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**Prof. Dr. Aytekin İşman**
Editor-in-Chief

**Prof. Dr. Jerry Willis**
Editor

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## Message from the Editor-in-Chief

Dear Readers,

TOJET welcomes you. TOJET has good news for its readers. TOJET is in Social Science Citation Index now. TOJET has been indexed in Social Science Citation Index beginning with volume 7 issue 1 2008. Many persons have given their valuable contributions for this success since October 2002. Please continue to give your helpful contributions to TOJET. I am always honored to be the editor in chief of TOJET. I am always proud of TOJET for its valuable contributions to the field of educational technology.

TOJET is interested in academic articles on the issues of educational technology. The articles should talk about using educational technology in classroom, how educational technology impacts learning, and the perspectives of students, teachers, school administrators and communities on educational technology. These articles will help researchers to increase the quality of both theory and practice in the field of educational technology.

The guest editor of this issue was Prof. Dr. Aydın Ziya ÖZGÜR. TOJET thanks the guest editor and the editorial board of this issue for their valuable contributions.

**Prof. Dr. Aytekin İŞMAN**
**Sakarya University**

## Message from the Guest Editor

Dear Reader,

I'm pleased to be a part of TOJET in this issue as a guest editor. It's a honor for me to present the Volume 8, Issue 1. TOJET is placed for 8 years in the educational technology area. The journal has gained appreciation from various users by its effort to select and publish qualitative studies. In this issue it is published 9 articles from England, U.S.A., Iceland, Malaysia and Turkey.

Education has one of the most important key roles for the countries' development rates. In this point of view, following the new information and communication technologies can be seen as a core point of development. So, for the valuable improvements we're looking for the contribution of academic researches.

**With my best regards…**

**Guest Editor**
**Prof. Dr. Aydın Ziya ÖZGÜR**

 

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# A METHODOLOGY FOR THE DESIGN OF LEARNING ENVIRONMENTS.

Tom PAGE
Department of Design & Technology, Loughborough University
Loughborough, Leics..LE11 3TU, UK
T.Page@lboro.ac.uk

Gisli THORSTEINSSON
Design and Craft Department, Iceland University, Reykjavik, Iceland
V/Stakkahlid Iceland
cdgt@lboro.ac.uk

**ABSTRACT**
This article presents and discusses some theoretical starting points and design considerations for addressing emotional and aesthetic aspects of virtual learning environments (VLEs) for support of ubiquitous teaching, studying and learning. In this article, we note that a VLE should be viewed upon as an interactive and sensations arousing instrument, a tool or mediator for communication and regulation of psycho-social processes and presence in terms of social distance. As a symbolic artifact to be assessed and perceived from the viewpoint of aesthetics. The most important emotionality aspects of a VLE could be pointed out to be a tool allows virtual presence and simultaneously allowing possibilities to regulate the social and psychological distance to others.

This work focuses on emotionality, particularly from the viewpoint of avatar based VLE collaborative solutions, graphical representations and participants of social simulations, which are used, as shared virtual spaces and mental tools: tools for thinking and mental problem solving. In addition, this work considers emotional mediation through the use of such communication technologies. With the provision of a basis for the ability to empathise, entering into another person's role, emotional reciprocity and as an essential factor for generating a shared and trusting or secure enough mutual emotional state for successful and motivating problem solving and innovation development. Emotional, study-related situations are also discussed from the perspective of one's cognitive and emotional load as well as via situational anxiety and situational pleasure.

**Keywords:** Emotional, Experiential, Virtual Learning Environments, Ubiquitous, Mobile And Network Based Learning.

## 1. INTRODUCTION

In the broadest sense, we can step into "virtual worlds" with different media, with the help of television, cinema or books. Even if such media stimulate only a few senses – the key point is the *imagination*, which fills in the gaps and for different amounts the emotional – sensatorial aspects it affords together with the aesthetic dimensions of such environments (cp. Peltoniemi & Tammi 1999). The way in which the development of computer technology has contributed to this changed reality offers great potential in terms of the development of dynamic aesthetic and real looking and *interactive* solutions. Novel technologies such as computer based virtual learning environments (VLEs) (see e.g. Lanier & Biocca 1992) and other network-based mobile tools (Gredler 2004; Lehtonen 2005; Page Lehtonen & Thorsteinsson [to appear]) have become very popular tools and environments in *educational research and development* or *design based research* (Orrill, Hannafin, & Glazer 2004) (Lehtonen, Thorsteinsson, Page, & Ruokamo, in press; McLellan 2004; Steuer 1992). Nevertheless, from the present research perspective it must be noted that emotional and aesthetic aspects are equally significant as the more commonly researched cognitive and rational aspects of such environments. In its entirety, the VLE becomes a interactive and sensatorial arousing place where people can sense presence, situational pleasure and experience things *embodied* with all their senses. We argue that research has been until presently somehow lacking for especially the embodied emotional and aesthetic dimensions of the development as well as the research of human emotional activity in those environments (see also Laurel 1992; Lehtonen, Hyvönen & Ruokamo 2005; Vuorela & Nummenmaa 2004). The emotional and the aesthetic factors might be seen to be key factors in creating such environments where the both the embodiment of emotionality and imagination takes the role and immerses us into virtual presence and engaging our activities there. It is therefore asserted that as well as the cognitive and rational aspects e.g. knowledge creation are important to study and take into a account in these environments at least as important aspects to take into a account are the emotional and aesthetic aspects (Lehtonen, Hyvönen & Ruokamo 2005). This work considers such emotional and aesthetic considerations that need to be provided for in VLEs and mobile network based learning environments.

It is essential to examine *emotionality* and *emotion media*tion related to interactive and socially formed VLEs and mobile network based learning environments and considers that phenomena also as attributes vis-à-vis the processes it consists - the teaching, studying and learning processes. An attribute, in this context, is a property of

 

an object, situation (e.g. communication situation), or a feature of the immediate environment, that indicates how that object situation or feature may/can be interfaced or in case of mobile network collaboration *interacted with* (McLellan 2004; Gibson 1966; 1979). In other words, for example in technology mediated communication seen from the viewpoint of emotions as attributes show what is possible or potential to do, or to achieve in certain situation. We acknowledge that such attributes can and should be made noticeable (dominant) through e.g. proper technologies to mediate emotionality in a suitable ways dependent on the situation to achieve fully benefits a human being's potentiality as a committed, self-directed creative and productive member of a group.

It can be seen that taking into an account the human emotion and emotional activity in *teaching, studying and learning* (Illeris 2003; Uljens 1997) a theoretical level structure based on multiple levels of emotionality observation (Table 1.) is needed. The emotions and emotionality is seen here on the five levels of observation evident in Table 1. The aesthetic dimensions are seen to provide highly emotional relations with the environment in dynamic user process in the levels of 2 in direct interaction with it and in the level 3 in dyadic or social interaction with others represented by the environmental characters (avatars) and situations.

Table 1. Five levels of the emotional activity observation (based on Lehtonen, Hyvönen & Ruokamo 2005):

| | |
|---|---|
| 1 | The level of subject's (subconscious) internal underlying emotional (neural) mechanisms (studied by psychology, neuropsychology / cognition science) in relation to technological and social environment. |
| 2 | The level of subjects' emotional aspects of behaviour as a subject in interaction with the technology, emotion expression and emotion experience (feeling) |
| 3 | The dyadic/social level of shared or mixed technology mediated emotionality as a subject and as a member of groups, (emotionality and network group dynamics in social interaction between teachers, students and learners as subjects') in joint attentions. The dyadic means that in the social situations in typical form are actually in each separate small communication situations actually in a way two people meeting at the time but in rapidly changing social situations, which are in relation to the others. |
| 4 | The emotionality in cultural level, especially cultural ways of emotion expression and emotion experience (feeling). The way how certain group, organization or country has its own communication culture. |
| 5 | The emotionality in inter- or transcultural level in global-level social interaction between teachers, students and learners with different cultural backgrounds. |

This article presents some theoretical starting points for the consideration of emotionality and aesthetic aspects for the VLEs and mobile network based learning environments. In other words how some of those most critical emotional and aesthetic aspect could be taken into an account.

## 2. EMOTIONS, SOCIAL AND AESTHETIC ISSUES AS A SOURCE OF EXPERIENCE

We define emotions in this article to be consciously or subconsciously generated processes with negative or positive tones that help estimate the significance of artifacts, situations and actions and their value for one's self (cf. information theory of emotions, (Siegel 1999; Simonov 1981; S. S. Tomkins 1962, 1963, 1991, 1992). According to this contemporary neuropsychological-based view, emotions are based on activities throughout the entire brain and different bodily systems (e.g. hormonal, motor and sensory ones) (Siegel 1999). It may be claimed that emotional processes and emotionality serve to provide overall direction and impetus for such relations with environments and human activities that appear rational or which are said to be rational. Learning and studying in and via online networks VLEs and mobile network based learning environments are no exceptions to this. (Brod 2000; Damasio 2001/1994; Siegel 1999). To quote Damasio (2000/1999b, 257-258), the concept of consciousness may even be totally reversed, *consciousness is a strongly emotional experience*, *a feeling of what is happening [and where]*. Emotions are experienced as episodes and mental states of various types, such as mood, happiness, sadness, hate or anxiety and it should be noted that all those affect decisions and activities we make. In addition to that a large number of emotional processes *are barely conscious or subconscious* (Damasio 2000/1999a; Oatley & Jenkins 1996; Siegel 1999). Emotions can therefore be considered as processes, with identifiable stages: first events are evaluated for their relevance to what is important to us, then follows an evaluation of the context – what can be done about the event (Oatley & Jenkins 1996). Furthermore, emotions may be considered as mental stages of readiness for action, setting priorities and prompting plans.

However, emotional and aesthetic aspects could be more seriously taken into an account and provided for in the development of such VLEs and mobile network based learning environments. Emotional and aesthetic factors have too often been paid little attention or overlooked by researchers which study learning especially in VLEs and mobile network based learning environments. The aesthetic dimensions of VLE applications should be understood or to be felt in *dynamic interaction process* rather than more or less passive perception process (cp. McLellan 2004; Gibson 1966; 1979). The aesthetic environment may be seen to *afford* positive emotions toward

 

the activity in *dynamic interaction* situation. Emotions and the tendency to assess experiences on the basis of how pleasurable or disagreeable they are, are not only background factors for the inclination to study and motivation but they also directly bear on how one studies, what one studies, whether one learns anything and whether what one learns is remembered (Lehtonen, Hyvönen & Ruokamo 2005; Damasio 2000/1999a, 2000/1999b; Siegel 1999; Simonov 1981). The body, the brain, the intellect and emotions are inseparable parts of us. The physiological-psychological-environmental activities labelled as the mind are 2000/1999a, 2000/1999b; Dennett 1996; Lehtonen, Hyvönen & Ruokamo 2005). From that viewpoint, emotionality and the dynamic interaction process require aesthetics as a key aspect also in all network-based environments (NBE), like VLEs and mobile network based learning environments. Furthermore, in taking into a account the emotional aspects in designing those as well as having a strong impact on the ways one teaches, the willingness he or she studies and learns, and on the issue whether one remembers what was studied or taught and supposedly learned.

The aesthetics, defined in this time how we *emotionally react* and *feel* our presence and interaction with our technology mediated social and technological surroundings. It may be seen to be very important attribute of emotionality. Albeit briefly referred to the significance of aesthetics may be said is from the emotional viewpoint how pleasurable or disagreeable we experience the environment. It is then not only one background factor for inclination to study and motivation but through the emotional influence it also directly bear on how we study, what we study, and do we learn anything and whether what we are capable to recall and later use from the areas we have been studying (Damasio 2000/1999a, 2000/1999b; Siegel, 1999; Simonov 1981; Lehtonen, Hyvönen, & Ruokamo 2005). We argue also that the aesthetic dimensions are very culture dependent and also the individual variation may be argued is quite significant. From that viewpoint the aesthetic dimension should always be paid a lot of consideration. In addition to presented above the aesthetic dimension may not be seen or treated as just visual art of just visual design issue, instead of it should be treated or studied from the viewpoint: what kind of *interaction* and *emotional* factors it *affords* while been actively used, not been only as passively assessed object. We point out that those points are too often paid little attention in research and design-based research of educational solutions.

**2.1. Social level emotional activity**

According to our research e.g. the *emotional mediation* between the participants in different forms and means provides very interesting phenomena in the consideration of the benefits and the disadvantages of technology-mediated communications. In addition, there lie the possibility that it allows one to regulate the social and psychological distance but still maintain certain amount of presence in the virtually represented ways. If the modulation does not happen well enough or almost at all the distance easily remains too long and the collaboration may be seen to suffer from it. The social interaction, *network group dynamics* (cp. e.g. Aulls 2004; Hargreaves 2000; Peltoniemi & Tammi 1999) and the *manifestations and the mediated interpretations of embodiment* must be paid attention to when planning the implementation of VLEs and mobile network based learning environments (Brave & Nass 2002). The current interactive facilities evident in most networked situations - predominantly text-based, are also, in addition those are slow, very demanding from the point of view of promoting interaction especially from the emotion-mediation viewpoint. Technologies used and teaching, learning and studying influence what emotions are evoked and mediated by studying and what students' experience. From that viewpoint, the different communication and embodiment representation or simulated embodiments like avatars; multimedia communications (voice, video) and especially avatar representation may be giving the sense of emotional presence but same time of letting people regulate the social and psychological distance and level and ways of interaction (Peltoniemi 2004). Furthermore, this mediates the real or simulated acts of embodiment, the bodily representations and attention from one to another that the shared feelings may carry the desired activity.

Online learning and studying, on the other hand, provides the possibility of protection afforded by technological conveyance, an option to withhold one's true feelings whilst being represented as an avatar as a participant. Especially the written communications despite of its limitations offer also many benefits in such contexts. They allow time regulation, time shifts, accuracy of messages and possibility to return to the message as well as the freedoms in answering, more anonymity (less emotion mediation) and possibilities to easy regulation of psychosocial distance. It is not surprising people seem to like written communications as e-mail, SMS, net chat, television chats indicate. This experiential emotional protection may also provide a way of handling difficult concepts for discussion or the consideration of subjects which would be otherwise, for example through face-to-face interaction might be very difficult. Afforded protection may also make collaboration on the level of feelings in some situations easier in a group and lead to extended openness which might be rarely encountered in personal interaction.

 

However, in other forms of collaboration, such emotion mediation problems make collaboration difficult and the lack of cues or attributes for expected or typical behavioural reaction in certain situations in meaningful ways makes the collaboration difficult ant emotionally very consuming. In such cases there needs to be a possibility for regulating the emotional mediation. This can be done, for example by selecting the expected or typical behavioural gestures of communication to be used from set of alternatives (e.g. chat, voice over IP, video, avatar with lip and face sync etc.). This can be seen to be important provision from the social level as well as cultural and inter and transcultural level and viewpoint (Figure 1.). Moreover, individual users may differ in these issues and more so between cultures in the ways and willingness to express and mediate emotional states sometimes differs very much and the systems should offer enough ways to mediate the emotional needs or the collaborators.

These mediated emotions serve to create a shared emotional state and "carry" as well as encourage the other participants to continue the collaboration and simulate the states of mind of others. In order to generate socio-mental connections, people often profit from a human mode of action called embodiment where the bodily expressions, particularly facial expressions and gaze play a significant role (Bowers, Bauer, & Heilman 1993; Erickson & Schulkin 2003). In a dialogue, one not only interacts with information but also on the individual level of emotions and cognition as a member of a group in some level of psychosocial distance. The connections are strongly both emotional and cognitive (Brave & Nass, 2002; Chayko 2002; Damasio 2000/1999a, 2001/1994; Lehtonen, Karppinen, Matikainen, Säkkinen, & Ruokamo 2005; Siegel 1999) and emotion mediation should be always being taken into account also in different mediated communication situations. Also the environment and aesthetics issues influence, we define the aesthetics to be in strongly connection with emotions. Aesthetic solutions have among their users a connection to positive emotionality to the pleasure.

## 3. EMOTIONALITY, INTERACTIVITINESS AND AESTHETICS

VLEs and mobile network based education based on virtual realities or simulations utilizes different and, in most cases, novel technologies and applications. It is based on the technological infrastructure, which we will study through an extensive use of modern interactive and *mediating* media like desktop virtual reality (VR), simulations and multimedia communication applications. But the technology is not the most important factor in that process. The most critical issue is to take into an account the users, *the human nature of using those technologie*s.

VLEs, mobile network based environments and collaborative simulations (Gredler 2004) may be seen as essentially shared virtual spaces. Providing mental and in group settings through visualization and communication tools, tools for thinking and mental problem-solving for presenting and sharing ideas and thoughts on symbolic level to others and a tool for communication, distributed knowledge and shared expertise in group setting. Those tools engage us just for especially two reasons. The way of using those media is *interactive in its nature* and the *emotional aspects* are well present in interaction with those tools. We may say the VLEs and mobile network based environments *afford* us more *emotionality* than many other ways of forms of computer-based environments. Those tools may be said to be *experiential*, which usually pertains to *experience* or *personal observation*, instead of obtained from reasoning. Those tools may be said in other words to afford us interactive and sensationally arousing experiential teaching, studying and learning. In this sense, experiential always refers to a personal and *emotionally coloured reality* as seen by individuals. By emotional we mean as stated mental activity comparable with perception, thinking, language and learning, which also produce feelings. On the social group level (see Table 1.) s*hared emotional states* as bring the participants together and motivate them in the ideation process. Such opportunities for using a VLE as tool for symbolic manipulation of problem-solving activities and as a tool for even cross-cultural communication has established a new and open way for ideation using VLE and mobile network-based solutions. Furthermore, the aesthetic factors should always taken into a account - and also from the multi- and cross-cultural viewpoints.

Emotions are also essential also from other perspective. For example, Prensky (2001) states that the present generation of students – the games generation of children – are quite different from older generations, they do not want to stay in a passive role with different media. They want active participation and emotionality, to manipulate presented objects and expect a degree of emotional and interactivity as opposed to merely passively watching and listening. It can be proposed that the traditional way of thinking and learning has been shifted from deploying established media such as literature and print - to a considerably more interactive media such as virtual realities and interactive digital video and audio. McLuhan (1997) once predicted that the information environment, in this case the virtual reality or simulation based environment, and the related effects engendered *by the computer are as inaccessible to literate vision as the world is to the blind*. The present generations of students do in fact also learn to use the different forms of digital media "as a second language". In addition, the emotionality in different forms belongs very much into that context. In the next section we observe more closely also two emotion related concepts: the *situational anxiety* and *mental load*, which do have quite strong influence

 

on the study processes and learning and the background variables, which may increase or decrease the presented phenomenon.

## 4. WHAT ARE SITUATIONAL ANXIETY/PLEASURE AND MENTAL LOAD?

*Situational anxiety* is an emotional response to a situation that is perceived as too rapidly changing, difficult and its characteristic features. Anxiety may be seen also in relation to fear or anger; those may be seen in a way compelling feelings (Huttunen 1997; Nathanson 1992; Thompson & Madigan 2005; Tomkins 1962, 1963, 1991, 1992). In strongest forms situational anxiety is sometimes replaced by situational fear or anger and disgust leading too often to avoidance toward the whole activity or situation (Huttunen 1997; Thompson & Madigan 2005).

