJECT

Istanbul University is one of the oldest universities in Europe. It has over 90 thousand students and approved its quality for distance learning

during the past five years. Global Understanding project was the first distance learning project of Istanbul University. Since it is a state university and a big one in numbers, initiating new projects are always a challenge and it takes time. The initiation of the Global Understanding project took relatively less time than expected. The project has been briefly presented at an informal setting to the first coordinator of the project by the Embassy of the USA in Istanbul. Just after that, the coordinator of the project from East Carolina has communicated to Istanbul University Faculty of Communications Coordinator. It has been discovered that the collaboration at this point, as the initiative of the coordinator, has to be presented not only to the department and to the Dean's Office, but also to the University.

The partner institutions are diverse, worldwide, and communicate through live video conferencing and Chat technology. The Global Understanding Project was first launched by East Carolina University, North Carolina, US in 2003. At the beginning, 21 universities from 17 countries carried out with the project headed by East Carolina University. (Czech Public, Pakistan, India, Chine, Peru, Taiwan, Morocco, Russia, Algeria, Malaysia, Mexico, Venezuela, Namibia, Moldova, Gambia, and Turkey). Students in each university are matched with other college students chatting on the net and using video chat in the universities' technical classrooms. In each session, students talked about campus life, family life, culture, art, science, values, beliefs, and other topics. Global Understanding is a course offered through videoconferencing. At the moment, the project is expanded to 48 universities from 25 countries (Algeria, Brazil, China, Colombia, Ecuador, Egypt, Ethiopia, Gambia, India, Iraq, Japan, Lebanon, Macedonia, Malaysia, Mexico, Netherlands, Nigeria, Pakistan, Peru, Poland, Russia, Taiwan, Turkey, UK, and USA).

In her article, Fisher states that "The course provides a format for students to learn about other cultures without traveling. Just 1% of East Carolina University undergraduates study in abroad. However, thanks to a pair of enterprising faculty members, a growing number of students are having international experiences without ever leaving the Greenville, N.C. campus. The university's Global Understanding program uses inexpensive and relatively unsophisticated technology — a low-bandwidth video link

and e-mail chat — to connect East Carolina students with counterparts at 23 institutions in 17 countries and five continents." [2]

> While other colleges have made use of computer hookups to bring a global perspective into the classroom, the East Carolina model is distinctive in that it links each participating class with partners at several foreign universities, exposing students to multiple points of view. Its low-cost, low-tech approach has allowed the university to build relationships with institutions in less-well-off countries like Namibia and Moldova and to sustain such partnerships even as budget constraints have forced many institutions to curtail their travel, both overseas and out- of-state.
>
> In just five years, the program has gone from a one-time pilot, hatched over a coffee break, to a mainstay of the university's general-education curriculum. Freshman-level Global Understanding course sections consistently fill up during the first hours of registration, says Rosina C. Chia, Assistant Vice Chancellor for Global Academic Efforts, and other faculty members are adapting the model for use in their own teaching.

"It's really powerful," says Marilyn Sheerer, East Carolina's provost. "It's not a stretch to see how students' perspectives have changed." As Fisher states, "The program got its start during a casual conversation between Ms. Chia, then a professor of psychology, and interim Dean of Communications and Computer Science, and Elmer Poe, who was then interim Dean of Technology. It would be nice, the two agreed, if there was a way to leverage East Carolina's strength in online and distance education to expand international opportunities for its students."

> Within months, in July 2003, the first class, which connected students in North Carolina and at Soochow University in China, was under way. Although the initial course was part of an intensive summer session, it established the basic model for future Global Understanding offerings: Classes of 15 to 20 students are split in half, and each group is given a series of questions meant to guide conversation. One half discusses the queries, which tend to focus on cultural practices like college life and family structure, as a group via videoconferencing, while the other students engage in one-on-one discussions on the same topics with overseas partners through e-mail. Halfway through the class meeting, the groups switch.
>
> The two approaches give students insights into societal norms and expose them to individual perspectives on topics that are sometimes sensitive, says Mr. Poe, who is now associate vice chancellor for academic outreach. Students are

[2] *Fischer, Karin, 2009,* East Carolina U. Uses Simple Technology to Link Its Students With Peers Overseas

> required to write papers with their foreign partners, and the in-class discussions are supplemented by outside readings that provide an academic foundation. For example, students might read anthropological texts and learn about how different societies view the role of the family.

After the success of the initial class, Mr. Poe and Ms. Chia, with the backing of East Carolina administrators, took time to formally outline the course structure and to enlist instructors and technical-support staff. They also set out to recruit additional foreign universities. The pilot partner, Soochow University, came about through the connections of Ms. Chia, who is originally from China. But Ms. Chia and Mr. Poe wanted to be more strategic about forming relationships. They reached out to the U.S. Department of State and to foreign governments for guidance and sought to attract institutions from countries and regions that "will be important on the world stage for the next 15, 20, 30 years," Mr. Poe says.

As Fisher stated "Early on, they decided against organizing the course around a single, bilateral relationship. Instead, each section of it includes East Carolina and three foreign partners. The four institutions are paired for five weeks at a time and then change partners, so that all students get the benefit of learning about three different cultures during the semester. There has been consensus to hold the courses in English, which tends to be the common language among all the partners, Ms. Chia says. But scheduling class times hasn't always come as easily."