A concept developed by us, *situational pleasure*, in contrast, may be understood to be the opposite, an emotional response to a situation that is experienced as easy or pleasant (cf. flow Csikszentmihalyi 1992). Mental load as a concept has been derived from Sweller's theoretic model of *cognitive load* (Chandler & Sweller 1991; Sweller & Chandler 1994) by supplementing it with *emotional load*. Mental load implies an *excessive burden in relation to a learner's emotional and cognitive resources* that is caused by the structures and activities of study-related equipment and materials and social interaction forms, which diminishes learning capacity. A part of this load is due to learning of the issue being processed and a part to concurrent effects of negative emotions. (see e.g. Thompson & Madigan 2005)

### 4.1 Situational anxiety and situational pleasure

By *situational anxiety* we mean that the strong feelings of fear and helplessness or anger and experiencing a situation as threatening inhibit learning. On the other hand, the situation itself may be remembered well but what one attempted to study during it is often forgotten or actively avoided. Indications of this have been found within neuropsychology, in particular. (Booth-Butterfield 1988; Cahill et al 2001; Damasio 2001/1994; Virsu & Haapasalo 2001; Siegel 1999). *Situational pleasure*, i.e., positive emotional substance that is evoked in a situation of learning or other activity, has an effect of supporting, even enhancing, remembering, cognitive functions and learning. (Damasio 2000/1999b; Virsu & Haapasalo 2001; Siegel 1999). This is utilised in different areas, for example, in the entertainment industry where the activity itself is entertaining. The pleasure provided by the senses and embodiment in active processes like studying via VLEs and mobile network based interactive and sensationally arousing environments, which is an important element in the contexts of learning.

The fact how easily situations are felt to be a burden or a pleasure is also influenced by the student's earlier experiences and attitudes. The significance of situational anxiety, fear and anger is revealed in its extreme form when a person faces a threatening situation and concentrates on repulsing danger or escaping to safety. Fear and anger may be seen to represent active ways of regulation of the situation. Another outcome may be passivity. Such situations are often accompanied by neurological and hormonal responses, for example, perspiring hands and stuck thoughts. (Adolphs et al. 2005; Cahill et al 2001; Siegel 1999). Under these conditions one is strongly controlled by emotional assessment and relatively rigid action patterns instead of flexible creativity and conscious problem solving (Brod 2000; Siegel 1999).

It has frequently been observed that the reactions caused by emotional assessment and excessive situational anxiety have effects that inhibit studying, learning and remembering, as well as being linked to study avoidance behaviour (Farnill 2001; Griffin 2000; Siegel 1999). Situational anxiety disrupts studying, especially when one studies something for the first time, and may lead to study avoidance behaviour (Oatley & Jenkins 1996), for example, dropping an online course. In later stages of studying, however, challenges or situational anxiety arising from a learning topic or problem may also have positive effects.

### 4.2 Mental load

Mental load has a crucial effect on alertness and selective attention. For example, an excessive load, poor and insecure social structure and poor group processes, deficient materials, equipment or navigational structure or incompetent use of hypermedia may, along with the load caused by subject matter, lead to rapid exhaustion and scattering of selective attention, which is important for studying, towards multiple targets. That kind of problems has also reported in some VLE and mobile network environment systems research (see e.g. McLellan 2004). Moreover, also excessively low demands of the subject matter may reduce alertness and diminish motivation (Virsu, 1991 1995).

Inadequate course structures and network orientation, study counseling and ambiguously compiled and expressed information about study content and goals can e.g. cause excessive load and apathy, even though such information is intended to help perceiving cognitive structures. One a crucial factor for mental load is the course

 

structure and time management (Tella et al. 2004). It appears e.g. quite often that students maintaining the pace on a course designed with a fixed schedule may entail problems. This causes anxiety to both the student and the group.

**4.3. Some factors affecting situational anxiety and mental load**

By the feeling of security we imply that a student can rely on the both social structures as well as on technology on individual level and on the level of social instruction and tutoring. Despite it, the research has given evidence that the social factors are much more important in network based activities than the technological ones. The technical things despite it do still have a strong influence - and, it is obvious that the chain is always as strong as its weakest link. Technologies such as VLEs and mobile network environments, scheduling, and especially interaction and peer groups are all important, but the social factors seem be the most important ones (Hastings & Sturt 2004; Vuorela & Nummenmaa, 2004). A secure, especially socially secure enough environment encourages unconventional thinking, creative practices and creative attempts of trial and error (Himanen 2004; Hyvönen & Juujärvi 2004; Siegel 1999).

An online student must achieve a harmony with his internal qualifications and difficulties and the emotions that they give rise to. Internal qualifications include goals, interest, motivation and will. Inner difficulties, in turn, are related to beliefs about ability, attitudes and various fears. Examples of external difficulties include the so-called accessibility factors or gaps, which occur, for example, when a student does not have use of a computer, necessary software or sufficient support, such as a support person. A significant external difficulty may also be considered to be vague expectations of cognitive activity or online orientation: because of defective instructions or tutoring the student is unable to perceive the entirety of action or content, its subgoals and subactivities. In addition, the terminology used may cause perceptual gaps. “Getting lost” or feeling the activity too complex or time consuming because of faulty orientation or improper VLEs or mobile network based learning environments by the improperly functioning systems is unpleasant and often leads to intense situational anxiety and mental load with numerous consequences. Those planning for and offering study units can address external difficulties and qualifications. In an optimal situation, difficulties are removed and qualifications reinforced so that teaching and studying can have potential to result in learning. (Hyvönen 2002). In the following chapters we highlight some additional factors that may be said to be quite lot related emotionality aspects: 1. *pedagogical models and guidance*, 2. *reliability of technological solutions*, 3. *reliability of equipment*. According to our experiments (e.g. Lehtonen, Hyvönen & Ruokamo 2005) and experience, these are the most central sources of situational anxiety and factors that affect mental loading.

**4.3.1 Pedagogical models and guidance**

The socio-pedagogical structure or model, the structure, goals and methods of a study unit as well as the socio-structural models are usually described and introduced by using various online materials and tools. The purpose of online instructions is to enable quick grasp of the structure of studying so that a student can subsequently assess his own needs, goals and time management. If the tools, pedagogical models (Lehtonen, Thorsteinsson, Page & Ruokamo 2005; Page, Lehtonen, & Thorsteinsson [to appear]) and instructions are not clear enough (improper orientations, Lehtonen, Thorsteinsson, Page & Ruokamo 2005; Page, Lehtonen, & Thorsteinsson [to appear], the student may try to find the fault in himself which may be said to be emotionally very harmful.

The significance of the general orientation period lies in the creation of a common ground (grounding process) (c.p. Galperin 1989). This is the time when rules, roles, shared goals, meanings, operational principles and fundamental knowledge that are required of everybody will be created and clarified and the necessary tools provided (Mercer 2000/2003). A well enough presented shared basis of online orientation functions also as a cognitive and mental framework between people and technologically-based equipment. The creation of a shared basis particularly decreases mental load, situational anxiety and contributes to the necessary feeling of security. Furthermore, modelling can be utilised to clarify a student’s position so that selective attention and study processes will proceed optimally. Such models provide the student with a script and a pattern of thought about what, how and when he should act (Lehtonen, Hyvönen, & Ruokamo 2005).

**4.3.2 Technological solutions - adaptability, suitability and usability**

Situational anxiety and mental load can also be caused by the technological solutions for activity and interaction. Related factors are students’ ability and inability to use information and communication technology and, for example, difficulties in using VLEs or mobile network based applications or for example moving inside the VLE or handling the simulation contents. The technology must be suitable and usable for a pedagogical context (Mattus 2004; Tella et al. 2004). Especially the *intuitive usability*, how intuitively the user may guess and find the way to act in certain situations as well as learnability, how easy it is to learn the system functionalities are very important viewpoints to consider. In some cases the user may adapt the system to suit properly for certain

 

usage situations. Furthermore, automatic adaptation may help users when implemented in ways, which do not confuse or surprise the users too much and when the active adaptation functionalities takes place. Consequently, the key issue is the ability to tolerate mental loading – how far will a student be able to progress in a cognitively and emotionally taxing environment and to what extent does the actual studying of the content suffer from such an environment? An environment or a tool should not be a hindrance but rather an instrument for thinking and problem solving (Fjortoft & Sageie 2000).

### 4.3.3 Reliability of equipment

Unreliability of the equipment in technological teaching, studying and learning environments, i.e., computers, networks, operating systems and software, e.g. VLE or mobile network software, causes fear of failure and anxiety. Technological problems can be overcome by improving the intuitive usability and especially reliability of equipment under different conditions of use, providing clear support systems for solving experienced problems and improving the usability of diverse equipment and their suitability for teaching and studying practice. In addition, despite of the fact,, that online communication solutions of such as internet protocol (IP) multimedia communications, are valuable options because of their features that convey emotional factors more comprehensibly (Lehtonen, Hyvönen, & Ruokamo 2005). But unfortunately on the same time the multimedia communications are still quite susceptible to different problems.

## 5. CONCLUSION

In network-based teaching and studying there is slow tendency to shift to contemplate situations connected to technology mediated networked interaction and the current conceptions of the tools used therein, to more ecological views taking into a account the emotional and social and even cultural views of group dynamics and technology usage. This is understandable, as the technological and cognitive points of departure emphasised in the early experimentations with network-based teaching and learning are proving from the perspective of high-quality, functioning network-based teaching research, design and implementation to be an inadequate point of departure.

We may see for example emotionality to be very important to take into account from this more ecological or holistic perspective. That is particularly important because just emotions represent us an individual-level system that provides us valuable information about the state of our own bodies and the relationship of our bodies and ourselves with ongoing activity, such as studying inside VLEs or with different types of mobile network based learning environments. We always assess, in all activity, our knowledge, training and all our acts also emotionally, even though we do not always notice it.

We have raised in this paper some important starting points for the discussion to take emotional aspect in consideration in research and in design based research of the area. We have also presented some of the emotional concepts like situational anxiety and pleasure and mental load for the design and assessment of VLE and mobile network based education, which at least should be taken into an account when developing, and researching network based education. Through the careful considerations of emotional aspect we may argue also that the VLE and mobile nwtwork based environments may benefit us in many ways from the study related emotional viewpoints and also that we need to take into a account also the emotional aspects of teaching, studying and learning to get the add-value we are expecting from those solutions.

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# AN EVALUATION OF A CONSTRUCTIVIST ONLINE COLLABORATIVE LEARNING ACTIVITY: A CASE STUDY ON GEOMETRY

Koo Ah CHOO[1] , Ahmad Rafi Mohamed ESHAQ[1],
Khairul Anuar SAMSUDIN[2], Balachandher Krishnan GURU[3]

[1]Faculty of Creative Multimedia
Multimedia University, Cyberjaya
63100 Selangor, Malaysia
ackoo@mmu.edu.my, ahmadrafi.eshaq@mmu.edu.my

[2]Fakulti Teknologi dan Komunikasi
Universiti Pendidikan Sultan Idris, Tanjung Malim
35900 Perak, Malaysia
kanuar@ftmk.upsi.edu.my

[3]School of Business
Monash University Malaysia,
No. 2 Jalan Universiti
Bandar Sunway, Petaling Jaya
46150 Selangor Darul Ehsan
Malaysia.
balachandher@buseco.monash.edu.my

**ABSTRACT**
This paper reports a case study which involved 32 secondary school students participating in an online collaborative learning (OCL) activity known as Diary of Discovering Geometry. This activity aimed to explore the real contents in the learners' surrounding for discovering the spatial concepts and the applications of geometry. The purpose of the study was to explore and investigate the online interaction that occurred in Diary and the perceived effects of Diary. A combination of descriptive and qualitative approaches was utilized to analyze the data. Findings indicate that the students tended to follow rather than being pro-active in Diary online interaction. The gain of knowledge in geometry was minimal. However, a majority of the participants perceived Diary positively as to increase their interest in computer, geometry and to share knowledge among the participants. Their interest in Diary decreased according to time. This can be remedied by introducing some interesting activities in order to maintain their interest throughout the activity. Discussion on the possible reasons of affecting online interaction was discussed. Limitation and recommendation based on the findings were also presented.

Keywords: Constructivist learning environment, Engagement Theory, Online collaborative learning, Secondary school, Case study.

## INTRODUCTION

The penetration of Information and Communication Technology (ICT) has resulted educational changes in some ways that we conduct teaching and learning in schools, from conventional drill and practice and direct instruction to a more constructivist, learner-centred teaching and learning. Constructivist learning environment refer to a place where learners may work together and support each other as they use a variety of tools and information resources in their guided pursuit of learning goals and problem-solving activities (Wilson, 1996b, p. 5). Its implications in education are obvious, and have been discussed and promoted in educational research. Some of the instances of constructivist learning environment are problem-based learning (Barrows, 1996), learning through relate-create-donate (Kearsley & Shneiderman, 1998), activity-based learning (Jonassen & Rohrer-Murphy, 1999; Engestrom, 1987), collaborative learning (Slavin, 1995; Johnson & Johnson, 1996); learning through construction (Kafai & Resnick, 1996), etc.

Kearsley and Shneiderman (1998) proposed their ideas of constructivist teaching and learning through "Engagement Theory". They suggested that students must be meaningfully engaged in learning activities through interaction with others and worthwhile tasks. They proposed three basic engagement principles. They are, 1) Relate - emphasises team effort that involves communication, planning, management and social skills. Students are requested to clarify and verbalize their problems (in groups), thereby facilitating solutions and multiple perspectives; 2) Create - Act of creating makes learning a creative, purposeful activity (conducting a

 

project is more interesting than answering sterile textbook problems). Project-based learning is the essence of problem-based learning (PBL) approaches; and 3) Donate or Have an authentic focus - Stress on the value of making a useful contribution or service (to any kind of customers) while learning. This will increase motivation and the meaning of learning.

**PURPOSE OF THE STUDY**

This paper used the design research approach to design an online collaborative learning (OCL) activity for geometry using the three principles of Engagement Theory (Kearsley & Shneiderman, 1999). The activity was named after "Diary of Discovering Geometry" or Diary. The aim of the study was to explore factors affecting Malaysian secondary school students' readiness for OCL, especially for teaching and learning geometry.

Two objectives were formulated in this study:
(a) To explore and investigate the nature of students' interaction and participation in Diary or OCL.
(b) To investigate whether Diary was able to promote positive effects in cognitive and affective learning aspects as perceived by the students.

**CONSTRUCTIVIST LEARNING THROUGH ONLINE COLLABORATIVE LEARNING (OCL)**

Sociocultural constructivism is one aspect of constructivist view which emphasizes the socially and culturally situated context of cognition. Learning is viewed as a process of acculturation and thus the study of social, cultural processes and artefacts are central. For example, learning occurs as people participate in shared endeavours with others, with all playing active but often asymmetrical roles in sociocultural activities (Duffy & Cunningham, 1996). Research in conventional, classroom-based collaborative and cooperative learning has gained much attention for the past decades in the works undertaken by Johnson and Johnson (1996), Slavin (1995) and Kagan (1994). Findings show that collaborative and cooperative learning has significantly improved the overall academic achievements and interpersonal skills of the students.

In recent years, many researchers adopted computer, Internet or online technology as one of the key features to engage collaborative learning (Garrison & Anderson, 2003; Koshmann, 1996; Mclnnerney & Roberts, 2004; McConnell, 2000), in which Mclnnerney & Roberts (2004) quoted it as Online Collaborative Learning (OCL), which is also has the similar concept of Computer Supported Collaborative Learning (CSCL).

Working in small collaborative groups has social and academic benefits for children (Dillenbourg, 1999; Johnson & Johnson, 1999). Also, there is experimental evidence that under certain conditions, CSCL activities produce a significant increase in children's learning when compared with individual training (Dillenbourg, 1999). Computer has always been a helpful tool to facilitate collaborative learning apart from being a tool for construction, communication, records and publication. The recent research approach for CSCL is more on process oriented account and not just on finding how the independent variables interact with the outcomes of collaborative learning (Dillenbourg et al., 1996; Koschman, 1996). Dillenbourg et al. (1996) believe during collaboration with different interfaces, different computer-based tasks and activities may yield very different interactions and learning outcomes.

**EVALUATION ON ONLINE INTERACTION AND DISCOURSE**

Online discussion or computer conferencing is a common online learning activity. Alavi and Dufner (2005) found that individual students who acquired more motivation and enjoyment from online discussions reported higher perceptions of learning. They recommended that students be graded for their quality of participation and responses to others, as well as for their efforts of making new postings. Individual characteristic is considered as one of the input factor affecting online learning outcomes apart from other factors such as instructor characteristics, course or activity types, technology used, and the learning process (Benbunan-Fich et al., 2005). For individual characteristics, students need to have motivation to learn online, skills or knowledge, cognitive ability to perform in the subject matter and their learning styles are all relevant to affect their quality of interaction in online learning environments (Benbunana-Fich et al., 2005). Any subject can be learned partially or fully online as long as the learner has motivation to learn online (Harasim et al., 1996).

Apart from this, Cecez-Kecmanovic and Webb (2000) suggested that a deeper understanding regarding the "inside" of collaborative learning process is necessary for establishing a deeper insight in collaborative learning. For example, message flow analysis was used to perform simple frequency count on the number of messages posted within a timeframe (Ruberg et al., 1996; Waugh et al., 1988); message act analysis was used to identify the functions that each message is to accomplish or to analyze the speech acts (Levin et al., 1990; Ruberg et al., 1996).

 

Message act analysis was initially based on a system for classifying instructional speech acts developed by Mehan (1979). He explained that there is a fundamental interaction sequence called initiation, reply and evaluation (IRE) relevant to the conventional classrooms where teacher usually initiates, student replies and teacher evaluates in instructional session. Ruberg et al. (1996) used this analysis to analyze the functions in online discourse to trace the act of "Reply, Initiate and Evaluate" which enables researchers to create a message map, describing multiple threads of interwoven discussion.

Another phenomenon highlighted in adopting new technology such as online interaction, Fidler (1997) has mentioned about the characteristics of early adopters and early excitement of adopting new technology, which is a common phenomenon in technology adoption theory and this phenomenon, was also supported by Fishman (2000), who commented that in any computer-mediated communication project, it is predicted that there would be an initial peak of computer-mediated communication tools use early in each project cycle, followed by a gradual decrease in use until each project is concluded.

## ONLINE COLLABORATIVE LEARNING IN MALAYSIA

Since 1997, Malaysia has embarked on the Smart School Project that emphasizes on self-directed learning and thinking-based education through the use of ICT (Malaysia Ministry of Education, 1997). According to Jaafar and Samshir, (2004) more development policies or programs should be targeted on secondary school students because they are the key people to shape the productivity and confident usage of the ICT in the country. Zoraini (1998, 2001) believes that online collaborative learning (OCL) is able to contribute positively to the creation of smart learning environments and to develop teachers' professionalism in teaching by opening more interaction opportunities with other colleagues (or experts) locally or internationally. On the contrary, the number of studies focusing on OCL or online projects for secondary schools in Malaysia is limited (Muhammad Kamarul & Mohamed Amin, 2004).

Lee and Zulkifli (1999) found some problems when they conducted a network writing class with some international students in a school. Some key problems faced were: Lack of access to the Internet, constraints from school administration as the activity was regarded as not pertinent to the curriculum, difficulty in gauging and maintaining partners' commitment, and the unfamiliar used of graphical-based chatting software. These problems could be the reasons for hindering the adoption and development of OCL in schools.

## DIARY: A CASE STUDY ON OCL FOR GEOMETRY

The principle of "relate-create-donate" (Kearsley & Shneiderman, 1998) was adopted in Diary of Discovering Geometry (or Diary). Diary was intended to achieve the following learning objectives: (1) To explore the possibility of using the real or surrounding contents as rich resources for learning geometry, (2) To record and document students' learning experiences in electronic presentation, (3) To promote reflective thinking among learners based on their real-life observations, reading and thoughts about geometry. The scope of geometry content covered the basic concepts of geometry such as points, lines, planes and spaces in real life, and their attributes. Other concepts and applications including shapes, polygons, symmetry, tessellations, perimeter, area, angle and volume were also suggested as topics for exploration.

The participants were required to be in their small groups to clarify and verbalize their findings through observation and share their ideas through the exchange of electronic messages (to fulfil the "relate" principle). The participants were then grouped according to their specialization in different roles such as editors, PowerPoint author, graphic designers and translator, in order to produce digital presentations with images and written reports of their findings (to fulfil the "create" principle). These works were sent to all participants and an International project (ie IEARN, www.iearn.org) on "Connecting math with our lives" (to fulfil the "donate" principle). The main communication tools used were emails and online messages sent through Diary e-group system. See Figure 1a for the main interface for Diary and Figure 1b for its online exchange.

 


Figure 1a. Diary's Website showing weekly activities

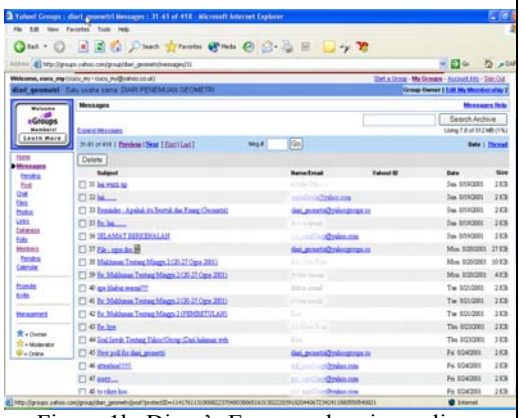

Figure 1b. Diary's E-group showing online interaction (messages)

## METHODS

### *Participants*

The participants involved were 32 students (23 males, 9 females), who had successfully subscribed to the Diary electronic group system or mailing list and continued participating the Diary until the end of the activity. Most of them (24 out of 34, 75%) were lower forms students, namely Form 1 (aged 13) and Form 2 (aged 14) students. A few upper secondary students (8 out of 32, 25%), namely Form 4 (aged 16) students were also invited to join Diary so that they could share their knowledge and guide their juniors in learning and exploring geometrical concepts and applications through the use of ICT. These participants were drawn from four schools based on the prescribed selection criteria, specifically, they must (1) be able to access the Internet either at home or at schools, (2) possesses a functional email address, (3) secure parental consent and (4) volunteer to participate in this activity. To protect their privacy and to avoid any possible biases, each of the participant was identified using a pseudonym such as 'S01', 'S02', ... in the analysis.

### *Instrumentation*

The following instruments were used for collecting data:

1) A project entry form was to collect the students' particulars before they start joining Diary. 2) Survey questionnaires for the beginning and post-Diary stage which contain questions related to the students' background information and various aspects on online collaboration. 3) Interview questions to collect students' feedback after participating Diary. 4) Emails and electronic messages posted to the electronic group. All emails and electronic messages related to Diary were recorded and analyzed. 5) Research journals were used to record the activities and the process of implementing Diary from the beginning until the ending stage.

The data collected were analyzed to descriptive data such as frequency, percentage, and were represented in chats. Qualitative data were also used to complement the quantitative findings.

### *Procedure*

Diary was conducted for six and half months in three stages, namely (1) The Beginning Stage, (2) The Ice-breaking Stage and finally (3) The Collaborative Stage. The progress and development of Diary project were observed and recorded in research journals. Electronic mails sent to the group and teacher coordinator were recorded. When the project was introduced in schools, project entry forms were given to each student and collected on the next day. After three weeks of exploration in the Beginning Stage, the students were asked to complete the questionnaires mainly covering on the problems faced in Diary and their suggestions to improve it.

 

After the Collaborative Stage, the students were interviewed via telephone at their preferred timeslot. They were asked to complete the Post-Diary questionnaires at their respective schools where demographics information and their feedback on their perceived knowledge acquisition and interest gained in geometry were collected. They also provided feedback on their learning outcomes.

**Data analysis and findings**

The statistical analysis revealed that 32 students had positive perception of the Diary. Majority of them agreed that Diary was useful (93.75%), easy to use (84.3%), important for learning (75%), interesting (78%) and well-managed (84%). By contrast, four students who perceived Diary as not important for their learning also perceived it to be not interesting.

The following are the types of analysis to analyze the participants' interaction and participation for Diary over a period of six and half months: Message flow analysis, individual participation, content analysis and message act analysis.

***Message Flow Analysis***

Figure 2 shows that the coordinator who initiated Diary and invited the students to join Diary was dominant in Diary postings. The coordinator briefed and updated the overall processes and progress of Diary and therefore posted most of the messages in Diary. The students sent a relatively small number of postings (75 postings) to Diary's mailing list compared to the coordinator's (145 postings). Overall, the students' participation in Diary was passive.

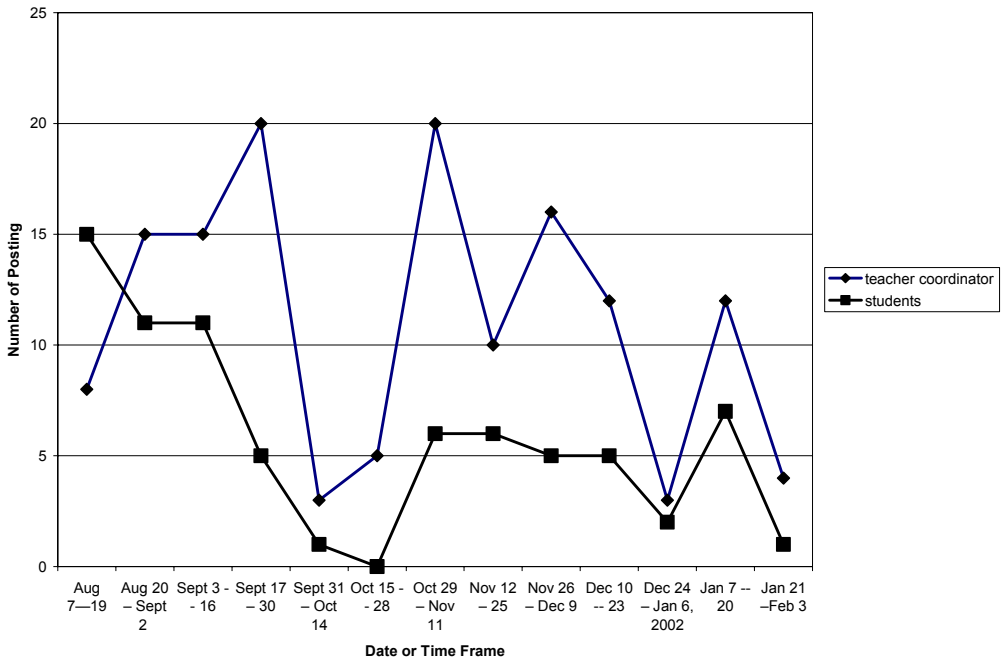


Figure 2. Message flow analysis for Diary

Based on Figure 2, most of the time, the flow of the messages posted by the coordinator and the students had a similar orientation. When the number of messages sent by the coordinator increased, the messages sent by the students would also increase, and vice versa.

At the Beginning Stage (middle of August), there were more messages sent by the students. The students had more interest (excitement) to know the topic on "Ice-breaking" by posting their particulars to the mailing list. They also asked some questions on Diary in order to get to know more details about this activity (see Figure 3). However, their participation declined towards October. During the Collaboration stage, the flow of students' messages became more consistent from November onwards. During this period, only those who were committed in Diary continued to show their responses in the final stage, they consistently posted some messages in Diary's

 

mailing list during this stage. To generalise, Diary's message flow was quite consistent with the norm of online project cycles as reported in the literature.

In general, the message flow showed that the motivation level of participating in Diary decreased with time (see Figure 2, August 7–19 to October 15-28) but increased when the field trip was initiated in October. This reflected that attractive activities were able to increase the level of students' motivation in OCL environment.

***Individual Participation***

The active and moderately active students were identified. The two active students were S23 and S24; the moderately active students were S08, S31, S29, S27, and S16. However, S16 withdrew from Diary at Collaborative Stage due to health problem. These students were interviewed after Diary and their postings were analyzed. Some personal traits were identified, particularly on their attitudes of learning and their interpersonal skills. For their learning attitudes, they have the following attributes:

1) These students had a higher sense of responsibility for Diary compared to the passive ones. They wanted to know more about Diary and their tasks in Diary so that they were able to plan and manage their time. For example, S29 took some time to decide whether to join Diary as he perceived this activity needed commitment from him. On the other hand, S23 usually had difficulties to access the Internet as he did not have the access at home, he voluntarily provided his phone numbers and his schedule during school holidays (as he worked part-time during school holiday) in case he was needed for Diary project. He also asked S24 to update him the progress of Diary. These students showed their responsibility by suggesting their roles in Collaborative Stage. S24 volunteered to be the editor or proof reader for PowerPoint slides, and his younger brother, S27 volunteered to help him. S08 volunteered to be the translator from local to English language, S29 volunteered to do the graphics for Diary and S23 agreed to become the editor for Diary.

2) They were more proactive to initiate and provide suggestions for Diary project. S23 suggested that some of the members needed to jumpstart the Diary project without waiting for others. He had a pragmatic personality and he preferred to do the project rather than merely talk. S24 initiated a chat channel in IRC for Diary Geometry as he felt that online chat was useful. S29 and S08 volunteered to join Diary by sending emails to the coordinator to express their interest in Diary. Their active participations were an indication of their leadership skills. One of them was a school prefect and the other was a school librarian. In contrast, the passive students were merely followers and most of them, did not hold any position in their schools.

3) They were problem solvers. Even though they faced obstacles in Diary, such as computer problems, time constraint, Internet access and lack of responses from other participants, they tried to solve these problems on their own. For example, S23 expressed that he did not want to give much excuses but wanted to complete the task for Diary and he wanted to see the output of this collaboration.

In terms of interpersonal skills, this group of students was more expressive through responding and providing feedback to others. In fact, S23, S24 and S29 complained that Diary was inactive due to passive responses from others. Hence, they initiated the idea for conducting chatting among the partners and interpreted as "Hye all", "hope everyone fine there…", "OK how's everyone there", "I am waiting", and "I hope you are clear on my message" .

***Content Analysis***

Table 1 lists the types of contents and their examples posted by students in Diary mailing list meanwhile Figure 3 shows the occurrence of these contents in Diary.

Table 1. Types of contents sent to Diary Mailing List

| Types of contents | Example of this content (Direct quotation from the messages) |
|---|---|
| C1 – Q & A about Diary | *I am S01 from School [C]. I faced problem to activate the left button in e-group program (Translated from local language).* |
| C2 – Project coordination | *Teacher, I hope you will send invitation email to:xxxx@yahoo.com because we are not able to join this group.* |
| C3- Geometry and mathematics | *hi...i think i would like to try to solve this just for fun problem...okay lets make it.. vase A has 5 litres in it and vase B has 3 litres in it.. why don't vase A pour 1 litre into Vase B...* |
| C4 – Socialization | *Hi & a'kum all! I wish u all gotta nice day. I am from [school D] would like 2 intro my self 2 ya ...* |

| | |
|---|---|
| C5 - Field trip arrangements and coordination | *...For your information, during PMR exam, we must take the year end examination, so how do we able to join the trip. Hopefully teacher is able to ..* |
| C6 – International project – "Connecting math with our lives" | *...Attached is a photograph of a cultural display of my country men - a man dressed in female costume standing on a Stilt .... We are interested in investigating and telling you the mathematics involved.* |
| C7 – others | *Blank messages sent by S16.* |

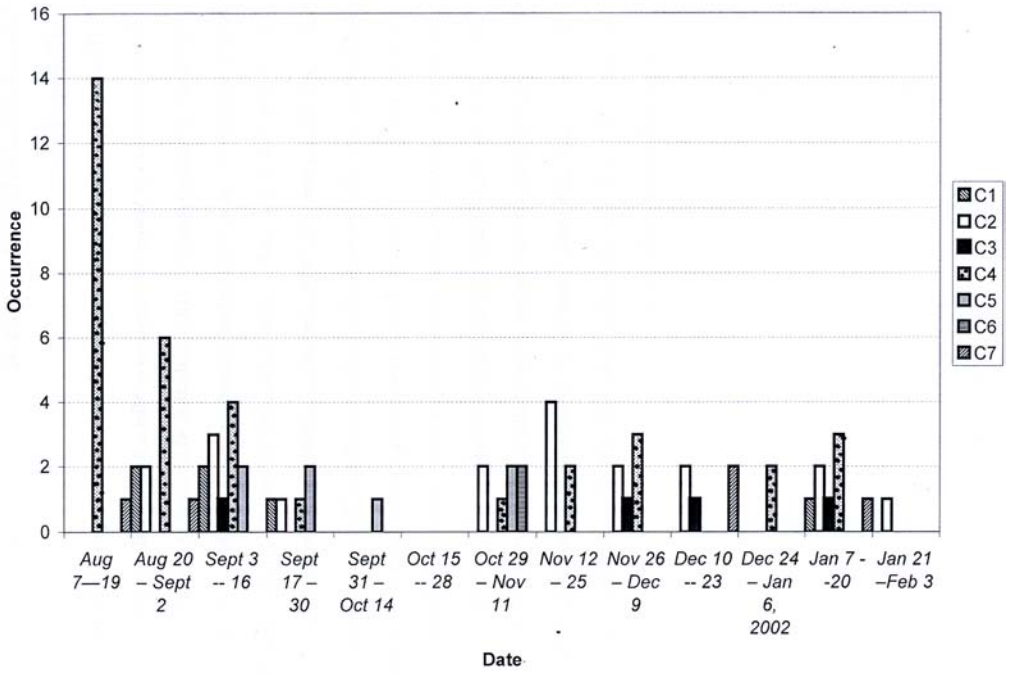


Figure 3. Content analysis of the messages sent by students

During the initial stage, C4 (socialization contents) dominated the online discourse for Diary as shown in Figure 3. The content related to geometry (or Mathematics) was not frequently posted although the coordinator had posted many messages to encourage discussions, especially during the school holidays in December. On the other hand, based on the students' posting (see Figure 3), there was no difference in terms of the number of posting in December with other months. Hence, school holiday was not a factor to increase the students' participation in Diary.

***Message Act Analysis***

The 75 messages sent to Diary mailing list (see Figure 1) were analyzed based on speech act, Initiate-Reply-Evaluate (IRE) sequence (Levin et al., 1990). In this context, "initiate" means students' initiated or suggested some opinions or questions to find out something related to Diary project (e.g. S24 initiated chat channel in mIRC for Diary). "Reply" requires the information to be responded directly to the requester. This information usually has less depth and substance to communicate further. "Evaluate" on the other hand means to analyze some matters or questions by giving their own analysis or interpretation.

Table 2 shows the percentage (%) of the occurrence of IRE sequence in the messages sent by the students to Diary mailing list. Some of the messages contain more than one type of message act. The total acts were 83:

Table 2. Percentage of the occurrence of IRE

| Act Sequence | Occurrence in Diary* | Percentage |
|---|---|---|
| I (Initiation) | 31 | 37% |
| R (Reply) | 48 | 58% |
| E (Evaluation) | 4 | 5% |

*Total occurrence of IRE = 83 in 75 messages.

The findings showed that "Reply" was the major act followed by the "Initiate" act. Most of the time, the students replied to the coordinator, especially at the early stage. The "evaluate" act has the least occurrence as the students needed to practice higher order thinking skills and longer time was spent for this act.

***Perceived Effects of Diary- Cognitive Learning Aspect***

During post-Diary interviews, those who expressed that they learnt geometry were asked to elaborate further about their learning gained. Surprisingly, most of them were not able to provide their answers in a greater detail even though geometry definition was posted on the Diary website and sent out to the mailing list a few during the course of Diary. They described geometry as "drawing", "is the study of lines or angles and shapes". However, one positive note about Diary is, many of them expressed that they were able to relate geometry to real life applications. S09 for example interpreted geometrical shapes through buildings and some artefacts in real life. S32 expressed that geometry was about the shape and the appearance of things that can be observed from the surroundings and S25 realized that geometry concept was not only limited to buildings, it can be extended to the natural beings.

Another aspect of cognitive learning was to investigate whether student-centred learning and active learning had taken place in Diary. In this case, data gathered from research journals, students' correspondence with the coordinator, and interview transcripts were analyzed. The findings provided substantial evidence that teacher-centred learning was more prominent than student-centred learning. This was inferred from the following observations:

1) The teacher coordinator sent most of the messages in Diary mailing list (See Figure 1). The coordinator posted numerous messages and tried to initiate more ideas or exchange of ideas related to geometry and mathematics, but received low responses from the students.
2) Although the students were encouraged to contribute ideas for the Diary's electronic presentation, they tended to accept opinions, to become followers rather than initiators. In fact, very few of them responded to the research questions or problems related to geometry (refer to C3 in Figure 3). Respondent S23 and S30, who were active earlier, however tended to wait for instruction by expressing "...please tell us what to do; we will do it without delay" and "...I am not good in giving suggestions...I will follow what has been done by others..." Respondent S25 felt shy and preferred her friends as companion to join Diary. Overall, the students felt more comfortable to follow rather than to initiate.

***Perceived Effects of Diary – Affective Learning Aspect***

Data from the interviews and post-Diary survey informed the following feedback from the students: 1) they learnt and gained experiences in using computers and the Internet through Diary. 2) Diary was able to promote sharing of knowledge among the participants. The frequency count of the agreement on these two items showed a strong agreement on both items (34% strongly agreed and 59% agreed, total: 93%). On another statement, "Diary has increased my interest towards geometry", 16% of them strongly agreed and 62% agreed (total: 78%). Overall, a majority of the participants had shown positive perception towards Diary in affective learning domain.

**DISCUSSIONS**

The major purpose of this exploration is to observe whether constructivist learning environment was able to be created through Diary, using the principles of Create-Relate-Donate (Kearley & Shneidermann, 1998), via online collaborative learning environment.

The overall results show that even though there were indications of positive perception of Diary from the students (such as perceived it as useful, interesting, promote knowledge sharing and increased their perceived interest in geometry and computer). However, the students' overall geometry knowledge gained in this study was minimal which they were not able: 1) to demonstrate through online discussion, online project submission and interviews that they learnt geometry, 2) to define the meaning of geometry, 3) to observe and report critically what kind of geometry concepts (shapes, areas, symmetry, etc) were used in their surrounding. These could be due to their overall participation and interaction in Diary was low or passive.

Only several students were active and moderately active. Relatively, a majority of the exchanged messages were categorized as administrative purposes and on socialization matter; all of these did not prove the learning of geometry.

Apart from these, two phenomena were also observed to explain the process of Diary:

 

1) Early excitement of using OCL technology was observed from the message flow analysis. However, the excitement decreased over time (Fidler, 1997; Fishman, 2000). In addition, efforts to boost and maintain the students' motivation in online collaborative learning are not easy. The initial peak of OCL or online project will be over. To maintain continuous participation, attractive and suitable activities should be introduced to the participants. In Diary, this was demonstrated by introducing field trip which was able to draw interest from the participants.
2) Individual motivation and their personal quality do affect the process or outcomes of online projects. This was also supported by the literature of the importance of individual's motivation in online learning (Harasim et al., 1996; Benbunan-Fich et al., 2005). In Diary, only those who were responsible committed and have shown positive interpersonal skills were positively reacted in Diary.

The implication of these findings informed the critical aspect to design OCL activities which were able to gain interest from the target learners and also to educate more students to have motivation in constructivist and exploratory kind of learning activity and of course to have better interpersonal skills to communicate with peers. In addition, the provision of a conductive learning environment to support online learning activity is also vital to ensure active participation in online project. This can be explained in the following section.

***Contextual Factors***
In order to bring an innovation to scale, it is important as the first step to understand how the innovations are adopted in local contexts (Fishman, 2000). Hence, it is recommended that if online tools are going to be used by students, there must be a good fit with the teacher's intentions, perceptions, and actions with respect to classroom culture.