2. THE COLLABORATION

The most important of all is not the substructure or the technical part of the projects. Mainly, the bilateral agreements provide the best setting for the collaboration. However, the institutions clearly explain what the main action would be and how the parts would take part in it, the coordinators and the objectives are stated as well. In such a mutual understanding atmosphere, the parts could clearly modify the needs and requirements depending upon their circumstances, potentials and expectations. The units and modules could always been added to the preplanned motives and the number of the students or the staff could also be increased or decreased regarding the deficiencies.

The project has been introduced to the International Relations office and the Vice Rector of the University. Two representatives from the East Carolina University had a site-visit to Istanbul University. Later, an Agreement titled 'The Establishment of Collaborative Relationship Between Istanbul University, Turkey and East Carolina University, USA" has been signed.

The main reason for the site-visit is to assess the level of technological infrastructure and support. Often, it is minimal, and so, while East Carolina holds its classes in an up-to-date "global classroom," Mr. Poe says he and Ms. Chia deliberately use the most basic equipment. The camera and software for videoconferencing cost around $350. Video is transmitted over a simple Internet connection, and East Carolina handles additional technical support. (The university often helps the partner look for outside sources of funds to cover the costs.) Beyond that, each partner needs eight computers so students can chat by e-mail, Mr. Poe says, "they can be old and decrepit as long as they can get on the Internet." Still, sufficient bandwidth remains one of the program's biggest challenges, he says.

The agreement items related with Global Understanding states that

> Beginning Fall semester, 2006, the universities will jointly offer a course in Global Understanding using videoconferencing and other Internet based tools. English will be used in teaching this course. Participation in this course will require each university to maintain internet connectivity that supports H.323 videoconferencing and IRC based chat. This course will provide partnerships between the students and faculty at Istanbul University and East Carolina University for the duration of the course. [3]

Once the agreement has been signed, the action to promote the project has started. It was then through hanging posters related with recruiting, participation, and description of the project. The second major task was the establishment of the technical room. The East Carolina University provided the infrastructure and necessary equipment for it at the beginning, but there had to be some technical people on our side as well. Two research assistants were appointed as responsible staff for the technical side of the project, connections and solving issues related with technical aspects. In

[3] From Agreement The Establishment of Collaborative Relationship between Istanbul University, Turkey and East Carolina University, USA

addition to the coordinator/lead teacher of the project a second academic is recruited for the project. They were either in the classroom together or they have rotated. Their collaboration helped the project to report the pros and cons, to give enough feedback about the Project, and to establish a better way for future.

Regarding the criteria for participation in the project, knowledge of English was a prerequisite and also interest in the project and different cultures was inevitable. For some participants, the certificates provided after each connection was a good motivation as well. Since Global Understanding was not offered as a course at that time, the students of the Faculty were selected on the basis of their motivation for the course and their language abilities. Usually, it was easy to find motivated students, but usually with not enough knowledge of English, and sometimes, even if they are motivated, that motivation may went down. Sometimes the group dynamics of the newly formed group each term affected the pattern and flow of the course. The participants would also develop ways to help to each other such as translation during the course, or helping the others with poor skills such as writing. Sometimes, the chat groups would have two Turkish participants and a foreign participant that the two would help each other to overcome the difficulties.

2.1. DEVELOPMENT OF COLLABORATION

The first year, the course has been offered only to the registered students of faculty of communication, undergraduate. The impression of the lead lecturer at first offering was that, the whole atmosphere was nice, but a bit complicated for the unmotivated students or for those who do not have enough English. Also, the number of the participants was always less than the partner institution students. That means each participant should have two or more colleagues from other countries. For those who have high level of language skills and motivation, it was not a problem, but for those from the lower levels, sometimes, it could become a serious problem. Later on, the course was put into the curriculum and the students enrolled to the course as a real student, rather than just on voluntary basis.

This paper discusses the opportunities that every student is lucky to be involved in such a wonderful program. Moreover, it gives a guideline to interested parties about safe participation on how to proceed with this videoconferencing which is a collaboration of academics from each related institutions as well. Global Understanding project has been awarded by and has been included into the evaluation of the Institute of International Education 7. Andrew Heiskell and the project lead by the East Carolina University covering 20 universities from 18 countries won the award of 'Honour' for "Innovation in International Education" branch.

One other purpose of this paper is to share the challenges of the Global Understanding project that was initiated in 2006 Fall semester between two universities, Istanbul University – Faculty of Communication Sciences and East Carolina University. The idea was the connection of the two institutions and their members, specifically the students. The blurred images of the different cultures could only then become more realistic and scientific. The connection should be stable and continuous, that's why there needs to be a floor for the permanent participants to meet and share the themes, questions, and answers.

Initially, Global Understanding was not a mandatory course, just an optional/ elective one for the students of Faculty of Communications of Istanbul University, but it has become a mandatory one after its proven success. The next year "Global Understanding" became a mandatory course in the curriculum offered as videoconferencing. If the students want to join that course, they must communicate with the coordinator of the course and thus get into touch with the other relevant participants of the course, to communicate with other university's participants.