There were some contextual factors affecting the process and the results of this activity. In Malaysian secondary school education, traditionally, in classroom learning environment, students are usually teacher- and examination-centric, focusing on summative assessment (Yaakop, E., 2002). Activities involving students' exploration on network writing was considered as not pertinent to curriculum (Lee & Zulkifli, 1999).

Diary was designed to be learner-centred, constructivist learning environment through the principles of relate-create-donate. However, the learning process that took place was evidently teacher-centric where most participants were passive rather than active. Students were merely being reactive, responding or reacting only to teachers' postings rather than being pro-active to initiate project ideas as encouraged by the coordinator.

***Educational Reform***
Through the Smart School Project, Malaysian secondary schools are going through educational reform to promote active and self-directed learning among the school students through the use of ICT (Malaysia MoE, 1997). In this transition period, it is not surprising to find out that Diary was not able to completely change the learning environment to a more student-centric paradigm. Apparently, more time is needed for students to adapt to online learning environment. However, more importantly, the overall educational setting and all parties who are involved in school education such as the Ministry, schools, teachers, school culture and parents should prepare and commit in any form of educational reform through technology.

The change from teacher- to learner-centric environment is a complex undertaking involving many aspects of educational system such as the contents, the curriculum, the teachers' belief and their instructional skills. Ibrahim (1994) suggested that teachers should play an important role before changing their instructional methods because there is a strong relationship between teachers' beliefs in mathematics and mathematics education with their instructional methods. Lee (1999) reminded that the changes brought by the technology should not be regarded as irritating or a threat in education. On the contrary, it needs to be viewed as ways to improve education. OCL can become an agent of change provided that all parties involved in the educational system are able to play their roles to inculcate constructivist education.

***Limitation***
Diary was introduced in schools as a case study to evaluate the acceptance of the students towards this mode of learning and how they react in this learning environment. While Diary has the ability to offer many positive learning experiences such as the opportunity to learn from others and to handle computers and the Internet, it is still bounded with a few limitations. These include (a) low participation of the students as Diary was not adopted as a compulsory activity for classes, it was introduced as an enrichment activity for their after school activity, and they volunteered to join it (as withdrawal was allowed); (b) possible biases of the teacher coordinator who

 

was also one of the authors of this study, and (c) small sample size prohibiting generalization to student population at large.

***Recommendation***

Based on the findings, the following are some recommendation: 1) Further research on OCL by using different activity and approach to investigate the effects of OCL in different settings; 2) The need to inculcate the right attitudes towards OCL should not only be confined to students but also to teachers, principals, ministry and parents, so that the educational culture can be geared towards a constructivist based teaching and learning environment through the use of online collaborative technologies; 3) Diary or OCL should be integrated in classroom learning and should be supported by principals and teachers in schools.

## CONCLUSION

This study use Engagement Theory for designing a pedagogical sound learning activity through OCL. Several evaluation methods were carried out to evaluate this activity. Diary was able to draw positive perception from the students. However, in order to gain the most out of OCL as another form of instructional strategy for classroom-based activity or for any open-based educational program, the students need to be more pro-active, expressive and committed in the program. The success (or failure) of OCL is depending on the students' attitudes and their participations. The activities introduced in OCL must be attractive, useful and important to them, or able to complement their existing learning activities in school.

For the participants who were involved in this study, they should be trained for expressing ideas confidently without feeling shy to make mistake and also to have better interpersonal skills to deal with people and to work with others. This should be supported by the educational system and culture to seriously promote constructivist learning environment be in it in classroom or outside classroom such as through OCL.

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# AN INVESTIGATION OF FACTORS RELATED TO SELF-EFFICACY FOR JAVA PROGRAMMING AMONG ENGINEERING STUDENTS

Petek ASKAR
Department of Computer Education and Instructional Technology, Faculty of Education, Hacettepe University, Beytepe, 06530,Ankara, Turkey
paskar@hacettepe.edu.tr

David DAVENPORT
Department of Computer Engineering, Faculty of Engineering, Bilkent University, 06530, Ankara, Turkey
david@bilkent.edu.tr

**ABSTRACT**
The purpose of this study was to examine the factors related to self-efficacy for Java programming among first year engineering students. An instrument assessing Java programming self-efficacy was developed from the computer programming self-efficacy scale of Ramalingam & Wiedenbeck. The instrument was administered at the beginning of the course via Internet with a questionnaire concerning gender, department, computer skills, computer experience, frequency of computer use and family background. Results indicated that self-efficacy of males were stonger than females, 11. 8 % of the variance in self-efficacy was explained by computer experience, the correlation coefficient calculated with the regression factor score of computer skills and self-efficacy scores was statistically significant. In addition siblings use of computers was significant and the mother's role was critical.

**KEYWORDS:** Gender studies, programming , higher education, engineering students, self-efficacy

## 1. INTRODUCTION

Self-efficacy theory has emerged as an important means of understanding and predicting a person's performance. Bandura defined perceived self-efficacy as "...people's judgements of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p.391). Self-efficacy mediates between an individual's knowledge and their actions. "Knowledge, skill, and prior attainments are often poor predictors of subsequent attainments because the beliefs that individuals hold about their abilities and about the outcome of their efforts powerfully influence the ways they will behave" (Pajares, 1996). In other words, one may possess the necessary knowledge or skills needed to perform a particular task, but still not succeed owing to self-doubt, lack of motivation, or other contextual factors. Self-efficacy, then, is a measure of an individual's belief in their ability to act successfully in a particular context. As such, it exercises a powerful influence over what an individual chooses to do and the courses of action they pursue.

Self-efficacy is especially important, and potentially useful, when the context relates to education. This is because the theory recognises also that an individual's actual performance influences their self-efficacy, and hence can affect any future performances. Thus learners with high self-efficacy are more likely to undertake challenging tasks and to expend considerably greater effort to complete them in the face of unexpected difficulties, than those with lower self-efficacy. Moreover, the learning achievements that result, particularly in the face of adversity, lead naturally to improvements in the individual's self-efficacy, and so, potentially, to further successes in the future. In contrast, those with low self-efficacy tend to view tasks as being more difficult than they really are and consequently may experience stress, depression and adopt such a narrow vision of a problem as to be unable to solve it. They are thus less likely to persevere or to seek out new opportunities for learning.

Theory suggests that individuals base their self-efficacy beliefs on four sources of information, 1) personal experience of the skill, 2) vicarious experience –seeing people similar to oneself perform the skill, 3) verbal persuasion, and 4) somatic and emotional states –fear, stress, also fatigue, aches & pains, etc. Research by Bandura (1986) showed that efficacy perceptions develop gradually with the attainment of skills and experience.. Individuals form their self-efficacy beliefs by interpreting information primarily from their previous experience (Bandura, 1994, 1995) . In addition to mastery experience, self-efficacy appraisals are partly influenced by vicarious experience of observing others perform similar tasks.

Most researchers have explored the relationship among academic performance, self-efficacy and demographical variables on different fields. Computer self-efficacy is one of them which has attracted several researchers from a variety of disciplines ( Albion, 2001; Askar and Umay, 2001;Delcourt and Kinzie, 1993; Karsten and Roth, 1998, Compeau and Higgins, 1995; Kurbanoglu, 2003, Usluel, 2007).

 

Despite this, surprisingly little attention has been paid to its role in the acquisition of computer programming skills. Ramalingam & Wiedenbeck (1998) developed and validated a self-efficacy scale for the C++ language programming. Their results using this scale seem to support the applicability of self-efficacy to C++ programming. They found that the self-efficacy of males and females did not differ substantially in practical terms. Female self-efficacy scores were found to be significantly lower than those of males, even after 12 weeks of instruction, however, the difference was small accounting for only 2% of the variance. They explained this by noting that the female students in their study were self-selected and probably had better maths skills and more computer experience than average. Since such abilities are assumed to be highly relevant to the acquisition of computer programming skills, the lack of practical difference was perhaps not surprising. Of more importance was their observation of a general increase in self-efficacy on the post-instruction measure, independent of gender, but with the greatest gains seen in those with lower initial self-efficacy scores. This is in line with theory, which suggests that the self-efficacy of beginning students is highly responsive to performance accomplishments in the early stages of skill acquisition.

In another study (Ramalingam, V., La Belle, D. and Wiedenbeck, S 2004), the researchers investigated the effects of self-efficacy and mental models of programming. The results showed that self-efficacy for programming influenced by previous programming experience.
This study aims to understand the factors related to some aspects of personal experience of the skill and vicarious experience which account for the variability in the perceived self-efficacy within the context of computer programming.

Given the huge global demand for computer literate engineers, it is vital to understand what factors influence an individual's choice of computing as a profession and subsequently affect their ability to acquire computer programming skills. Nowadays, computer programming is a common, often mandatory part, of an undergraduate engineering education. Yet, in contrast to subjects such as maths and physics, students tend to perceive programming courses as being somewhat difficult. In part, this is undoubtedly due to unfamiliarity with the subject, since computing (unlike maths and physics) has not traditionally been part of the high school curriculum. But in spite of the fact that students are increasingly likely to have had prior exposure to computers both at home and school –albeit generally as a tool for writing reports, communicating with friends or simply playing games, rather than as something that they can program to perform new tasks– such negative perceptions seem to persist. This initial study thus focuses on the relationship between programming self-efficacy beliefs and other variables (including gender, family issues, subject/department choice, prior computing skills, and frequency of computer use). The study, of university-level engineering students, concentrates on the factors that determine an individual's self-efficacy beliefs rather than their effects on performance.

## 2. METHOD

A group of freshmen engineering students enrolled on an introductory Java computer programming course, were asked to complete a questionaire and a self-efficacy scale at the very beginning of the course. The resulting data were used to investigate the following research questions, which form the core of the study:

1) Is there a significant difference between female and male students' self-efficacy for Java programing?
2) Are there significant differences in self-efficacy of Java programing students from the various engineering departments?
3) How do prior computing skills & frequency of computer use affect self-efficacy beliefs?
4) How does family (mother, father, & sibling) usage of computers affect self-efficacy beliefs?

### 2. 1 Participants

The subjects in this study were 326 engineering and science students, (200 first year students from the computer, electronics, and industrial engineering departments, and 20 first year science students, all of whom were enrolled in an introductory Java programming course, plus 106 second, third and fourth year computer engineering students who volunteered to take part.) All students completed the self-efficacy scale and returned demographic data including gender, age, department, family issues, years of computer experience, and skills at computer usage.

All the participants were students at Bilkent University, in Ankara, Turkey. As such, they should be considered very good academically, having achieved scores within the top 3 % of the national university entrance examination (taken annually by some 1.5 million students!) All instruction at Bilkent is in English, and students are required to pass a English language proficiency exam prior to entering their departments. Computer programming is a required course for all engineering students.

 

### 2.3 Instrumentation

An instrument assessing Java programming self-efficacy JPSES was developed from the computer programming self-efficacy scale of Ramalingam & Wiedenbeck (1998). The overall reliability of the self-efficacy scores for their C++ scale was 0.98. The corrected item-total correlations ranged between 0.5 and 0.84. The new scale for Java Programming consisted of 32 items and the reliability of the scores was 0.99 (taken across all 326 students). The scale, which was in English, is giveb in Appedix 1. The participants were given instructions to: "*Rate your confidence in doing the following Java programming related tasks using a scale of 1 (not all confident) to 7 (absolutely confident).*" In addition to the scale, a questionnaire for collecting information related to gender, department, prior computer experience, computer skills and family computer usage was prepared and delivered to the students via the Internet.

## 3. RESULTS

Analysis of variance, principal components and regression analysis were undertaken using SPSS to investigate any relationship among self-efficacy for Java programming and the other variables obtained from the questionnaire. The overall self-efficacy scores were used in the analyses.

Table 1: Mean and SD of Self-Efficacy Scores according to Gender and Deparment of the Freshman

| | N | Mean | SD |
|---|---|---|---|
| Gender | | | |
| Female | 42 | 43,64 | 20,24 |
| Male | 167 | 74,05 | 52,57 |
| Deparment | | | |
| Industrial Engineering | 58 | 52,17 | 33,83 |
| Electrical-Electronics En. | 67 | 69,76 | 45,97 |
| Computer Engineering | 75 | 74,73 | 58,65 |

### 3. 1 Gender Issues

Means and standard deviations of the self-efficacy scores of female and male student are given in Table 1. There was a significant difference between males and females with regard to the self-efficacy for Java programming. (t=5.929, p=0.00) with the self-efficacy of males being higher than that of females.

### 3. 2 Department

The main effect of department was significant. ( $F(2;303)=44.185$, $p<0.01$ ) The multiple comparison analysis showed that computer engineering students' self-efficacy scores were significantly higher than that of students from the other engineering departments.

### 3. 3 Computer Experience

Simple Regression analysis revealed that the number of years of experience a student had with computers had a significant linear contribution to their self-efficacy scores. ( $R= 0.344$, $F(1,304)=40.682$, $p<0.001$). Indeed 11.8 % of the variance in self-efficacy was explained by the number of years of computer experience a student had. As the computer experience increases there is a tendency to gain self-efficacy in programming.

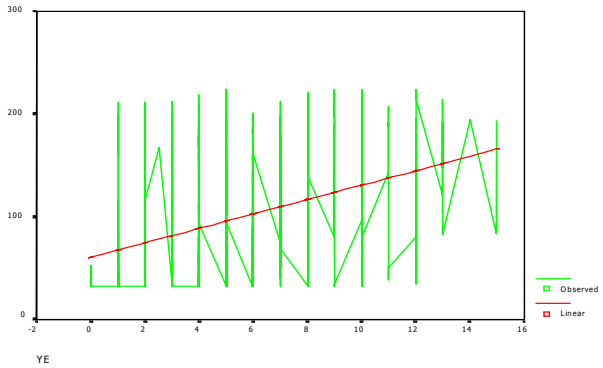


Figure 1. Linear curve fit x= years of experience, y= self-efficacy scores

### 3.4 Computing Skills

Computer skills were measured on chat, e-mail, word-proceesing, spreadsheet, powerpoint, web-design, databases and programming. The principal component analysis revealed only one factor with an eigen value higher than 1. The factor loadings were ranged between 0.54 (skill in chat), and 0.802 (skill in word-processing).

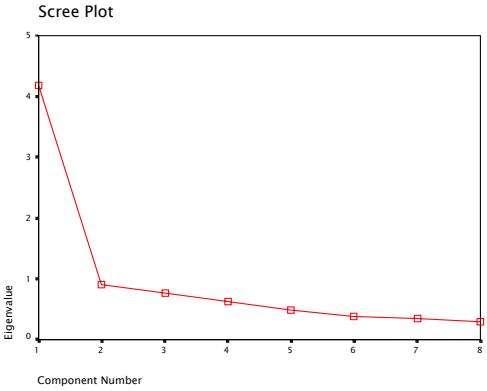


Figure 2: Scree Plot of Computer Skills

The correlation coefficient calculated with the regression factor score and self-efficacy score was statistically significant (r=0.592, p<0.01).

Table 2: Factor loadings on the first factor ( Principal Component Analysis)

| Skill in Computers | Factor loadings on Component 1 |
|---|---|
| Chat | 0,535 |
| E-mail | 0,746 |
| Word processing | 0,802 |
| Spreadsheet | 0,679 |
| Presentation | 0,781 |
| Data-bases | 0,741 |
| Internet | 0,758 |
| Programming | 0,703 |

### 3.5 Frequency of Computer Use

Significant differences were found between the students who used computers everyday and those who used them only a few times in a week ( t=8,216, p<0.01; with the more frequent users having higher self-efficacy scores ( means are 109,66 and 57,40 respectively).

### 3.6 Family Computer Usage

Table 3: Self-efficacy Scores According to Family Computer Use

| | N | Mean | SD |
|---|---|---|---|
| Mother | | | |
| Using | 29 | 86,45 | 60,89 |
| Not Using | 180 | 64,96 | 46,86 |
| Father | | | |
| Using | 78 | 67,76 | 50,28 |
| Not Using | 131 | 68,05 | 48,98 |
| Sibling | | | |
| Using | 139 | 73,29 | 52,96 |
| Not Using | 70 | 57,31 | 39,50 |

The self-efficacy scores of the students who reported that their mothers used computers were significantly higher than those students whose mothers did not use computers (t= 2.196, p=0.029). In addition, the students whose brother or sisters used computers got statistically higher self-efficacy scores than students who reported

 

that their siblings did not use computers (t=2.452, p=0.015). On the other hand, no statistically significant differences were observed between the self-efficacy scores of the students whose fathers used computers and those who didn't (t=0.042, p=0.967). Overall, the highest self-efficacy scores was clearly that of the mother's computer use.

**4. DISCUSSION AND CONCLUSION**

Since its emergence as part of Bandura's Social Cognitive Theory in the late 1970's, self-efficacy has been the subject of considerable interest amongst education researchers. Because self-efficacy is based on self-perceptions regarding particular behaviors, the construct is considered to be situation specific or domain sensitive. That is, an individual may exhibit high levels of self-efficacy within one domain while exhibiting low levels within another domain (Cassidy and Eachus, 1998).

This initial study thus focuses on the relationship between programming self-efficacy beliefs and gender, family issues, subject/department choice, prior computing skills, and frequency of computer use. The study, of university-level engineering students, concentrates on the factors that determine an individual's self-efficacy beliefs rather than their effects on performance.

Our results indicated that female students had significantly lower initial self-efficacy beliefs compared with those of their male peers. In our case all students were required to take the course, but it may be considered similar to Ramalingam & Wiedenbeck's study since all students entering the engineering departments have extremely high scores on the university entrance exam indicating very good mathematical & analytic skills. In this sense, they may even be considered gifted students and previous studies have shown that gifted girls in particular are prone to underestimate their self-efficacy (compared with the more normal overestimation of ability seen in most youngsters.)

One of the major areas of self-efficacy research in academic settings has been to explore its link with subject/career choice. Our results seem to confirm such a link, the computer engineering students recording higher self-efficacy for computer programming (their chosen major) than those who selected electronics or industrial engineering. On the other hand, the self-efficacy scores of all the students was markedly low. This is probably a result of two factors. First, as intimated previously, few students have any background in programming and are thus being forced to base their beliefs on other factors (especially their maths ability and prior computer usage.) Secondly, students in Turkey often select their major subject area on the basis of social and family pressures, departments being chosen simply on the basis of the score achieved in the university entrance exam, without any real notion of what the subject might involve.

Our study found a relatively high correlation of 0.59 between self-efficacy beliefs and prior (non-programming) experience with computers. The frequency of computer use also produced improved self-efficacy although the overall scores were still quite low. As noted above, this may be due to a number of factors, in particular, the fact that students are being forced to make judgements without direct prior experience and thus have to extrapolate from experiences they see as possibly relevant into a new unknown domain.

Perhaps the most interesting aspect of our study relates to the effects of computer use by family members on student self-efficacy scores. Whilst the father appears to have practically no influence, and siblings usage is certainly significant, the mother's role is especially valuable. We may explain this by assuming that mothers are generally viewed by their offspring as being equal or less technologically literate than they are. In this case, the mothers are effectively peers and so the result is probably in line with the theory which views only those of equal or less ability as relevant to ones beliefs. In contrast, the fathers knowledge/competence has little relation to their skill acquisition since they do not so relate.

Overall, our initial results appear to confirm the relevance of self-efficacy to the acquisition of Java programming skills and are in line with Bandura's theory. Clearly, there is a need for further detailed investigations, particularly of the family influences.

 

**Appendix 1.**
Java Programming Self-Efficacy Scale

Rate your confidence in doing the following Java programming related tasks using a scale of 1 (not at all confident) to 7 (absolutely confident). **If a specific term or task is totally unfamiliar to you, please mark 1.**

| Not confident at all | Mostly not confident | Slightly confident | 50/50 | Fairly confident | Mostly confident | Absolutely confident |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

1. I could write syntactically correct **Java** statements. _____
2. I could understand the language structure of **Java** and the usage of the reserved words. _____
3. I could write logically correct blocks of code using **Java** _____
4. I could write a **Java** program that displays a greeting message. _____
5. I could write a **Java** program that computes the average of three numbers. _____
6. I could write a **Java** program that computes the average of any given number of numbers. _____
7. I could use built-in functions that are available in the various Java **applets**.. _____
8. I could build my own **Java applets**. _____
9. I could write a small Java program given a small problem that is familiar to me.
10. I could write a reasonably sized Java program that can solve a problem this is only vaguely familiar to me. _____
11. I could write a long and complex Java program to solve any given problem as long as the specifications are clearly defined. _____
12. I could organize and design my program in a modular manner. _____
13. I could understand the object-oriented paradigm. _____
14. I could identify the objects in the problem domain and could declare, define, and use them. _____
15. I could make use of a pre-written function, given a clearly labeled declaration of the function. _____
16. I could make use of a class that is already defined, given a clearly labeled declaration of the class. _____
17. I could debug (correct all the errors) a long and complex program that I had written and make it work. _____
18. I could comprehend a long, complex multi-file program. _____
19. I could complete a programming project if someone showed me how to solve the problem first. _____
20. I could complete a programming project if I had only the language reference manual for help. _____
21. I could complete a programming project if I could call someone for help if I got stuck. _____
22. I could complete a programming project once someone else helped me get started. _____
23. I could complete a programming project if I had a lot of time to complete the program. _____
24. I could complete a programming project if I had just the built-in help facility for assistance. _____
25. While working on a programming project, if I got stuck at a point I could find ways of overcoming the problem. _____
26. I could come up with a suitable strategy for a given programming project in a short time. _____
27. I could manage my time efficiently if I had a pressing deadline on a programming project. _____
28. I could mentally trace through the execution of a long, complex multi-file program given to me. _____
29. I could rewrite lengthy and confusing portions of code to be more readable and clear. _____
30. I could find a way to concentrate on my program, even when there were many distractors around me. _____
31. I could find ways of motivating myself to program, even if the problem area was of no interest to me. _____
32. I could write a program that someone else could comprehend and add features to at a later date. _____

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# HOW DOES STUDENT ABILITY AND SELF-EFFICACY AFFECT THE USAGE OF COMPUTER TECHNOLOGY?

Prof. Dr. Aytekin İŞMAN
Sakarya University

Gülsün Ersoy ÇELIKLI
Eastern Mediterranean University

**ABSTRACT**
The main aim of this research was to find out the self-efficacy level among participant students and analyze their beliefs. This study showed that male students are more confident comparing to female student, similar to research of Bimer (2000), the computer usage has been known as biased toward the interests and fashion of men, this research also showed that females are not as confident as men are to computers. Awoleye & Siyanbola (2005), Bimer (2000), indicated that computers have some gendered attributes that favor man in some way so that men are more likely to use computers and they are more confident. Therefore it can be said that many studies has been support the gender factor in self-efficacy, but this research also showed that this changes are more likely to be depend on the complexity of the task and the year of computer usage of the particular student as Busch(1995) has been found the similar results. Similar to the study of Compeau, and Higging (1995), it is found that self-efficacy shapes the individuals beliefs and behaviors as well. It is not surprising to find out that students have different computer levels and this affects their self-efficacy. Also some students have advance computer knowledge, therefore they complain about the level of the computer courses offered to them. In addition to this it can be said that students with different computer skills shows different self-efficacy levels as well.

**INTRODUCTION**
Computer technology is involved in many aspects of our daily lives. In universities teachers' expectations from students about their computer abilities has been increasing. Most of the teachers do not accept hand written projects, they usually prefer presentations prepared on computers, and they also expect their students to do further studies, comparisons of their subject with different authors results. Basically all departments at Eastern Mediterranean University, Faculty of Education, has basic computer literacy courses given to their students in order to provide equal opportunities to all their students to gain the ability of efficient computer usage for their projects, and presentations. On the other hand as much as university intention to help students to gain computer abilities, the students self-efficacy is also important to be able to apply what they have learned to real situations.

**THE AIM OF RESEARCH**
This study is about the students' self-efficacy to use computers. Usually project based assignment need, further research about subjects and there is a need for computer to be used to do researches about the subject, to type the project, or to do presentations, or both. The students' self-efficacy to use computer beneficially as a tool can be a matter of discussion in the universities, where it can be considered that students need this technology more than their previous level of studies. The main problem is that many students can not efficiently benefit from computers, for some students it is an extra work to involve computers in their assignments. For this reason this project aim is to measure the student's self-efficacies or levels of using computers beneficially.
There are 4 research questions that this paper answers;

1- What is the student's self-efficacy level at Eastern Mediterranean University (EMU), faculty of education?
2- Is there a difference about computer self-efficacy based on the years of computer usage?
3- Is there a difference about computer self-efficacy based on gender?
4- Is there a difference about compute self-efficacy based on having computer at home?

**IMPORTANCE OF THE RESEARCH**
The results of this study might be so surprising; there are many students at the EMU , who have very poor computer abilities. Even though all the departments are offering computer courses, mostly in their first years of study, students still face with difficulties to improve and transfer their knowledge to the next levels. Most of the students still have difficulties preparing presentations by using computers, or even typing their reports efficiently by using computer. The importance of this study is that it focused to investigate where students have problems about their computer self-efficacy or if they have any problems at all as it is observed by instructors. The suggested reason for poor computer abilities in this study is that, since students are so much focused on their major area of their studies, they don't put much effort to learn maximum from their computer courses. This leads most of them to face lack of computer usage knowledge and poor abilities to use it as a tool for their assignments.

 

**RELATED RESEARCHES**

Information is the human beings unsatisfied hunger since ages. It always exists and human being never stopped seeking for more of it. Knowledge become meaningful when there is a process of learning. O'Hara (1998) indicated that:

> John Dewy noted that when people learn about a new tool they learn what it is and when and how to use it. When people learn new information in the context of meaningful activities they are more likely to perceive the new information as a tool rather than as an arbitrary set of procedures and facts. (p. 4)

On the other hand another definition of information says that it is an important issue that determines the society's competitions power and development status under today's economical conditions (Battal, Çakın, &Tuğyan, 2006).

Selwyn argues that one of the main aims of educational computing is to equipped students with usage of this technology (1997). On the other hand students are tending to develop expectations about their success in the future by observing their teachers most of the time (Gray, Hannay, & Ross, 2001). It is also discussed that self-efficacy is about the beliefs in one's self capability to implement, and organize the courses of action that are necessary to generate given attainments from the perspective of social cognitive theory (Busch, 1995 ; Compeau, & Higging, 1995; Durndell & Haag, 2002; Gray, Hannay & Ross, 2001; Moroz & Nash, 1997; Murphy, Coover & Owen, 1988; Stephens & Shotick, 2002). It is also mentioned in literature that computers dynamic tools for developing cognitive skills and it also helps the learner to develop useful learning strategies (Caldwell, 1980).

During computer education it is suggested that teacher should give an importance to understand each student learning characteristics (Carlson, & Silverman, 1986).

The survey that will measure the students' abilities about computers should target to measure the cognitive aspect of computer abilities which includes both general computer knowledge, and programming knowledge (Sewlyn, 1997).

Another research suggests that in today context people are getting familiar with computers at young ages, and they are more likely to know basic information before they start their university education (Bradlow T. E., Hoch S. J., & Hutchinson W., 2002). There are also many studies about gender issue and its relation to self efficacy (Durndell & Haag, 2002).

Computer self-efficacy is the belief about one has the capability to perform a specific task (Bandura,1997). Computer self-efficacy also means a judgment on one's potential to use a computer (Compeau & Higgins, 1995). Also researches on gender issue and computing has often, but not really always, shaped results that are indicating greater male rather than female experience, use of computers (Balka & Smith, 2000; Brosnan & Lee, 1998). In addition to this the research of Bandura on computer self confidence or self efficacy (1997) also shaped the finding that showed males as a standard have more computer self efficacy than females (Torkzadeh & Koufteros, 1994). There are many studies in literature that have tried to analyze the relationship between computer self efficacy and computer experience (Burkhardt, & Brass, 1990;Chua, Chen, & Wong, 1999; Coffin & Mackintyre, 2000; Gist, et a1.,1989; Hill, et al., 1986 ; Webster, & Martocchio, 1992; Whitely, 1997).

Self efficacy is associated with one's performance accomplishment. The feeling of success of any task improves the self efficacy of person related to that particular task (Bandura 1977, 1982; Campell & Hackett, 1986; Hackett & Campell, 1987).

Also many researches discuss the attitudes toward computers as a part of computer self efficacy. Brock and Sulsky (1994) suggest that attitudes toward computers are usually thought to be composed of two factors which are (1) beliefs that the computer is a helpful tool, and (2) beliefs that computers are self-directed entities. On the other hands Spott, Bowman and Mertz (1997) claims that Instructional technologies and computers have the power to help higher education faculties address increasing demands on their time and energy. In addition to this Volman and Eck (2001) suggest that computers research themes and outcomes have been changed within the last decade. There are also some concerns about teachers and students having difficulty to adapt to technology and therefore this slows down the mechanisms in schools. Zhao and Frank in 2003 indicated that concerns about the slow adoption of technology by teachers and students are not new and quite wide. And according to Zhao and Frank number of researchers considers that schools, being the social organizations they are, are directly at chances with new technologies (2003).

 

Simpson and Payne suggests that if teachers perceive computers as a powerful tool in both teaching and learning than it is expected from them to use it more frequently in their own teachings as well (1999). It can be said that computers are part of people's life. Universities are where students and teachers are using computers for researches and assignments, therefore it is considered to be a very helpful tool for them. Therefore self-efficacy toward computers especially among students plays a very important role in motivation of students as well as their performance.

## METHOD

### Operational Definition of Variables

This study was designed to examine students' self-efficacy toward computer usage, based on their departments and genders. Independent and dependent variables of this study are as followed:

**Independent Variables:**

Characteristics of the students are the independent variables. There are 5 independent variables for this study.

1. Gender.
2. Having Computer in their homes.
3. Since how many years they are using computer.
4. Took a Computer course.
5. Department

**Dependent Variables**:

1. I am confident about my basic computer hardware knowledge.
2. I am confident about my ability to install any software.
3. I am confident to format my own computer when it is necessary.
4. While I am using computer, if I get any error message, I am confident to solve the problem.
5. If any error occurs while I am using computer, I feel confident if get professional help to solve it.
6. I am confident about my Microsoft Word very abilities.
7. I am confident about my Microsoft Excel abilities.
8. I am confident about my Microsoft Power Point abilities.
9. I am confident to prepare my presentations on computer.
10. I avoid using computers as much as possible.
11. At the university they thought us basic computer usage very well.
12. I learned how to use computers with my own willing.
13. I am confident about my computer abilities.
14. I use computers only for internet.
15. I will be more confident if I have more computer related courses in my department.
16. I will be more confident if i improve my computer skills.
17. I believe that it is a must to know how to use computers.
18. I think computer courses given to us are useless.
19. The level of computer courses offered by our department is below our abilities.
20. I am scared to use computers.

### Identification of the Population

The population of this study included undergraduate students of Eastern Mediterranean University, Faculty of Education, Department of English Language Teaching (ELT) and Turkish Language Teaching (TLT) in fall 2007-2008 at Northern Cyprus.

### Sample

The sample of the study is selected by random sampling method, 70 students were selected with this method, among the Eastern Mediterranean University, Faculty of Education undergraduate students, who are registered during fall 2007-2008. In total 36 of the students were from English Language Teaching and 34 of them were from Turkish Language Teaching department.

### Instrument

For this research study, 5-scale Likert type of questionnaire is designed to analyze students' self-efficacy of computer usage. There were 25 items in this instrument, 5 items were related to personal information, and 20 items related with self-efficacy of computer usage are on a series five-point Likert-scale. (4=Strongly agree and 0=Strongly disagree). The reliability alpha coefficients of the scale were 0.82 (20 items).

**Data Analysis Procedures**

In this study, quantitative research methods were used to analyze the collected data. The results of the survey evaluated with SPSS software. Descriptive analysis, Independent sample T-Test, One-Way ANOVA analysis and Post Hock Scheffe Analysis has been applied.

**Findings**

The main focus of this study was to find out the faculty of education students beliefs about their own computer usage abilities. The following results have been found at the end of the evaluation of the collected data. It shows that 51.4% of the participants were from English Language Teaching department and 48.6% of the participants were from Turkish Language Teaching department. It is also indicated that 48.6% of the participants were male and 51.4% of the participants were female students. Results showed that all participants took a computer course at the university. The percentages according to participants year of computer usage, showed that 20% of the participants are using computers since 2 years, 22.9% of them are using it since 3 years 21.4% of them are using it since 4 years, 22.9% of them are using it since 5 years, 4.3% of them are using it since 6 years, 5.7% of tem are using it since 7 years, and finally 2.9% of the participants are using it since 8 years.

Results showed that 64.3% of the participants have their own computer at home while 35.7% of them don't have. Findings demonstrated that 87% of the participants are confident about their basic hardware knowledge (Agree, Strongly Agree) while only 13 % of them have moderate knowledge (Sometimes) about computer hardware. On the other hand 86% of the participants indicated that they are confident (Agree, Strongly Agree) about their abilities to install any software, while 14% of them are sometimes able to install and sometimes not. When it is asked to participants if they are confident to format their own computers, 86% of them indicated that they don't feel confident (Disagree, Strongly Disagree.) to format their own computers, while 14% of the participants are confident (Agree, Strongly Agree). 80% of the participants indicated(Agree, Strongly Agree) that they are able to solve the problem if they get any error message while they are working on computer, and 20% of them can sometimes handle these kinds of problems. 32% of the participant seeks for professional help when any kind of error occurs while 68% of them need professional helps sometimes. It is found that all participants indicated that they are confident about their Microsoft word abilities. 13 74% of the participants are confident about their Microsoft Excel abilities while 26% of them are not quite confident. It shows that 72% of the participants indicate that they are confident about their Microsoft power point abilities while 28% of them have some difficulties. On the other hand it is found that all participants indicated that they do prepare their presentations on computer, and they don't avoid using computers. On the other hand none of the participants are avoid using computers. It is found that 45% of the participants are not happy about basic computer courses they took from their departments while 55% of them are happy. Results showed that 70% of the participants indicated that they improved their computer skills with their own willing, while 30% improved it through other ways. Also 53% of the participant students are confident about their computer abilities, 21% of them are not quite confident and 26% of the participants are not confident at all. 73% of the participant indicated that they don't use computer only for internet while 27% of them indicated that they sometimes use it only for internet. Research results show that all participants (100%) indicated that they will be more confident if they take more computer related courses from their departments. They also indicated that they will be more confident about their computer usage if they improve their computer abilities, and they believe that it is a must to know how to use computers. None of the participants (100%) thinks that computer courses given to them are useless. On the other hand 35% of the participants believe that these courses are below their abilities, while 65% of them believe that courses are good. Research results shows that 7% of participants indicated that they are scared to use computers, 27% of them are also sometimes scared, and 66% of the participants do not scared to use computers at all.

Furthermore independent sample t-test has been done between gender and dependent variables. According to the results there is a significance difference between male and female students in item number 9, 15, 18, that are I am confident to prepare my presentations on computer significance is .032<.05, I will be more confident if I have more computer related courses in my department significance is .004<.05, and I think computer courses given to us are useless0 significance is .004<.05 respectively. There is a significance difference among students departments and items 12, 19, and 20. Significance of item 12 "I learned how to use computers with my own willing" is .006 which is less than .05 therefore there is a significance difference based on the departments of students. Significance of item 19 "The level of computer courses offered by our department is below our abilities" is .007<.05 therefore there is significance difference again. Finally for item 20 "I am scared to use computers" significance is .000<.05 therefore there is a significance difference among departments for this item. The results showed the significance level between students having their own computer at home and the dependent variables. The results indicate that there is a significance difference for item 2, and 14, that are "I am confident about my ability to install any software" the significance level is .027<.05 and "I use computers only for internet" the significance level is .030<.05.

 

There is also a significance difference between years of computers usage of students and in items 1, 2, 3, 4, 9, and 18. Item 1 is "I am confident about my basic computer hardware knowledge" and its significance is .000<.05. Item 2 is "I am confident about my ability to install any software" and its significance level is .000<.05. Item 3 is "I am confident to format my own computer when it is necessary" its significance level is .000<.05. Item 4 is "While I am using computer, if I get any error message, I am confident to solve the problem" and its significance level is .011<0.05. Item 9 is "I am confident to prepare my presentations on computer" its significance level is .016<.05. Finally item 18 is "I think computer courses given to us are useless" its significance level is .012<.05.

Results showed that students who are using computers since 4 years or more their means are higher than those who are using it less than 4 years for item "I am confident about my basic computer hardware knowledge." On the other hand for the item "I am confident about my ability to install any software", students who are using computers since 4 years their means are higher than those who are using it since 2 years. For another item "I am confident to format my own computer when it is necessary" those students who are using 6 years or more their means are higher than those who are using it less than 6 years. Finally, those students who are using it since 8 years their means are higher than the rest for item "I think computer courses given to us are useless".

**DISCUSSION AND CONCLUSION**

The main aim of this research was to find out the self-efficacy level among participant students and analyze their beliefs. This study showed that male students are more confident comparing to female student, similar to research of Bimer (2000), the computer usage has been known as biased toward the interests and fashion of men, this research also showed that females are not as confident as men are to computers. Awoleye & Siyanbola (2005), Bimer (2000), indicated that computers have some gendered attributes that favor man in some way so that men are more likely to use computers and they are more confident. Therefore it can be said that many studies has been support the gender factor in self-efficacy, but this research also showed that this changes are more likely to be depend on the complexity of the task and the year of computer usage of the particular student as Busch(1995) has been found the similar results. Similar to the study of Compeau, and Higging (1995), it is found that self-efficacy shapes the individuals beliefs and behaviors as well. It is not surprising to find out that students have different computer levels and this affects their self-efficacy. Also some students have advance computer knowledge, therefore they complain about the level of the computer courses offered to them. In addition to this it can be said that students with different computer skills shows different self-efficacy levels as well.

There have been many studies done on computer self-efficacy, and beliefs. These researches should be guide for related educational institutions to implement solutions to the exciting problem. The main and the most urgent problem of the EMU case is that all students have different level of computer usage abilities, and it is very difficult to address all students need through one basic computer course, therefore students might be grouped according to their computer usage level and take computer courses based on their levels. This might help students to improve their self-efficacy and the results of the updates can be a further study to be done on this issue.

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# ORGANIZATIONAL COMMITMENT OF EMPLOYEES OF TV PRODUCTION CENTER (EDUCATIONAL TELEVISION ETV) FOR OPEN EDUCATION FACULTY, ANADOLU UNIVERSITY

Assoc.Prof. Nedim GÜRSES
Anadolu University, Open Education Faculty, Eskişehir,
ngurses@anadolu.edu.tr

Assoc.Prof. Dr. Emine DEMİRAY
Anadolu University, Open Education Faculty, Eskişehir,
edemiray@anadolu.edu.tr

**ABSTRACT**
In like manner as conventional education and teaching approaches distance education tends to model the same procedures.Indeed, formerly enriched on printed material served as a primary source. However, thanks to the developments in technology and evolution in education, computerised information has made inroads in distance education programmes. Moreover the radio and television also are fullfil the need of this particular program. At Anadolu University's Open Education Faculty's TV Production Centers (Educational TV-ETV) programs are produced consistent with the faculties adapted Open Education System. Since 1982, more than 5000 educational programs have been produced at the center.