The criteria of choice may only depend upon the language level, interest, and participation. Firstly, the teacher makes a meeting with participating students to explain how the course would work. S/he distributes documents that have course topics and ways to prepare them for the live meeting. The classroom was still in Faculty of Communication and now there were more computers in the classroom to help the participants to chat during the live connections. Students mainly discuss about the agreed topics with each other and then they start face-to-face communications with the other

country by videoconferencing. The advantages of videoconferencing were that, the participants could communicate with people as a whole, as a class, and in an individual way. Especially in the first meetings the partners would like to see each other in screen and feel very happy to meet in person after some chatting. Videoconferencing is a tool that could be used in education and it provides more motivation and self-confidence. Students talk about their cultures one by one and each presentation is compatible with the previous one. The pre or post questions about the topics help the participants to explore the topic more and exemplify things more in detail. It helps to create and provides an enjoyable, understandable, and shared atmosphere. Sometimes it can be funny because of having a different sense of humor.

By 2010, the course is offered to all the faculties of the university on a voluntary basis and the students, again, registered for the course. The paper discusses the establishment of that project within the Faculty and from the first coordinator and initiator of the project, discusses the opportunities and challenges related with it. Moreover, it gives a guideline to interested parties about safe participation on how to proceed with this videoconferencing which is a collaboration of academics from each related institutions as well.

3. FINDINGS AND INTERPRETATIONS

Global Understanding project was the first distance education learning project of Istanbul University. Istanbul University is one of oldest universities in Europe. It is a state university and a big one in numbers. Initiating new projects are always useful for students to understand world and know other cultures, lives, peoples... If the number of new projects remains, students will know more things about world therefore the country is going to be more developed than past.

The leading education institutions both in the country and the world is developing new applications and strategies to cope up with the expectations of the 21st century and leading innovative technologies. Moreover, it gives a guideline to interested parties about safe participation on how to proceed with this videoconferencing, which is a collaboration of academics from

each related institution as well. The reflections of the participating students reaching to hundreds are all very positive.

4. CONCLUSION

Istanbul University is a modern, well equipped, and well-organized education center. It was a leading institution in the past and it will be an updated, well oriented, and well-qualified education institution in the future. With its more than hundred thousand students and around five thousand dignified academics the substructure of the education will provide its best throughout the upcoming years.

Regarding the opportunities and challenges of the Project, one must admit that it is a well-established international project and it helps the participating institution to promote themselves and to be involved in more interactive scale and interesting projects as a side benefits. Even if the services and substructures of the universities may not be compatible with each other sometimes, it provides a tolerant atmosphere to help each other and create new ways to continue communication.

Within the first few semesters, the participating partners were not know very clearly and their objectives were not clarified either. However, the Project developed its own ways to assess and evaluate the participants' feedback through the pre and posttests, and enriched the valid data to prove that the courses really provide some platform for the participants to develop a better understanding of the other.

Regarding the academic's load of work, it was difficult to continue teaching just for ideals. Especially in circumstances of Istanbul, sometimes it was requiring work outside of working hours since the live links should be arranged depending upon the GMT and local time of all participants. Once the relevant hours fitting were decided, it was a full occupation for about six weeks every Monday and Wednesday. Thus, teaching an hour live connection could cost more than few hours in reality. The goals were not gaining money through the course, so neither the assistants nor the teacher or the coordinators were paid any kind of fee for the courses. That's why only one classroom is provided for such an experience. Opposite to the

Turkish case, in Greenville, East Carolina officials are seeking to expand the number of introductory Global Understanding courses. One challenge, Ms. Sheerer, university provost says, is that class size must be small, which means additional instructors are needed.

As Fisher puts out, "To accommodate partners in parts of the world as disparate as Gambia, Malaysia, and Russia, classes sometimes have to be held early in the morning or well into the evening for some institutions." One group of Chinese students, Ms. Chia recalls, came to class in winter coats because the heat in their building had been turned off after dark. The complex, multipartner model has meant that the Global Understanding program has expanded slowly, Mr. Poe and Ms. Chia acknowledge. The university had a sufficient number of partners to offer seven sections of the course this semester, which means just a fraction of East Carolina's 4,000 freshmen could enroll. They hope to add an additional section this fall." But Mr. Poe and Ms. Chia say they want to be choosy. Only about one of three possible partners is a good fit; some don't want to make the time commitment, while others are not comfortable with the student-driven style of the course.

Although the course is taught remotely, teams of East Carolina faculty members and technological experts visit each foreign campus to train instructors and to gauge the enthusiasm of university leaders. East Carolina typically signs two-year agreements with the partner institutions and won't go forward unless the project has backing from top administrators, Ms. Chia says.

Without the support of the top management, the course would be impossible to manage since the course was not on papers, placing the course was a bit difficult. For example, the classroom could be occupied by some other classes having more priority or maintaining a sustained program could be difficult since at each change of partners the class hours would also be changing. Thus, the program requires a large tolerance scale regarding all the participants in it involving not only the students, but also the teachers, the technical staff, and etc.

Some relationships, nevertheless, stumble. After political unrest broke out in Kyrgyzstan in 2005, the government stopped paying faculty members

at Osh State University, East Carolina's partner there. Two students took over and led the class until the end of the semester, but the partnership was not continued.

The course was a bit blurred when it first started and was not that much successful in maintaining the students' goals. When the poor visibility and unclear sound is added to the other shortages, the students were rather de-motivated instead of being motivated through the course. The pronunciation problems, the difficulty of meaning the self in front of all the others, and deciphering the cultural issues were all difficult things for them and it was difficult to see the outcomes at the very beginning. Yet, with the better screening facilities, stronger infra-structure, and the developing language level of the participants helped the program to improve. The betterment of the courses helped the participants to overcome their prejudices and clarify their perceptions.