In this study, the views of employees at Anadolu University's Open Education Faculty's TV Production Center's organizational commitment level are analysed according to affective, continuance, normative commitment perspectives within the framework of Meyer and Allen model.

In this study, an account of the TV Production Center is provided. Employee's commitment levels are also taken into consideration. Needless to say that to maintain higher success in practices, commitment to organization is very important. Hence, to assess the level of commitment to the organization, surveys were distributed to employees. The organizational commitment scale provided by Meyr and Allen was also implemented to monitor the results.

In the study, organizational commitment within affective commitment, continuance commitment and normative commitment is analyzed. The survey was applied to 134 employees of TV Production Center and also face-to-face interviews were conducted. In the second stage, SPSS program was used for necessary analyses according to the demographics of employees (gender, age, and marital status, number of children, working duration, working unit, title and education) frequency test, t-test and Anova test were applied.

**Keywords:** Distance Learning, Open Education, Organizational Commitment, TV Production Center.

## I. INTRODUCTION

Essentially, most systems aim to maintain their validity. In fact, systems produce certain products to reach this goal. In educational systems the product is expected to produce positive behaviors of individuals. Both the input and outputs are directly related with individuals .That is why the workforce is cosiderably more important when compaired to other elements. The individual power incooperating teachers and personnel, plus technology and equipments have to complement each other to achive the desired goal. Educational workers are members of society with the required knowledge, skill and attitudes which shape organizational, administrative and educational targets. (Balay, 2000)

The current evoluation of industrilization combined with other social factors, such as population growth and economic problems require more education. As such, traditional education methods have been relplaced with distance learning which has made inroads in the educational system worıdwide. Indeed, distance education carries more democratic opportunities: "With the limitations of traditional education and teaching techniques as paralel to lack of possibilities within classrooms, distance education appears to be the solution for directing activities and programs from one single source center". (Alkan, 1981)

In general, the material and technology used in traditional education and teaching are also used in distance learning. The first practices of distance learning consisted of written texts supported by graphic elements. Today, technology and educational technology lie at the basis of this transition which in them inspires computer supported techniques. In Turkey, the key for open education is to use technology which provides students with autonomy. More than anything, besides the required printed materials, radio-television and related educational

 

programs are the prime sources for education at Anadolu University's Open Education Faculty's TV Production Center course productions take place according to open education. Since 1982 more than 5000 educational TV programs have been produced at this center.

In this study, the opinions of employees who are working at Anadolu University's Open Education Faculty's TV Production Center organizational commitment level are evaluated according to affective, continuance, normative commitment perspectives within the framework of Meyer and Allen model.

**I.1. History of TV Production Center of Open Education Faculty at Anadolu University (Educational TV-ETV)**

Broadening the perspective of broadcasting from a regional level to a national one in Turkish television broadcasting gave rise to the idea of using this medium in education at Eskişehir Academy of Economics of Business. The first moves took place in 1970's when first closed circuit programing was established with a group of people who secured determined motivation. First small signal carrier was used for broadcasting purposes in Eskişehir, following the steps of Ankara TRT television station. Progressing from an educational tool to a seperate entity as part of an institution took place in 1972. The institute of teaching via TV was officially recognized on September 1st, 1972 [14293 numbered Official Gazette]. The mission statement of this regulation is: "to provide efficiency in education and built human labor for television techniques". Thanks to the technical support of the agreement between Germany and Turkey, the institute of Educational TV provided the backgrounds of color TV and educational technology with broader possibities. (Askun, 1979)

To create more efficient techniques and methods in education and teaching, the German Ministry of Foreign Affairs assigned Studio Hamburg for broadcasting and developing technological facilities of Turkish educational systems and their programming application by TV Production Center (Educational TV-ETV). This operated for five years and three months from January of 1976. The project was officially completed in March 20th, 1981. The Production Center, with the aim to develop color television technology and its use in teaching and education also produced educational programs for UNICEF and the Academy of Economics of Business. According to project agreement, within this period, all equipment techniques, maintance, graphics-decor, animation, sound, lighting, and camera took place with five years with twenty German experts and a total of 120 personnel. As a result, the institution was capable of producing color, black and white TV programs and film productions; 4 or 5 productions could be created at a this stage. The Production Center was capable of broadcasting within 150 km radius with its rich external shooting possibilities. At the same time the quality standard ran in accordance with world standards and was seen as being of higher quality. (ETV, 1981-unpublished report)

The Educational TV which was founded by highly motivated young people as part of Eskişehir Academy of Economics of Business in 1970. This opportunity of broadcasting in January 1976 was made possible by the project agreement in collabration with the German Government. It is against this background that distance education teaching became part of Open Education Faculty in 1982.

Those involved trained to produce educational TV programs as part of Open Education Faculty TV Production Center (Educational TV-ETV) during that period. Indeed, they contributed to its development. To gain better perspective, in 2008 it is capable of broadcasting on a national scale with its developed technology and trained personnel to provide the required service for teaching and education.

All the equipment and technology in this center adhere to international standards. Within the period of 2007-2008 educational year, two TV studios, a sound recording studio, live broadcasting truck (O.B.WAN) and seven AVID editing sets, recording edit sets in Studio 6 and transfer room are set all in place. In the TV Production Center, external shooting equipment, ENG (Electronic News Gathering) also operates besides mounted ones. Two rooms for two and three dimensional animation units, electronic graphics, sound equipment, band duplication unit and decor and make up rooms are also available.

DVD copies all productions made in TV Production Center are sent to students according to the budget. Students in Western Europe Program, available in European countries attain their courses in DVD formats as well.

**I.2. Organizational Commitment**

Organizatioanl commitment can be described as employees committed feelings towards their organization. This concept has become a study issue in many countries in the last 30 years. This was introduced by Whyte [1956] and later developed by Porter, Mowday, Steers, Allen, Meyer, Becker and many other researchers. (Gül, 2002)

 

A range of descriptions of the way employee's involvement in business commitment to the values and the aims and the ways to create more effective means are provided in the literature.
Morrow indicates that there are more than 25 descriptions related with organizational commitment. (Oliver, 1990) Some of the descriptions read as follows:

- In its wider perspective organizational commitment involves personal commitment and loyalty. (Morris, Lydka and O' Creavy, 1993)
- Organizational commitment is not only loyalty to the employer, but it is being open to criticism in terms of organizations' well-being and success. (Yüksel, 2000)
- Organizational commitment is the commitment of individual identity to the organization and its direction towards the organization. (Sheldon, 1971)
- Organizational commitment is more than what an organization expects from its individuals as formal and normatives but it is more about their values and aims. (Celep,2000)
- Organizational commitment is willingness to stay as a member of the organization, willingness to show effort for the organization and supports aims and values. (Dubin, Champoux and Porter, 1975)

Another research made an organizational commitment by Meyer and Allen defines another organizational commitment. (Meyer, Allen, 1987; Meyer, Herscovitch, 2001) Researchers defined two ways of organizational commitment of employees. The first one is the "affective commitment dimension" when employees share the aims and values of the organization. The other one is "continuance commitment dimension" highly linked by the fear of losing status, money.In 1984 Meyer and Allen added the third perspective which was improved by Weiner and Verdi called "normative commitment" or "moral commitment". As a result, they created three layered model. Normative commitment is the wish/desire of an employee to work for the organization and the employee feels it as her/his responsibility. This is also attributed with loyalty norms of the person. (Onay Özkaya, Deveci Kocakoç, Kara, 2006)

**Affective Commitment:** In this commitment, the employee deeply accepts the values of the organization and wants to stay as a part of the organization. This is the best way of the commitment to the organization. These types are the ones employers' dream of. These employees reflect positive attitudes towards the job and are ready to provide extra effort for the job.

**Continuance Commitment:** It is the result of what employees see t of their investment to the organization. Employees think that they commit time and effort and that is why they feel like they need to stay in the work place. They think that if they leave the job they will have fewer choices. These people stay in theorganization because they can not find any other job. Some of them consider health, family issues and retirement are the main considerations in staying on, and job satisfaction does not feature highly.

**Normative Commitment:** Employees see and feel that it is kind of responsibility to stay at the organization. Reciprocation is the key. One of the main reasons is that employers take theminto their organization during their most needy time. These types think that the organization behaves positively towards them and in return, loyalty can be the answer. As a result, the commitment involved keeps the employee with the organization thanks to their strong ties.Strong normative ones stay because they think they have to and strong continuance ones do it because they think that they need the job. (Balay, 2000; Wasti 2000, Bayram 2008; Çetin 2004)

Organizational commitment becomes vital because of five causes. Firstly, giving up the job, discontinuity, less motivation and job search; secondly, job satisfaction, job involvement, motivation and performance within behavioral, emotional and cognitive forms; thirdly, autarchy, responsibility, participation, ways of understanding the job with its characteristics tied to the job itself and employee; fourthly, age, gender, employment time and education as part of employee qualities; and lastly, indivuduals need to know the proximities of their organizational commitment. (Balay, 2000)

Studies show that there are many variables effecting employees commitment to organization Mowday, Porter and Steers developed a classification related with this issue and questioned effective factors; personal characteristics, role and job characteristics, structural characteristics and job experience and work place witin this area. Mowday, Porter and Steeers defined personel factors within two subgroups: demographic characteristics and work factors. Demographic factors are analyzed within gender, age, marital status, educational level, income level, status, and individuals' psycho-social characteristics. Work factors are analyzed according to the desire for success, participant values and cumulative values. A role and work characteristic consists of the job validity, coverage, role conflict and vagueness in the job. Structural characteristics are releated with structure of the organization. The size of the organization, control degree, unionization level, image

 

of the organization, practice of total quality management, flexible working hours, payment system and carrier opportunities and perception on practices related with important ethics issues. Work experience and work environment generally indicate socialization process of employees, relationship between personnel and managers, organizational climate, customer orriented organizational atmosphere, trustworthiness of the organization and job satisfaction factors. (Boylu, Pelit, Güçer, 2007)

Organizational commitment is the loyalty, behavior and interest of employee towards the success of his or her own organization. All these are determined by factors like age, status as part of personal issues and job design, and leadership practices as part of organizational issues. In addition, job security, participation in decisions, responsibility and autarchy parallel to positive climate create a better positive climate towards organizational commitment. (Yalçın, İplik, 2005)

**I.3. Methodology**

To have greater success in organizations, the need of highly committed individuals cannot be undermined. The subjects of this study are the employees of Open Education Faculty of Anadolu University. Sampling incorporates employees of TV Production Center. To define the organizational commitment levels of employees at TV Production Center a survey was conducted to participiants.This was established by Meyer and Allen: "Organizational Commitment Scale". (Allen, Meyer, 1990).30 questions are included in the questionnaire. Eigth are related with demographic information, 22 with organizational commitment. In this study, organization commitment is referred as affective, continuance and normative commitment. 134 employees of TV Production Center participated in face- to- face interview techniques and all outcomes were transferred to SPSS program. The first results are classified according to gender, age; marital status, number of children, educational level, working unit, title and the years spend in the jobs - demographic characteristics-. Employees' organizational commitment within demographics were analyzed with t-test and Anova and displayed in tables. All ratios in the tables are the means for answers within affective, continuance and normative commitment. If any of the answers was blank no points were counted. That is why in different groups there appears to be different number of people.

In the study, firstly the history of ETV, which is responsible for production of educational-teaching material for students of Open Education Faculty at Anadolu University is depicted; than technical capabilities and the methodology were used. In the findings section the assessments of outcomes for the employees of TV Production Center and theire commitment levels are put forward.

**II. FINDINGS**

Organizational commitment is one of the aims of any organization to maintain their validity. Individuals with well developed organizational commitment are more easy going, more down to earth, more productive and carry more loyalty and responsibility for the organization. Additionally, they cost less in budget terms. (Balcı, 2003)

**Table 1.** Demographic Characteristics of Survey Participants

| **Gender** | **f** | **%** |
|---|---|---|
| Female | 53 | 39.6 |
| Male | 81 | 60.4 |
| **Total** | **134** | **100** |
| **Age** | **f** | **%** |
| 17-22 | 16 | 11.9 |
| 23-30 | 32 | 23.9 |
| 31-40 | 28 | 20.9 |
| 41-50 | 49 | 36.6 |
| 51 and over | 9 | 6.7 |
| **Total** | **134** | **100** |
| **Marital Status** | **f** | **%** |
| Married | 80 | 59.7 |
| Single | 54 | 40.3 |
| **Total** | **134** | **100** |
| **Number of Children** | **f** | **%** |
| None | 57 | 42.5 |
| One | 46 | 34.3 |
| Two | 27 | 20.1 |
| Three and more | 4 | 3.0 |

| **Total** | **500** | **100** |
|---|---|---|
| **Educational Level** | **f** | **%** |
| Primary | 2 | 1.5 |
| Secondary | 33 | 24.6 |
| Associate or Undergraduate Degree | 70 | 52.2 |
| Masters- Doctoral | 29 | 21.6 |
| **Total** | **134** | **100** |
| **Working Unit** | **f** | **%** |
| Manager of ETV | 1 | 0.7 |
| Director | 12 | 9.0 |
| Production Personnel | 4 | 3.0 |
| Production Planning | 8 | 6.0 |
| Scenario | 4 | 3.0 |
| Camera | 17 | 12.7 |
| Tecnical Service | 9 | 6.7 |
| Sound | 9 | 6.7 |
| Light | 9 | 6.7 |
| Recording- Editting | 13 | 9.7 |
| Graphics- Make up | 11 | 8.2 |
| Vision Mixer | 3 | 2.2 |
| Studio Manager | 3 | 2.2 |
| Prompter | 4 | 3.0 |
| Secretary | 3 | 2.2 |
| Band Copies | 8 | 6.0 |
| Maintenance | 2 | 1.5 |
| Transportation | 2 | 1.5 |
| Service | 12 | 9.0 |
| **Total** | **134** | **100** |
| **Title** | | |
| Academic Personel | 20 | 14.9 |
| Staff | 50 | 37.3 |
| Worker | 10 | 7.5 |
| Company Worker | 21 | 15.7 |
| Scholarship Student | 33 | 24.6 |
| **Total** | **134** | **100** |
| **Number of Years in the Work Place** | | |
| 1-5 | 49 | 36.5 |
| 6-10 | 8 | 6.0 |
| 11-15 | 17 | 12.7 |
| 16-20 | 26 | 19.4 |
| 21-25 | 19 | 14.2 |
| 26 and more | 15 | 11.2 |
| **Total** | **134** | **100** |

As it is seen in Table 1 60.4% of employees working at TV Production Center of Open Education Faculty at Anadolu University are males, 39.6% were females, 11.9% were in the age of 17-22, 23.9% is 23-30, 20.9% were 31-40, 36.6% were 41-50, 6.7% were 51 and over.

According to these, 35.8% of the employees are under 30, 64.2% are around and over 30 years old. In terms of their marital status, 59.7% are married, 40.3% are single. 42.5% of the employees have no children, 34.3% have one child, 20.1% have two and 3% have three or more children. In terms of employees' education, 1.5% has primary education, 24.6% have secondary, 52.2% have associate or undergraduate degree and %21.6 have masters or doctoral degrees. Apparently %73.8 employees can be viewed as having associate and doctoral degrees. Employees' jobs differ in various parts at the TV Production Center.14.9% employees are academics, 37.3% are students on the job trainees, 24.6% are scholarship student, 15.7% are private company worker and 7.5% are blue-collared workers. In terms of their working duration in the organization, %36.5% are 1-5 years, 19.4% are 16-20 years, 14.2% are 21-25 years, 12.7% are between 11-15 years, 11.2% are 26 years and over and

 

6% is 6-10 years. 57.5% employees with on and more years of working time admit that the organization employs experienced and specialized employees.

**Table 2.** Answers of Employees Working at TV Production Center for Questions Releated with Affective, Continuance and Normative Commitment

| | | Totaly Disagree | | Disagree | | Not Sure | | Agree | | Totally Agree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Count | Row N % | Count | Row N % | Count | Row N % | Count | Row N % | Count | Row N % |
| AFFECTIVE COMMITMENT | Q.9 I would be very happy to spend the rest of my career with this organization | 1 | ,7% | 9 | 6,7% | 26 | 19,4% | 40 | 29,9% | 58 | 43,3% |
| | Q.10 I enjoy discussing my organization with people outside it | 5 | 3,8% | 26 | 19,8% | 21 | 16,0% | 60 | 45,8% | 19 | 14,5% |
| | Q.11 I really feel as if this organization's problems are my own | 6 | 4,5% | 33 | 24,8% | 25 | 18,8% | 53 | 39,8% | 16 | 12,0% |
| | Q.12 I think that I could easily become as attached to another organization as I am to this one (R) | 6 | 4,5% | 16 | 12,0% | 27 | 20,3% | 48 | 36,1% | 36 | 27,1% |
| | Q.13 I do feel like 'part of the family' at my organization (R) | 7 | 5,4% | 11 | 8,5% | 24 | 18,5% | 53 | 40,8% | 35 | 26,9% |
| | Q.14 I do feel 'emotionally attached' to this organization (R) | 4 | 3,0% | 16 | 12,1% | 22 | 16,7% | 61 | 46,2% | 29 | 22,0% |
| | Q.15 This organization has a great deal of personal meaning for me | 2 | 1,5% | 10 | 7,5% | 22 | 16,4% | 54 | 40,3% | 46 | 34,3% |
| | Q.16 I do feel a *strong* sense of belonging to *my* organization (R) | 1 | ,8% | 19 | 14,3% | 30 | 22,6% | 54 | 40,6% | 29 | 21,8% |
| CONTINUANCE COMMITMENT | Q.17 I am not afraid of what might happen if I quit my job without having another one lined up (R) | 34 | 25,8% | 43 | 32,6% | 32 | 24,2% | 14 | 10,6% | 9 | 6,8% |
| | Q.18 It would be very hard for me to leave my organization right now, even if I wanted to | 9 | 6,8% | 17 | 12,9% | 24 | 18,2% | 52 | 39,4% | 30 | 22,7% |
| | Q.19 Too much in my life would be disrupted if I decided I wanted to leave my organization now | 5 | 3,8% | 25 | 18,9% | 24 | 18,2% | 50 | 37,9% | 28 | 21,2% |
| | Q.20 It wouldn't be too costly for me to leave my organization now (R) | 10 | 7,6% | 21 | 15,9% | 18 | 13,6% | 48 | 36,4% | 35 | 26,5% |
| | Q.21 Right now, staying with my organization is a matter of necessity as much as desire | 3 | 2,3% | 11 | 8,4% | 32 | 24,4% | 57 | 43,5% | 28 | 21,4% |
| | Q.22 I feel that I have too few options to consider leaving this organization | 16 | 12,1% | 36 | 27,3% | 30 | 22,7% | 31 | 23,5% | 19 | 14,4% |
| | Q.23 One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice — another organization may not match the overall benefits I have here | 20 | 15,2% | 29 | 22,0% | 29 | 22,0% | 41 | 31,1% | 13 | 9,8% |
| E CO | Q.24 I think that people these days move from company to company too often. | 9 | 6,9% | 34 | 26,0% | 46 | 35,1% | 37 | 28,2% | 5 | 3,8% |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Q.25 I do not believe that a person must always be loyal to his or her organization (R) | 2 | 1,5% | 7 | 5,3% | 14 | 10,6% | 57 | 43,2% | 52 | 39,4% |
| Q.26 Jumping from organization to organization does not seem at all unethical to me (R) | 8 | 6,1% | 36 | 27,3% | 35 | 26,5% | 29 | 22,0% | 24 | 18,2% |
| Q.27 One of the major reasons I continue to work for this organization is that I believe that loyalty is important and therefore feel a sense of moral obligation to remain | 6 | 4,6% | 33 | 25,2% | 36 | 27,5% | 35 | 26,7% | 21 | 16,0% |
| Q.28 If l got another offer for a better job elsewhere I would not feel it was right to leave my organization | 17 | 12,9% | 36 | 27,3% | 33 | 25,0% | 31 | 23,5% | 15 | 11,4% |
| Q.29 I was taught to believe in the value of remaining loyal to one organization | 9 | 6,9% | 20 | 15,4% | 27 | 20,8% | 58 | 44,6% | 16 | 12,3% |
| Q.30 Things were better in the days when people stayed with one organization for most of their careers | 8 | 6,1% | 25 | 18,9% | 32 | 24,2% | 34 | 25,8% | 33 | 25,0% |

According to Table 2, the responses from employees to these three commitment perspectives show that the highest involment reflects itself in affective commitment (25.23%), normative commitment follows with 18.1% and lastly continuance commitment achieves 17.5%.This result is also supported by the literature which is echoed as follows: affective, than normative and lastly continuance commitment. (Boylu, Pelit and Güçer 2007)

In terms of patcipants answers for "exactly agree", the highest preference is again for the questions relatad with affective commitment. 43.3% exactly profess that they wish to spend the rest of their careers in the same organization; 34.3% employees also exactly agree that the organization means a lot to them. 34.9% employees support the view that employees should be loyal to the organization. 25% employees profess that things would be better if people commit most of their carrier time for the some organization.

In terms of answers for continuance commitment, 26.5% employees think that leaving the organization would harm them financialy, 22.7% employees share the viewthat it would be really difficult to leave the organization even if they wanted to do so.

**Table 3.** Gender Oriented Comparative t-Test Results of Employees Working at TV Production Center in Terms of Their Affective, Continuance and Normative Commitment to Their Organization

| | Gender | n | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Mean Points for Affective Commitment | Female | 53 | 3,7335 | ,61316 | ,08422 |
| | Male | 81 | 3,6978 | ,67300 | ,07478 |
| Mean Points for Continuance Commitment | Female | 53 | 3,3783 | ,67997 | ,09340 |
| | Male | 80 | 3,1607 | ,59202 | ,06619 |
| Mean Points for Normative Commitment | Female | 52 | 3,3787 | ,77182 | ,10703 |
| | Male | 80 | 3,2982 | ,70471 | ,07879 |

In Table 3, gender oriented comparative t-test results of employees working at TV Production Center in terms of their affective; continuance and normative commitment to their organization are displayed. According to the table mean points of affective, continuance and normative commitment for females are higher than males.

**Table 4.** Age Oriented Comparative Anova Results of Employees Working at TV Production Center in Terms of Their Affective, Continuance and Normative Commitment to Their Organization

| | Age | n | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound | | |
| Mean Points for Affective Commitment | 17-22 | 16 | 3,7366 | ,54980 | ,13745 | 3,4436 | 4,0296 | 2,50 | 4,62 |
| | 23-30 | 32 | 3,7132 | ,65316 | ,11546 | 3,4777 | 3,9487 | 2,38 | 5,00 |
| | 31-40 | 28 | 3,6875 | ,71403 | ,13494 | 3,4106 | 3,9644 | 2,38 | 4,88 |
| | 41-50 | 49 | 3,7365 | ,69460 | ,09923 | 3,5370 | 3,9360 | 1,75 | 4,88 |
| | 51 and over | 9 | 3,6052 | ,35066 | ,11689 | 3,3356 | 3,8747 | 3,12 | 4,12 |
| | Total | 134 | 3,7119 | ,64788 | ,05597 | 3,6012 | 3,8226 | 1,75 | 5,00 |
| Mean Points for Continuance Commitment | 17-22 | 16 | 3,1905 | ,50305 | ,12576 | 2,9224 | 3,4585 | 2,29 | 4,00 |
| | 23-30 | 31 | 3,0968 | ,75267 | ,13518 | 2,8207 | 3,3729 | 1,00 | 4,14 |
| | 31-40 | 28 | 3,2925 | ,65545 | ,12387 | 3,0384 | 3,5467 | 1,43 | 4,57 |
| | 41-50 | 49 | 3,3197 | ,61859 | ,08837 | 3,1420 | 3,4974 | 2,00 | 4,29 |
| | 51 and over | 9 | 3,3333 | ,41033 | ,13678 | 3,0179 | 3,6487 | 2,71 | 4,00 |
| | Total | 133 | 3,2474 | ,63509 | ,05507 | 3,1385 | 3,3563 | 1,00 | 4,57 |
| Mean Points for Normative Commitment | 17-22 | 16 | 3,5179 | ,57823 | ,14456 | 3,2097 | 3,8260 | 2,29 | 4,43 |
| | 23-30 | 30 | 3,2992 | ,80525 | ,14702 | 2,9985 | 3,5999 | 1,86 | 4,43 |
| | 31-40 | 28 | 3,3418 | ,75826 | ,14330 | 3,0478 | 3,6359 | 2,00 | 4,86 |
| | 41-50 | 49 | 3,3411 | ,75018 | ,10717 | 3,1256 | 3,5566 | 1,29 | 4,86 |
| | 51 and over | 9 | 3,0000 | ,48445 | ,16148 | 2,6276 | 3,3724 | 2,57 | 3,57 |
| | Total | 132 | 3,3299 | ,73004 | ,06354 | 3,2042 | 3,4556 | 1,29 | 4,86 |

In Table 4 the focus is on the age oriented compatarive Anova results of employees working at TV Production Center in terms of their affective, continuance and normative commitment to their organization.

Within these age groups, there is no significiant difference between means points of affective commitment; but continuance commitment is higher in 41-50 and 51 and over groups; normative commitment is higher in the17-22 age group when compared to other groups.

**Table 5.** Marital Status Oriented Comparative t-Test Results of Employees Working at TV Production Center in Terms of Their Affective, Continuance and Normative Commitment to Their Organization

| | Marital Status | n | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Mean Points for Affective Commitment | Married | 80 | 3,7312 | ,68664 | ,07677 |
| | Single | 54 | 3,6832 | ,59088 | ,08041 |
| Mean Points for Continuance Commitment | Married | 80 | 3,2661 | ,68525 | ,07661 |
| | Single | 53 | 3,2192 | ,55598 | ,07637 |
| Mean Points for Normative Commitment | Married | 79 | 3,3128 | ,74865 | ,08423 |
| | Single | 53 | 3,3553 | ,70769 | ,09721 |

In Tables 5, marital status oriented comparative t-Test results of employees working at TV Production Center in terms of their affective, continuance and normative commitment to their organization are analysed. According to the table there is no significant difference between singles and married for continuance and normative commitment. It is apparent that affective commitment is higher for married when compared to singles.

**Table 6.** Number of Children Oriented Comparative t-Test Results of Employees Working at Production Center in Terms of Their Affective, Continuance and Normative Commitment to Their Organization

| | Number of Children | n | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound | | |
| Mean Points for Affective Commitment | None | 57 | 3,7346 | ,62058 | ,08220 | 3,5700 | 3,8993 | 2,38 | 5,00 |
| | One | 44 | 3,8283 | ,63185 | ,09526 | 3,6362 | 4,0204 | 2,38 | 4,88 |
| | Two | 27 | 3,4054 | ,64582 | ,12429 | 3,1499 | 3,6609 | 1,75 | 4,75 |
| | Three and more | 4 | 4,3750 | ,35355 | ,17678 | 3,8124 | 4,9376 | 4,12 | 4,88 |
| | Total | 132 | 3,7179 | ,64718 | ,05633 | 3,6065 | 3,8294 | 1,75 | 5,00 |
| Mean Points for Continuance Commitment | None | 56 | 3,1973 | ,61991 | ,08284 | 3,0313 | 3,3633 | 1,43 | 4,14 |
| | One | 44 | 3,2955 | ,68781 | ,10369 | 3,0863 | 3,5046 | 1,00 | 4,29 |
| | Two | 27 | 3,2540 | ,60016 | ,11550 | 3,0166 | 3,4914 | 2,29 | 4,57 |
| | Three and more | 4 | 3,6786 | ,47201 | ,23600 | 2,9275 | 4,4296 | 3,14 | 4,29 |
| | Total | 131 | 3,2566 | ,63542 | ,05552 | 3,1468 | 3,3665 | 1,00 | 4,57 |
| Mean Points for Normative Commitment | None | 56 | 3,3975 | ,71775 | ,09591 | 3,2053 | 3,5897 | 1,86 | 4,86 |
| | One | 43 | 3,3721 | ,80338 | ,12251 | 3,1248 | 3,6193 | 1,29 | 4,86 |
| | Two | 27 | 3,1587 | ,62438 | ,12016 | 2,9117 | 3,4057 | 1,86 | 4,00 |
| | Three and more | 4 | 3,4286 | ,73771 | ,36886 | 2,2547 | 4,6024 | 2,57 | 4,29 |
| | Total | 130 | 3,3405 | ,72795 | ,06385 | 3,2142 | 3,4668 | 1,29 | 4,86 |

Table 6 demonstrates the number of children orriented Anova results of eployees working at TV Production Center in terms of their affective, continuance and normative commitment to their organization.

According to the table it is significant that employees with three and more children show great commitment within these three perspectives when comparde to other employees.

**Table 7.** Educational Level Oriented Comparative Anova Results of Employees Working at TV Production Center in Terms of Their Affective, Continuance and Normative Commitment to Their Organization

| | Educational Level | n | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound | | |
| Mean Points for Affective Commitment | Primary | 2 | 3,5625 | ,08839 | ,06250 | 2,7684 | 4,3566 | 3,50 | 3,62 |
| | Secondary | 33 | 3,8279 | ,63637 | ,11078 | 3,6023 | 4,0536 | 2,38 | 5,00 |
| | University | 69 | 3,6410 | ,68755 | ,08277 | 3,4759 | 3,8062 | 1,75 | 4,88 |
| | Masters-Doctoral | 29 | 3,7789 | ,57953 | ,10762 | 3,5585 | 3,9994 | 2,50 | 4,57 |
| | Total | 133 | 3,7163 | ,64830 | ,05621 | 3,6051 | 3,8275 | 1,75 | 5,00 |
| Mean Points for Continuance Commitment | Primary | 2 | 4,2143 | ,10102 | ,07143 | 3,3067 | 5,1219 | 4,14 | 4,29 |
| | Secondary | 33 | 3,3983 | ,54370 | ,09465 | 3,2055 | 3,5911 | 2,00 | 4,57 |
| | University | 68 | 3,1176 | ,66384 | ,08050 | 2,9570 | 3,2783 | 1,00 | 4,29 |
| | Masters-Doctoral | 29 | 3,3448 | ,57842 | ,10741 | 3,1248 | 3,5648 | 2,00 | 4,29 |
| | Total | 132 | 3,2543 | ,63245 | ,05505 | 3,1454 | 3,3632 | 1,00 | 4,57 |
| Mean Points for Normative Commitment | Primary | 2 | 4,2857 | ,60609 | ,42857 | -1,1598 | 9,7312 | 3,86 | 4,71 |
| | Secondary | 33 | 3,6010 | ,66860 | ,11639 | 3,3639 | 3,8381 | 1,86 | 4,71 |
| | University | 67 | 3,2665 | ,71337 | ,08715 | 3,0925 | 3,4405 | 1,86 | 4,86 |
| | Masters-Doctoral | 29 | 3,1133 | ,74562 | ,13846 | 2,8297 | 3,3969 | 1,29 | 4,86 |
| | Total | 131 | 3,3324 | ,73227 | ,06398 | 3,2059 | 3,4590 | 1,29 | 4,86 |

Table 7 presents educational lavel orriented Anova results of employees working at TV Production Center in terms of their affective, continuance and normative commitment to their organization.

According to the table secondary education places itself with in affective emmotional and primary education takes place in continuance and normative commitment.

**Table 8.** Title Oriented Comparative Anova Results of Employees Working at TV Production Center in Terms of Their Affective, Continuance and Normative Commitment to Their Organization

| | Title | n | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound | | |
| Mean Points for Affective Commitment | Academic Personnel | 20 | 3,7670 | ,57571 | ,12873 | 3,4975 | 4,0364 | 2,50 | 4,57 |
| | Staff | 50 | 3,7100 | ,72159 | ,10205 | 3,5049 | 3,9151 | 1,75 | 4,88 |
| | Worker | 10 | 3,5554 | ,75290 | ,23809 | 3,0168 | 4,0939 | 2,38 | 4,62 |
| | Company Worker | 21 | 3,7764 | ,59752 | ,13039 | 3,5044 | 4,0484 | 2,75 | 5,00 |
| | Scholarship Student | 33 | 3,6878 | ,59581 | ,10372 | 3,4765 | 3,8990 | 2,38 | 4,62 |
| | Total | 134 | 3,7119 | ,64788 | ,05597 | 3,6012 | 3,8226 | 1,75 | 5,00 |
| | Academic Personnel | 20 | 3,4143 | ,67150 | ,15015 | 3,1000 | 3,7286 | 2,00 | 4,29 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Staff | 50 | 3,2229 | ,59027 | ,08348 | 3,0551 | 3,3906 | 1,43 | 4,29 |
| | Worker | 10 | 3,1857 | ,26979 | ,08532 | 2,9927 | 3,3787 | 2,86 | 3,86 |
| | Company Worker | 21 | 3,3197 | ,83165 | ,18148 | 2,9412 | 3,6983 | 1,00 | 4,57 |
| | Scholarship Student | 32 | 3,1533 | ,62460 | ,11042 | 2,9281 | 3,3785 | 1,86 | 4,14 |
| | Total | 133 | 3,2474 | ,63509 | ,05507 | 3,1385 | 3,3563 | 1,00 | 4,57 |
| Mean Points for Normative Commitment | Academic Personnel | 20 | 3,0357 | ,59694 | ,13348 | 2,7563 | 3,3151 | 2,14 | 4,43 |
| | Staff | 50 | 3,2743 | ,70804 | ,10013 | 3,0731 | 3,4755 | 1,29 | 4,86 |
| | Worker | 10 | 3,7000 | ,81497 | ,25772 | 3,1170 | 4,2830 | 1,86 | 4,86 |
| | Company Worker | 20 | 3,4560 | ,85607 | ,19142 | 3,0553 | 3,8566 | 1,86 | 4,71 |
| | Scholarship Student | 32 | 3,4063 | ,69144 | ,12223 | 3,1570 | 3,6555 | 1,86 | 4,43 |
| | Total | 132 | 3,3299 | ,73004 | ,06354 | 3,2042 | 3,4556 | 1,29 | 4,86 |

Table 8 features the title orriented Anova results of employees working at TV Production Center in terms of their affective, continuance and normative commitment to their organization. According to the table, in terms of mean points for affective commitment is higher in private company workers and academics; similarly, mean points of continuance commitment is higher in private company workers and academics while mean points for normative commitment is higher in worker and company workers.

**Table 9.** Working Years Oriented Comparative Anova Results of Employees Working at TV Production Center in Terms of Their Affective, Continuance and Normative Commitment to Their Organization

| | Working Years | n | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound | | |
| Mean Points for Affective Commitment | 1-5 | 49 | 3,7547 | ,61303 | ,08758 | 3,5787 | 3,9308 | 2,38 | 5,00 |
| | 6-10 | 8 | 3,7188 | ,51647 | ,18260 | 3,2870 | 4,1505 | 3,00 | 4,62 |
| | 11-15 | 17 | 3,4496 | ,61508 | ,14918 | 3,1333 | 3,7658 | 2,38 | 4,50 |
| | 16-20 | 26 | 3,6786 | ,81466 | ,15977 | 3,3495 | 4,0076 | 1,75 | 4,88 |
| | 21-25 | 19 | 3,8618 | ,61646 | ,14143 | 3,5647 | 4,1590 | 2,62 | 4,88 |
| | 26 and more | 15 | 3,7333 | ,58011 | ,14978 | 3,4121 | 4,0546 | 2,43 | 4,50 |
| | Total | 134 | 3,7119 | ,64788 | ,05597 | 3,6012 | 3,8226 | 1,75 | 5,00 |
| Mean Points for Continuance Commitment | 1-5 | 48 | 3,1766 | ,69146 | ,09980 | 2,9758 | 3,3774 | 1,00 | 4,57 |
| | 6-10 | 8 | 3,7143 | ,65688 | ,23224 | 3,1651 | 4,2634 | 2,57 | 4,29 |
| | 11-15 | 17 | 3,0868 | ,71473 | ,17335 | 2,7194 | 3,4543 | 1,43 | 4,29 |
| | 16-20 | 26 | 3,2234 | ,56485 | ,11078 | 2,9953 | 3,4516 | 2,00 | 4,14 |
| | 21-25 | 19 | 3,2632 | ,51345 | ,11779 | 3,0157 | 3,5106 | 2,00 | 3,86 |
| | 26 and more | 15 | 3,4286 | ,52904 | ,13660 | 3,1356 | 3,7215 | 2,71 | 4,29 |
| | Total | 133 | 3,2474 | ,63509 | ,05507 | 3,1385 | 3,3563 | 1,00 | 4,57 |
| Mean Points for Normative Commitment | 1-5 | 47 | 3,4220 | ,71705 | ,10459 | 3,2115 | 3,6325 | 1,86 | 4,71 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 6-10 | 8 | 3,4464 | 1,04822 | ,37060 | 2,5701 | 4,3228 | 2,00 | 4,71 |
| | 11-15 | 17 | 3,2185 | ,72337 | ,17544 | 2,8466 | 3,5904 | 2,00 | 4,86 |
| | 16-20 | 26 | 3,0604 | ,67027 | ,13145 | 2,7897 | 3,3312 | 1,29 | 4,29 |
| | 21-25 | 19 | 3,3534 | ,67068 | ,15387 | 3,0301 | 3,6766 | 1,86 | 4,57 |
| | 26 and more | 15 | 3,5429 | ,73083 | ,18870 | 3,1381 | 3,9476 | 2,57 | 4,86 |
| | Total | 132 | 3,3299 | ,73004 | ,06354 | 3,2042 | 3,4556 | 1,29 | 4,86 |

Table 9 displays working year orriented Anova results of employees working at TV Production Center in terms of their affective, continuance and normative commitment to their organization.According to the table, mean points for affective commitment is higher in the 21-25 working years group; mean points of continuance commitment is higher both in the 6-10 working years and 26 years and more, while mean points for normative commitment is higher only in 26 years and more working years group.

## III. CONCLUSION

Employees commitment builts an atmosphere for better and more efficient production possibilities. That is why, it is important for an organization to be aware of these ways to improve commitment of its employees. It is seen that employees with high commitment level to any organization develop strategies to reach the goals required.Better relations with others and their association with the organization are also strengthened.

TV Production Center of Open Education Faculty at Anadolu University (Education TV ETV) and it's employees commitment degreed is as follows; employees working at TV Production Center are 60.4% males, 39.6% is females. 35.8% of employees are under 30 years old, 64.2% are around and over 30 years. In terms of their marital status, 59.7% are married and %40.3 is single. 42.5% have no children, 34.3% have one, 20.1% have two, 3% have three or more children. Organization employees mainly have assecrate, under graduate and graduate degrees which is 73.8%. 14.9% of the employees are academics; 37.3% are staff, 24.6% are scholarship students, 15.7% are company workers and the other 7.5% are just workers. If we look at the amount of working years within the organization sample group, 57.5% are for 10 years plus and their experience and specialization are reflected at work.

In terms of the level of approval to the statement in accordance with those commitment by employees; the results augur well with affective commitment; normative follows, and lastly continuance emerges. This result also ties with the literature.