The students' participation was somewhat vital for the course and their level of attention, interactivity have a lot to do with their individual success as well as the success of the program. The economy of the program mainly dwell upon the university sources, having the place, equipment, and infra-structure. The students in some other countries pay a great sum of money for their university fees, yet, having the status of a state university, the Turkish students feel very much lucky to learn that they have it all free. Regarding the quality and equality issues, the rising consciousness of, for example about the meals provided (breakfast, lunch and dinner) for 1 TL is not something common in other countries. Thus, looking at the others, the participants explore themselves and position themselves into a more prestigious point within their own circumstances. The courses help the participants to learn more about themselves, to re-position, and re-structure themselves; evaluating their own circumstances from a different perspective.

The course content and function help to establish a real International Classroom in its widest sense. The project is also encouraging faculty members to use the Global Understanding model to internationalize their own upper-level courses. In such a case, there could be more chances than mere understanding but also developing interdisciplinary research between

and among the universities. For example, in East Carolina, US, Ms. Chia and Mr. Poe help lead workshops each semester, and several professors have begun connecting with overseas institutions as part of their course design. For example, students in a computer-science course are working in multinational teams on a software-design project, while a Spanish class holds weekly language practice with an English class in Peru.

As Fisher pointed out in Patricia (Patch) Clark's theater education course, students swapped folklore and indigenous children's tales with their counterparts in Peru and Russia. They then adapted some of the foreign stories into short plays that they performed as part of a children's theater troop that visits schools throughout Eastern North Carolina.

Sloane Burke's health-education majors have held discussions with students in Germany and Moldova on issues such as health disparities, infectious disease, and maternal and child health. Ms. Burke, an assistant professor, said coordinating lectures overseas means more work; still, she will use a grant to travel this summer to China, where she hopes to establish a new partnership. The global nature of the courses creates "a richer learning environment," she says. And while the Global Understanding project was established to bring an international experience to the East Carolina campus, it has also spurred students who complete the course to go overseas; now about 10 percent of those students subsequently study abroad. Within the last decade a 10 percent increase may not seem to be too much but, it is a lot when the total number of students is 10 thousands.

Through the global understanding project, among the triangle of information management, relationship management and management of self a kind of social network site is provided and established. The wikipedia pages related to each university, forums, and chats allocating the live connections introduced a collaborative workspace for each participating institution. [4]

[4] A comparison of privacy issues in collaborative workspaces and social networks: Functional triangle of social software according to (Richter& Koch 2007)

Figure 1: Functional triangle of social software according to (Richter& Koch 2007)

In such a confidential area, the students discuss topics ranging from college life, family, meaning of life, and from stereotypes to prejudices. Each class session includes discussion in both small groups and one-to-one chat with reflective journaling afterwards. Local sessions are also held to integrate and synthesize information gained in the global sessions. This intimate, small group setting provides undergraduates with a graduate seminar type experience not often found in undergraduate classes.

The students are partnered for the duration of the two-country link providing for continuity and allowing an atmosphere of trust to develop. This comfortable atmosphere engages students to share information, opinions, values, attitudes, and emotions. Partners email each other on a daily basis to create open discussions, to help them to evaluate their values, and to share their traditions. These one-to-one discussions lead to friendship. Partners read each other's newspapers to learn what is current, timely, and to get real exposure to what is going on in their partner's culture. Partners also write a joint paper. This joint project teaches them how to collaborate effectively. Through one-to-one partnering, students begin to see similarities among themselves, see positives in others, and to de-emphasize the negative differences. This realization is the key to changing

negative stereotypes and understanding other cultures. Through learning about other cultures, students begin to understand their own culture and gain a broader perspective on life.

As a result of cross-cultural communication students learn to express themselves effectively. Slang, clichés, or words without translations in other languages cannot be used to express a thought or feeling. This causes students to think carefully about not only what they say, but how they say it. On the other hand, students also learn how to improve their listening sub skills such as critical listening. During the course they even practice their songs, few key words in the other language, so they not only they understand the meanings of the words but also the attitudes and emotions associated with those words.

Last semester around 30 participants from English language department, American Culture and Literature department, College of Economics and College of Communication as well as International Relations department and even, Math and Physics departments gathered.

Throughout our experience we've first positioned the Global Understanding course as a freshmen course. However, it's been figured out that it could also be a course for sophomore, junior, and even senior students. This course is recommended for any major where communicating with diverse populations is key to a successful career in the field.

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Istanbul Journal of Innovation in Education
Volume 1 Issue 1 January, 2015 pp. 89-104

The Efficacy of Blended Learning in Courses on Intellectual Property Rights and Patents

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Abstract: The study reported in this paper compared the effects of two approaches of blended learning on students' learning outcomes in courses on intellectual property rights and patents. One group of students followed three weeks of online graduate courses and underwent peer assessment. In a second group of students, the online work and peer assessment were combined with active face-to-face experience-based learning. Pre and post-tests were used to measure the students' knowledge about intellectual property rights and patents. In addition, a questionnaire was used to gather data on the students' opinions regarding course arrangement and implementation, digital learning, the learning environment, and their knowledge, understanding, and implementation of intellectual property rights and patents. The data were quantitatively analyzed to determine whether the two blended learning approaches differed in terms of the effects measured. The findings show that the students approved of the online courses and also the face-to-face learning. These findings may reflect approval of the decrease in costs and time. The implication is that active face-to-face experience-based learning should supplement online courses with peer assessment, as this combination led to more successful learning outcomes among students taking courses on intellectual property rights and patents.

Keywords: blended learning, online learning, peer assessment, face-to-face learning, active learning, intellectual property rights, patents

Purpose Statement

The study reported here had two purposes. The first was to identify the relationship between blended learning strategies and graduate students' acquisition of knowledge and skills related to intellectual property rights and patents; and the second was to ascertain whether one blended learning approach was better than the other in terms of learning outcomes.

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Introduction

Technologies such as online courses, discussion boards, YouTube, and Facebook have improved both the accessibility and the affordability of education. Although such technologies enable interaction and collaboration (McCarthy, 2010) in learning coded knowledge (Collins, 2010), they are insufficient for promoting the acquisition of tacit knowledge (Collins, 2010), such as that related to the implementation of intellectual property rights and patents. Online courses offer flexibility, affordability, and accessibility to users, but face-to-face methods of sharing knowledge and discussing material also remain effective; particularly when it comes to acquiring tacit knowledge. The interaction that takes place in both face-to-face and online discussions among peers has been shown to improve markedly the acquisition of learning and skills (Moore & Iida, 2010). The future of blended learning, particularly for coded knowledge, may rest in a combination of online learning and participant interactions. Tacit learning, however, appears to require more communication and interaction than is presently possible within the online environment, as it is assisted by discussing, learning, and interacting with others.

Literature review

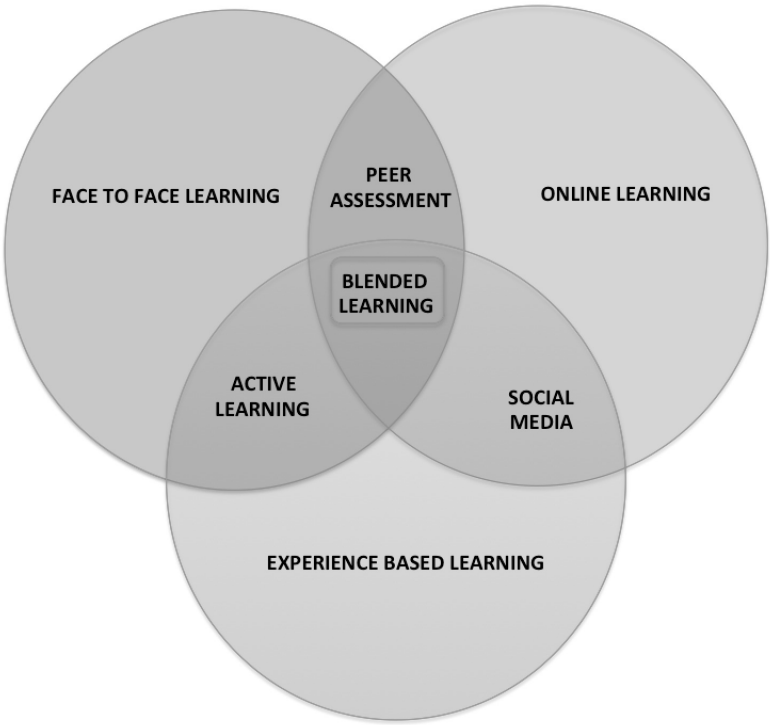
Social perspectives on learning have played a crucial role in education, particularly in adult learning. A number of studies have shown that theories of online learning, particularly those allowing for interaction and communication, are supported within the realm of constructivist and social learning theories (Hrastinski, 2009). Hence, constructivism has come to play an important role in accounting for learning and teaching, particularly in terms of instructional technology (Woo & Reeves, 2007). As stated by Uzunboylu, Cavus, and Ercag (2009), "social constructivist theory assumes that students act and reflect within an environment, and this is then followed by reflecting, abstracting, and increasing experiential knowledge" (p. 382). Since Vygotsky's (1978) research on the effects of social interaction, language, and culture on learning, studies that aim to determine the effect of strategic and meaningful interactions on learning have gained importance. As Woo and Reeves (2007) have

clarified, meaningful interactions in a learning environment are designed to enhance learning, by allowing participants to share their perspectives and experiences in communities of practice. Hence, as Birch and Volkov (2007) mentioned, "learner-centered learning has gained importance for the learners who can interact and share their knowledge, skills, experiences, and perspectives with each other" (p. 295). In such learning environments, learners become active participants in conversations and general communication with other learners in their physical environment, with help from the instructor as a facilitator (Kearsley, 2011). According to Wang (2008), this kind of learning environment can also be developed in virtual forms, allowing learners a far greater range of opportunities to access and share knowledge, experiences, and resources. For this reason, the last decade has seen digital-based technologies creating various technology enhanced learning environments in which learners can actively participate and benefit by acquiring a range of knowledge and skills in a relatively short period of time and within a relatively small budget (Lee & Woods, 2010). As a result, the affordability and accessibility of knowledge and skills have significantly improved (Gray, Thompson, Sheard, Clerehan, & Hamilton, 2010). Furthermore, technology-based learning helps learners in sharing their ideas, thoughts, knowledge, and experiences, and also in providing feedback and assessment. Thus, it appears that the effort involved in learning has decreased, whereas the efficacy of learning has improved substantially (Shih, 2010).

The findings of a number of recent studies have shown that online courses help students to learn a range of different subjects, especially those involving coded knowledge (Collins, 2010). However, in terms of tacit knowledge, a more interactive environment is required. Therefore, under the influence of tacit knowledge based learning models, virtual learning environments aim to support online learning by allowing more active interaction, participation, and communication in order to improve learning outcomes. However, it appears that, in the case of most online courses, the inclusion of active online interaction is insufficient as a part of blended learning (Graham, 2006). Learners appear to require active face-to-face interaction and experience-based learning for blended learning to be successful (Lou, Guyo, Zhu, Shih & Dzan, 2011). Furthermore, recent

research has shown that team-based or project-based learning activities can also be effective in terms of learning outcomes (Lou, Shih, Diez & Tseng, 2010; Neo, Neo & Kwok, 2009). Hence, as Shih (2010) pointed out, blended learning of the type reflected in Figure 1, where online and face-to-face instruction are integrated with experience-based learning, may be the most effective and efficient in achieving learning outcomes.

Figure 1: The effects of blended learning approaches on learning outcomes (Graham, 2006)



In blended learning approaches, learners can actively participate in the learning process, not only by taking online courses and communicating through the mutual and virtual environments, but also by participating in face-to-face experience-based learning. Such an approach has been shown to lead to significantly improved learner motivation (Derntl & Motschnig-

Pitrik, 2005). In terms of face-to-face learning, Ashman and Gillies (2013) pointed out that cooperative learning models help learners to think, analyze, evaluate, and improve their work, especially if the cooperation takes place in a physical environment. Furthermore, learners then benefit from better opportunities to create and innovate new products and services (Van Gennip, Segers & Tillema, 2010). It appears that online learning and peer assessment can create an effective learning environment; but this may not be sufficient. For the effective and efficient achievement of learning outcomes, active participation in face-to-face experience-based learning should be integrated with other methods of blended learning, such as online learning and peer assessment. With this in mind, the present study is set out to evaluate the efficacy of two different blended learning approaches among students following courses in intellectual property rights and patents.

Methodology

In order to investigate the effects of two blended learning approaches on the learning outcomes following courses on intellectual property rights and patents, this study focused on online courses offered by the European Patent Office in Istanbul. In the following sections, the research questions and hypotheses are set out, followed by information on the participants, research instruments, and research procedures.

Research Questions

The present study aimed to address a number of research questions, given in (1) to (3) below.

(1) Is a blended learning approach appropriate for graduate courses on intellectual property rights and patents?

(2) Is a blended learning approach that includes active face-to-face experience-based learning more effective in graduate courses on intellectual property rights and patents than one that does not?

(3) Which particular aspects of a blended learning approach are favored by students taking courses in intellectual property rights and patents?

Hypotheses

On the basis of the research questions stated above, the hypotheses in (4) to (6) below were set for the present study.

(4) A blended learning approach will be appropriate for graduate courses on intellectual property rights and patents.

(5) A blended learning approach that includes active face-to-face experience-based learning will be more effective in graduate courses on intellectual property rights and patents than one that does not.

(6) Particular aspects of a blended learning approach that are favored by students taking courses in intellectual property rights and patents will be identifiable by means of a survey.

Participants

The participants in this study were 110 randomly selected graduate students (62 male and 48 female) studying different majors at five universities in Istanbul. The participants were divided into two groups with 31 males and 24 females in each. All the participants studied three different online courses offered by the European Patent Office. Participants in Group 1 studied the online courses individually and participated in peer review of their assignments. Participants in the Group 2 studied the courses together, actively sharing their experiences, assignments, and ideas. The aim of the grouping was to investigate the effect of blended learning on students' level of understanding, where blended learning involved online courses and peer assessment, with or without active face-to-face experience-based learning. Each group had a team leader who was responsible for the group activities throughout the study, making the peer review of assignments less difficult and time consuming. All participants were asked to submit their assignments via group emails. The assignments of all group members were thus seen by their peers, who could then provide comments and feedback. Participants were assigned a total of six assignments. All these assignments were reviewed and commented upon by the remaining group members at the end of the study.

Instruments and Research Procedures

This study adopted a quantitative approach. All participants completed pre and post-tests focusing on their knowledge of intellectual property rights and patents. The pre-test was completed at the beginning of the study (before the coursework began), and the post-test in the last week of the study (after the courses had been completed). The tests contained both closed and open-ended questions related to intellectual property rights and patents, and were scored according to the answer sheet provided by the European Patent Office. In addition to the pre and post-tests, participants were required to complete a survey questionnaire at the end of the study. The questionnaire contained a number of 5-point Likert scale items targeting their opinions regarding (i) course arrangement and implementation, (ii) the digital learning involved in the courses, (iii) the learning environment, (iv) their knowledge of intellectual property rights and patents, and (v) their success in the implementation of intellectual property rights and patents. The questionnaire data were analyzed by SPSS to obtain descriptive statistics.

Implementation of the Two Blended Learning Strategies

The main purpose of this study was to compare the outcomes of the two blended learning approaches in terms of students' knowledge of intellectual property rights and patents. The outcomes following the online courses with peer assessment were compared to those following the online courses and peer assessment integrated with active face-to-face experience-based learning. The aim was to determine which of the two strategies was more effective. The effects of the two strategies on learning outcomes were measured by comparing the performance of students from the two groups on the pre and post-tests.

The participants in Group 1 followed the online course individually for a total of 36 hours, without any active face-to-face learning interactions, as reflected in Figure 2. The participants in Group 2 followed the online course for 36 hours together within the group, where they had the opportunity for 12 hours of active face-to-face experience-based learning, as reflected in Figure 3.

Figure 2: The procedure followed by Group 1

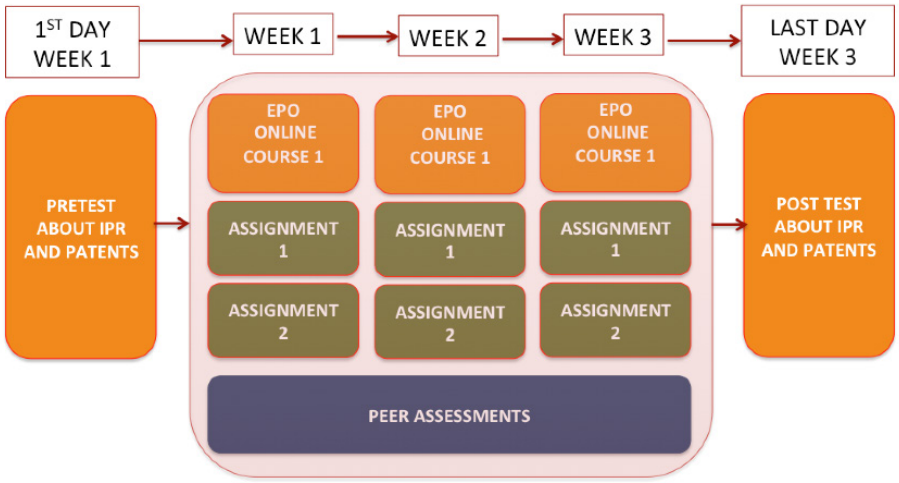
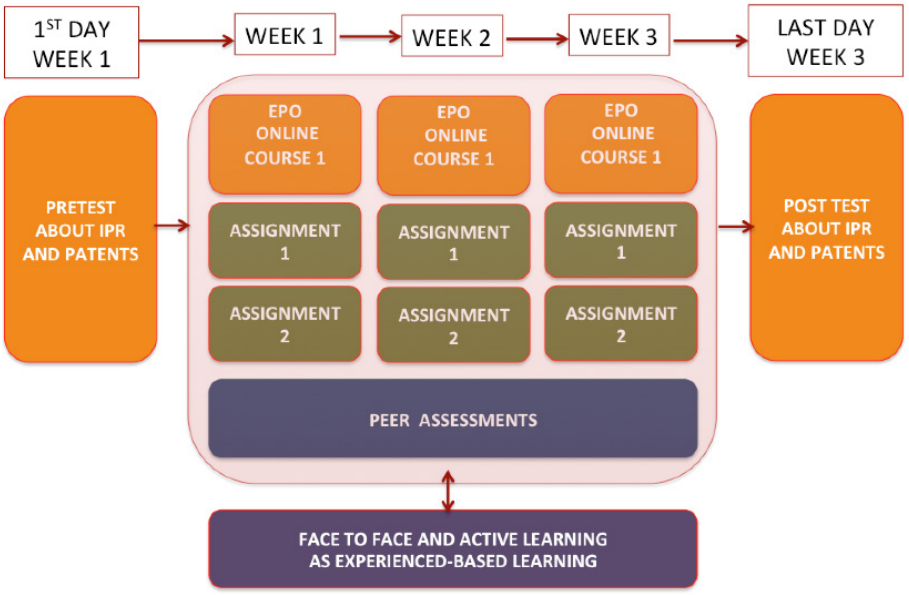


Figure 3: The procedure followed by Group 2



Recalling that all the participants submitted each of their six written assignments to the entire group, and each was commented upon by the

other participants; the group leaders motivated the participants to share their thoughts on the assignments, and to analyze, discuss, interact, and criticize freely. The participants of Group 2 were furthermore motivated to talk about their thoughts, feelings, awareness, and experiences.

Results

The results of the pre and post-tests on intellectual property rights and patents are given in Tables 1 and 2. Table 1 shows the results of the participants who took the online course individually and participated in peer assessment via email. Table 2 shows the results of the participants who took the online course in their group, participated in peer assessment via email, and had face-to-face contact with other members of the group during active experience-based learning. The questionnaire results for both groups, reflecting their opinions on the course, its delivery, and its outcomes, are also given in Tables 1 and 2.

As can be seen in Table 1, the participants in Group 1 scored 11 points out of 100 in terms of their knowledge about intellectual property rights and patents. After taking the course, this score increased to 40.5. This difference between pre and post-test scores was statistically significant ($p <$ .05) according a paired t-test of total scores. In terms of students' opinions on the five aspects of the learning method, significant differences were also observed. In terms of course arrangement and implementation, the participants' average score improved from 3 to 10, and in terms of digital learning capacity, from 4 to 9. The scores for the learning environment rose from 3 to 8.5. The scores reflecting the students' understanding of intellectual property rights and patents improved from 1 to 8, and those reflecting their ability to implement intellectual property rights and patents from 0 to 5. These results suggest that the blended learning approach, which included individual online learning and peer assessment via email, led to significant gains in terms of learner outcomes in the course on intellectual property rights and patents.

Aspects of Learning Methods	Pre-test Scores (Week 1)	Post-test Scores (Week 3)	Difference in Scores
Course arrangement and implementation	3	10	7
Digital learning	4	9	5
Learning environment	3	8.5	5.5
Intellectual property rights and patent learning	1	8	7
Success in the implications of the intellectual property rights and patents	0	5	5
TOTAL	11	40.5	29.5
Paired t-test (* $p < .05$)	.010*	.034*	

Table 1: Results for Group 1 (n=12)

The results in Table 2 indicate an even more drastic improvement in students' knowledge of intellectual property rights and patents for Group 2, with an increase in total score 11 to 63. This increase was found by t-test to be statistically significant ($p < .05$). In this group, participants had the benefit of active face-to-face experience-based learning. In terms of course arrangement and implementation, the scores improved from 2 to 14, and for digital learning capacity from 4 to 11. The scores for the learning environment rose from 4 to 13. Finally, the scores reflecting students' understanding of intellectual property rights and patents rose from 1 to 14, and for their implementation from 0 to 11. The results suggest that this method of blended learning, which included online learning, peer assessment, and active face-to-face experience-based learning, had a greater positive impact on learning outcomes than did the method used for Group 1, as the scores improved more than they did for Group 1. In other

words, the blended learning approach that included face-to-face contact time was more beneficial than that without for the learning outcomes of this course on intellectual property rights and patents.

Aspects of Learning Methods	Pre-test Scores (Week 1)	Post-test Scores (Week 3)	Difference in Scores
Course arrangement and implementation	2	14	12
Digital learning	4	11	7
Learning environment	4	13	9
Intellectual property rights and patent learning	1	14	13
Success in the implications of the intellectual property rights and patents	0	11	11
TOTAL	11	63	52
Paired t-test (* p < .05)	.010*	.034*	

Table 2: Results for Group 2 (n=12)

The post-test scores of Groups 1 and 2 are compared in Table 3. These results show that the learning outcomes were better in Group 2, where the students participated in active face-to-face experience-based learning in addition to the online coursework and peer assessment. In terms of course arrangement and implementation, Group 2 scored 40% better than Group 1. In terms of the digital learning, experience, the scores of Group 2 were 22% better than those of Group 1. In terms of the learning environment,

Group 2 had 53% better scores than Group 1, and in their knowledge of intellectual property rights and patents, 75% better. Finally, the most dramatic difference between the two groups was in their implementation of intellectual property rights and patents, where Group 2 scored 120% better than Group 1.

Aspects of Learning Methods	Post-test Scores (Week 3) For Group 1 (n=12)	Post-test Scores (Week 3) For Group 2 (n=12)	Difference in Scores
Course arrangement and implementation	10	14	4
Digital learning	9	11	2
Learning environment	8.5	13	4.5
Intellectual property rights and patent learning	8	14	6
Success in the implications of the intellectual property rights and patents	5	11	6
TOTAL	40.5	63	22.5

Table 3: Post-test scores of the two groups

The quantitative results of this study have shown that the answer to the research question in (1) is affirmative: the blended learning approach using online learning and peer assessment was successful in the students' achievement of positive learning outcomes following their course on intellectual property rights and patents. This lends support to the hypothesis in (4). The results also show that the answer to the research question in (2) is affirmative, lending support to the hypothesis in (5): the learning outcomes of the students who participated in active face-to-face experience-based learning were better than those of students who lacked the face-to-face aspect. Finally, in terms of the research question in (3) and the hypothesis

in (6), the results show that students favored certain aspects of the blended learning experience.

Conclusion

This study investigated the effects of two blended learning strategies among graduate students who studied three-week online courses on intellectual property rights and patents offered by the European Patent Office, and participated in peer assessment. The findings clearly showed that the transfer of knowledge was efficient with both blended learning approaches. In one group of students, the blended learning strategy was enriched by means of active face-to-face experience-based learning. The purpose of the study was to determine which of the two blended instructional approaches was more effective. The results of the second group, who participated in face-to-face learning, were better than those of the first group. By taking the online courses, all participants effectively gained knowledge in a relatively short time, but this knowledge was insufficient on its own – when it came to understanding the implications and implementation of intellectual property rights and patents, the group with face-to-face learning achieved better scores. The opportunity to express their own ideas, ask questions, and implement intellectual property rights and patents as part of the active face-to-face experience-based learning allowed the students to achieve greater success in creating and developing new patents while protecting their intellectual property rights.

This study illustrates that, although an online course with peer assessment may be effective in terms of costs and time, student understanding and performance is enhanced by the opportunity for active face-to-face experience-based learning. The findings of this study offer support for the social constructivist theory (Birch & Volkov, 2007; Wilson & Stacey, 2004; Vygotsky, 1978), which claims that students learn from each other, through experiencing the application of meaningful knowledge and skills, and through active learning and interaction (Uzunboylu, Cavus & Ercag, 2009). Such students can actively implement their knowledge in terms of tangible goods and services. A limitation of this study was the relatively small number of participants (n = 110), and further studies with larger

numbers of participants are required in order that the findings may be generalized. Such research is essential as digital technologies continue to develop and blended learning strategies play a greater role in connecting people more closely and making knowledge more accessible within a limited time and budget. The results of this study suggest that, particularly in the case of creativity-based outcomes, such as the implementation of intellectual property rights and patents, technology developers and managers need to utilize the most effective strategies, including active face-to-face experience-based learning.

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