According to the t-test mode relating to commitment perspections and gender factors; the mean points for all affective, continuance and normative commitment are higher for females when compared to males. This indicates a significant relationship between gender and organizational commitment. Females are reluctant to consider new job possibilities because of factors like children and marriage. According to Anova mode, relating to commitment perspectives and age, there is no significant difference between age groups for these commitments.

Continuance commitment appeared to be higher for the 41 +age group .Simply put, the older one is , the less inclined he/she is to move to a new job , hence, a stronger commitment is dedicated to the company. For these groups, a new job means potential risks. In another organization, they may not have the same rights and the status. That might be the reason that this particular age group is seen to be related to continuance commitment.

The indicator of greater significiance in 17-22 age group for normative commitment might be tied to the fact that the employees in this group consists of students of Open Education Faculty.In fact, while continiuning their education these students also work as scholarship student at TV Production Center. Their high commitment within normative can be explained by their engagement to their school.

In terms of the outcomes of t-test in regard to employees' marital status and these three commitments the study shows that those married are organizationally more committed than those who are singles. This can be explained to the financial commitments and responsibilities which the average family has to face with.

In terms of the number of children factor in relation to the commitments the study shows that the ones with three and more children achieve higher mean points in any category when compared to the other ones. Hence, the responsibility within the family is strongly related to organizational commitment.

 

In terms of the educational level of employees and the commitment degree; primary and secondary education groups reflect more loyalty in commitment groups when compared to higher education groups.It can be argued that they might be offered more job opportunities unlike the less educated ones..

In terms of the titles involved for the employees of TV Production Center, academics offer higher loyalty levels when compared to others; this might be because of their avarage age and the amount of working year's commited to the organization. For the ones with 15+ years of working within the organization, significant difference within commitment issue came to the fore.

As a general assesment; females, married emplyoees and the ones with children in the older age groups, lower educational levels employees, the ones with 15+ working years within the organization, all show greater loyalty to the organization. This trend also runs parallel with the literature.

The attachment level of the staff towards their institution is an important indicator regarding organizational development and their willingness to do their job. In this regard, research studies focusing on this topic should scrutinize on the current situation, and implications of these studies should be used to ameliorate the attachment level of staff in organizations. Such implementations are good opportunities to develop positive attitudes of the staff towards their organization.

In addition, organization managers should value their employees, improve working conditions, respect employee opinions, consider employee complaints and reward their successes to increase the staff attachment level. When the staff members see that they are considered, their emotional, normative and continuity attachment will increase successively. Individuals with higher level of organizational attachment will be more willing to work for the organization and to stay as a member of the organization, which brings about higher levels of productivity in the organization.

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# PERCEPTIONS OF ONLINE INSTRUCTION

Wade W. FISH, Ph.D.
Assistant Professor of Educational Leadership
Department of Educational Leadership
Texas A&M University-Commerce
P.O. Box 3011 / Young Education North #113
Commerce, TX 75429-3011
Phone: 972.722.1723
Fax: 903.886.5507
E-mail: Wade_Fish@tamu-commerce.edu

Peggy B. GILL, Ed.D.
Associate Professor of Educational Leadership
Director of Tyler GEAR UP
Department of Educational Leadership and Policy Studies
The University of Texas at Tyler
3900 University Blvd. – HPR 131
Tyler, TX 75799
Phone: 903.565.5675
Fax: 903.565.5527
E-mail: pgill@uttyler.edu

**Biodata of Authors**
Dr. Wade Fish is an Assistant Professor of Educational Leadership at Texas A&M University-Commerce. He teaches graduate level online special populations and research methods courses. His research interests include online teaching, relations between parents of children receiving special education services and educators, and instructional practices for students receiving special education services.

Peggy B. Gill, Ed.D. is currently Associate Professor of Educational Leadership at the University of Texas at Tyler where she teaches online graduate education courses. She is also the Director of the Tyler GEAR UP Project which is a federally funded program to encourage and support minority and low income students entrance into college. She is Co-Editor of *School Leadership Review*, a journal that addresses the leadership issues in public education. Her research interests include educational change and leadership.

**ABSTRACT**
Online instruction has influenced how higher education redefines teaching as universities understand the significance and move towards the paradigm of online teaching and learning. Despite the benefits of online teaching, many university faculty members tend to gravitate toward instructional practices that are most comfortable to them. The purpose of this study was to reveal whether faculty at one university valued and supported the paradigm of online teaching and learning. Participants were asked to rate their comfort levels and training towards teaching online, as well as their perceptions pertaining to student learning outcomes and the delivery of academic tasks being taught online. Advantages, disadvantages and barriers of online instruction as perceived by university faculty were additionally revealed in this study. Perceptions of teaching and learning outcomes were strongly influenced by experience teaching online. Clearly, those who had positive online experiences felt the teaching and learning outcomes were equivalent to traditional classrooms while those who had never taught online, or had previously negative experiences, did not feel the teaching and learning outcomes were essentially the same. Few participants were comfortable with teaching entire courses online, but almost all respondents saw value in using online availability to enhance the traditional classroom environment.

**Key Words:** faculty perceptions, online teaching, online instruction

## INTRODUCTION
The popularity of online instruction in higher education has risen in recent years as evident in the increased number of online course offerings (Beatty & Ulasewicz, 2006; Li & Akins, 2005). During the 2000-2001 academic year, 89% of public 4-year institutions offered distance education courses (Tellent-Runnels et al., 2006). Technological advancements in online teaching (Bennett & Lockyer, 2004) and student demand (Britt, 2006) have influenced colleges and universities to move towards the paradigm of online learning. As institutions understand the significance of online teaching (Sanders & Morrison-Shetlar, 2001), online instruction has influenced how higher education redefines teaching (Conceicao, 2006). Universities are investing in web-based

 

course delivery systems and are focused on recruiting and training faculty to teach online (Floyd, 2003; Koehler, Punyashloke, Hershey, & Peruski, 2004).

Universities frequently demand the implementation of online instruction despite some faculty members not always having the competency to teach courses online (Sims, 2002). Most university faculty throughout the country perceive technology as stressful (Young, Cantrell, & Shaw, 2001), have little experience with online delivery and do not know how to deliver online courses (Britt, 2006; Koehler et al., 2004). Furthermore, not all faculty members are suited to teach online courses due to differences in individual teaching styles (Christianson, Tiene, & Luft, 2002). While a Hinson & LaPrairie (2005) study concluded that only few faculty members were confident in their ability to integrate technology into instruction, faculty did become more comfortable with online teaching through consistent professional development and interaction with knowledgeable professionals and peers. Therefore, sufficient training and support should be provided to faculty to enhance their ability to deliver online instruction (Bennett & Lockyer, 2004).

Online teaching provides faculty with the flexibility of location and time (Li & Akins, 2005) in addition to the unique dimensions and rewarding experiences that are not always present under traditional instructional delivery conditions (Conceicao, 2006). Online instruction potentially enhances student independence, student retention, and facilitation of higher order thinking (Britt, 2006; Koehler et al., 2004). Despite these benefits, transitioning to online instruction is not easy as university faculty tend to gravitate towards instructional practices that are most comfortable to them (Hinson & LaPrairie, 2005).

While a study conducted by Wilson (2001) revealed that faculty perceived online instruction as being inferior to traditional teaching, Warren and Holloman (2005) concluded that both methods of instruction are equivalent with no significant differences in student outcomes. According to a Christianson et al. (2002) study measuring perceptions of online teaching among nursing faculty, online courses were characterized as highly interactive and effective. Furthermore, faculty perceived their online teaching experiences as being successful and enjoyable to teach.

Quality online instruction is dependent upon faculty not subscribing to the myths of online learning (Li and Akins, 2005). Common misconceptions of online learning identified by Li and Akins included this non-traditional method of delivery being perceived as (a) being limited to content learning, (b) promoting student isolation, (c) serving as a one-way learning process, (d) encouraging student cheating and (e) requiring both learners and instructors to be proficient in technology.

The purpose of this current study was to reveal whether faculty at one university valued and supported the paradigm of online teaching and learning. Faculty members within this institution were encouraged by university administration to develop online courses in efforts to adhere to student demand and increased enrollment. Did faculty members value online teaching despite these demands placed upon them? Participants were asked to rate their comfort levels and training towards teaching online, as well as their perceptions pertaining to student learning outcomes and the delivery of academic tasks being taught online. Advantages, disadvantages and barriers of online instruction as perceived by university faculty were additionally revealed through open-ended questioning.

**METHODOLOGY**

Participants consisted of 87 faculty members from a public university in a southwestern state. All five colleges within this university were represented. A cover letter explaining the study along with a link to an online survey tool, created through *Survey Monkey,* was distributed to all faculty members within each college of the university to gather participant perceptions of online instruction. This instrument consisted of a questionnaire which allowed participants to provide input pertaining to online instruction in reference to the following: (a) background information, (b) comfort levels and training, (c) student learning outcomes, (d) delivery of academic tasks and (e) perceived advantages, disadvantages and barriers. Survey questions were created utilizing literature review research. This survey instrument was pilot-tested to a select group of university faculty in order to obtain feedback with regards to the validity, reliability, and clarity of the survey tool. The feedback from the pilot-test participants was utilized to improve and enhance the final version of the survey tool. The survey instrument had internal consistency, using Chronbach's alpha of 0.93.

Nonparametric statistics were used to analyze survey results due to the nonrandom sampling of participants and the ordinal nature of the data. The computation of Kruskal-Wallis test statistics was used at the 0.05 level of significance to compare differences in the mean rankings of the Likert scale responses between university faculty members with previously positive, previously negative and no experiences teaching online. SPSS was utilized to

 

calculate descriptive statistics to include the means, standard deviations and percentage totals of the survey items.

Participants responded to open-ended questions addressing what they perceived to be the advantages, disadvantages and barriers of online instruction. Qualitative statistics were utilized to measure these open-ended survey questions. Data were analyzed by both the researchers and an independent coder based upon categories to construct meaning through the constant comparative method (Lincoln & Guba, 1985). Within the open-ended responses, content was uniquely identified by particular ideas through color-coding. This method was utilized to label and distinguish among categories of the data. Data were then organized based upon emergent categories revolving around similar characteristics.

**RESULTS**

Data were organized to compare perceptions of online instruction between those faculty members who had previously positive, negative and no online teaching experiences. While 36% (31) of those surveyed had positive experiences teaching online and only 9% (8) encountered generally negative experiences, 55% (48) of the faculty indicated that they had never utilized online teaching as a method of instruction. The College of Nursing and Health Sciences was the most represented among faculty with online teaching experience with 16% (14). The highest representation of faculty with no online teaching experience resided from the College of Arts and Sciences with 28% (24).

The majority of the faculty primarily taught undergraduate students as only 9% (8) of participants surveyed primarily served graduate and post-graduate students. The highest percentage of faculty with positive online teaching experiences identified their teaching style as that of a facilitator, while the demonstrator/personal model was the teaching style for 33% (29) of those surveyed with no online teaching experience. Kruskal-Wallis results, revealed significant mean rank differences between the three faculty groups for all of the Likert-scale survey items in reference to comfort levels and training, student learning outcomes and the delivery of academic tasks. Appendix A provides the means of faculty responses for each of these ranked Likert-scale survey items.

*Comfort Levels and Training*

Participants were asked to rate their comfort levels, qualifications, training for teaching online, as well as their desire to teach online courses. Most of the faculty with both previously positive and negative online teaching experiences felt relatively comfortable implementing online instruction. Only 10% (4) of all experienced online instructors surveyed did not feel comfortable teaching online compared to the 56% (27) of faculty with no online teaching experience who revealed that they felt relatively uncomfortable with implementing this type of instructional delivery. While 90% (35) of faculty with online teaching experience did consider themselves qualified to effectively teach courses online, only 37% (18) of the participants surveyed without online teaching experience considered themselves qualified to effectively teach online courses.

The perceived comfort level and qualifications towards teaching online courses among faculty with no online teaching experience was likely due to the fact that only 12% (6) within this group believed that they had been provided with sufficient training to conduct online instruction. While 48% (15) of university faculty with positive online teaching experiences responded favorably that they were provided with sufficient training to teach online, the number of faculty with negative online teaching experiences who believed that they were provided with sufficient training accounted for 63% (5).

Overwhelmingly, 79% (31) of experienced faculty teaching online had received either formal or informal training, while 69% (33) of faculty with no online teaching experience had never taken advantage of any type of training pertaining to online instruction. Furthermore, only 13% (11) of participants surveyed with no online teaching experience expressed a desire to teach some of their courses online. Appendix B provides a summary of distribution of faculty responses pertaining to comfort and training levels.

*Student Learning Outcomes*

The majority of faculty with positive online teaching experiences responded favorably with regards to online instruction positively influencing student learning outcomes. Most participants surveyed within this subgroup believed the following: (a) learning outcomes from online courses are potentially equivalent to traditional courses within their area of specializations, (b) most students within their area of specialization benefit from online teaching and learning, (c) online teaching complements adult learning theory, (d) most students prefer online instruction and (e) online instruction enhances the ability to effectively serve students

 

Faculty with no online teaching experience responded less favorably than their colleagues with positive experiences. While 74% (23) of the faculty within this group believed that online instruction potentially complements adult learning theory, only 21% (10) believed that online instruction is equivalent to traditional course delivery. Furthermore, 60% (29) either strongly disagreed or disagreed that online instruction is beneficial to most students. Only 12% (6) of those with no online teaching experience responded favorably that the majority of students prefer online instruction.

While 81% (25) of the faculty with positive online experiences considered themselves advocates for online teaching, only 13% (1) with negative experiences teaching online responded in the same manner. Only 25% (2) of faculty with negative experiences agreed that online instruction is equivalent to traditional teaching. No participants within this subgroup believed that online instruction benefits most students, complements adult learning theory or is the preferred method of course delivery for most students. Appendix C compares the discrepancy among the three faculty groups pertaining to these survey responses.

*Delivery of Academic Tasks*

The majority of faculty with predominately positive experiences teaching online believed that lectures, case studies, group discussions, group activities and research could be effectively taught online. On the other hand, no participants with negative online experiences believed that group discussions, group activities and research could be effectively implemented online. Only 25% (2) of those with negative experiences believed that lectures could be effectively taught online, while 26% (2) responded favorably towards the effectiveness of online case study activities.

Regarding the delivery of particular instructional tasks, faculty with no online teaching experience responded more favorably than their colleagues who had generally negative experiences teaching online. According to survey results, 50% (24) within this group believed that lectures could be taught effectively online, while 47% (23) and 48% (24) responded favorably with regards to online case study and research implementation respectively. Appendix D provides a distribution of participant responses pertaining to the delivery of academic tasks being taught online.

*Advantages and Disadvantages of Online Teaching and Learning*

Participants within this study were asked to discuss the advantages and disadvantages of online teaching and learning through open-ended questioning. Advantages and disadvantages of online instruction identified by faculty members revolved around common themes pertaining to higher order thinking, student convenience, face-to-face interaction and student honesty.

*Higher order thinking*

One common theme cited by faculty members who had positive experiences with online teaching revolved around the facilitation of higher order thinking. As one faculty member stated "one advantage includes facilitating higher order thinking among students and the application of adult learning theory."

Lack of higher order thinking was a common disadvantage identified by faculty who had no experiences teaching online courses. One of these faculty members stated that online instruction "provides no or little higher level thinking and application," while another faculty member labeled this form of instruction as "cheap and low level." One participant with no online teaching experience expressed the following:

> Online instruction is very inefficient from a pedagogical and cost/benefit analysis. Online algorithms are great for recitation and practice and to enhance learning. We used to call that homework. Face to face instruction is the best way to become intimate with the essence of discipline. The cold stare of a monitor simply misses the nuances of content.

*Student convenience*

Student recruitment and student convenience were the other themes addressed by those faculty members who had more positive perceptions of online teaching. One faculty member indicated "online learning is one of the best ways for adult learners, particularly those who work, to participate in higher education." Other participants believed that online delivery is able to "reach a greater number of non-traditional students" in addition to providing an "outreach of students in rural areas." Catering to students who support families was another advantage cited by faculty members who had an overall positive perception towards online teaching. Online learning provides a means to "meet the needs of students who live far from the university or who have children or life demands which limit their ability to attend traditional campus classes."

 

Participants who previously had either negative or no experiences teaching online courses shared similar input pertaining to student convenience and flexibility. One faculty member who had negative experiences teaching online stated that online instruction "provides a flexible forum for individuals who work and cannot meet in a regular classroom environment." Another participant with no online teaching experience stated that the advantage of online teaching is the "flexibility in choosing learning time and opportunity to review content on an individual basis."

*Face-to-face interaction*

Lack of face-to-face interaction was not only a common disadvantage identified by faculty members who had positive experiences with online instruction, but for those participants who had never taught online as well. Many faculty members with previously positive experiences stressed that while online instruction served as an effective means for delivering course content, they still missed the face-to-face interaction with students. One faculty member indicated that "a major problem with teaching engineering courses online is regarding (the ability to incorporate) laboratory components and hands-on activities."

The notion of not being able to physically meet with students on a regular basis was what appeared to prevent most faculty members who had never taught online from considering this delivery of instruction. One faculty member with no online teaching experience stressed that online teaching "eliminates personal contact that has value in mentorship and learning," while another indicated that "I like real interaction with students." According to another participant with no online teaching experience, online teaching "is not face-to-face. Teaching is a personal interaction. Online is not teaching and is not appropriate to a university." One faculty member stated that "real teaching requires human interaction. We have lost too much person to person interaction in our society."

*Student honesty*

Student honesty was a concern expressed by all participants surveyed especially among those faculty members with no experience teaching online. Many faculty expressed concerns that students were more likely to cheat on tests and assignments without the physical proximity of an instructor. Two participants with no online teaching experience expressed the following.

> The biggest barrier to online course offering is that it is purely based on the honor system. There is never any assurance that the person enrolled is the one who is actually doing the work. So far, I would like some assurance that enrolled students are the ones actually taking the exams.
>
> (A concern is) trust and security. Professor and student don't really know each other. Someone else could be doing assignments and exams. Fraud is less containable than it is in real life, but it is getting harder in real life too. Security in your teaching materials can be compromised.

Faculty members with negative experiences teaching online expressed similar concerns. One faculty member reported

> Everyone can cheat and have someone help them with their work. Who really knows who is doing the work? All the students tell me that they have had someone do some or most of their work for an online course.

A second faculty member was also concerned about the security of online teaching.

> The nature of online courses sets up an atmosphere that is easy to "get around" fulfilling certain types of course requirements. It would be naïve on an instructor to think otherwise. For example, a member of our department tried to give an online exam through a secure website. However, it was discovered that a number of students cheated by linking laptops together on a wireless network.

While student honesty was also a disadvantage expressed by faculty members with positive experiences teaching online, these participants indicated that online teaching caters more towards the self-motivated and disciplined student. Less motivated students and those with learning styles that more appropriately caters towards traditional teaching will likely struggle with online teaching and learning.

*Barriers to Online Teaching and Learning*

Common barriers perceived by all faculty members surveyed revolved around course preparation time, faculty training and support, and faculty acceptance towards the paradigm of online instruction. Course preparation time was a disadvantage noted by all participants within this study. According to one faculty member who had a previously negative online teaching experience, online teaching is "very time consuming. (It is) like writing a

textbook to explain the textbook." One participant who had a more positive outlook towards online teaching stated that online instruction "takes longer to organize, construct, teach and evaluate." A faculty member with no online teaching experience concluded the following:

> It (online teaching) takes a great deal of instructor time in a normal instructor's class with students. I see big problems working with students online and the time it takes for class preparation and grading, while maintaining a full teaching load and conducting research.

Faculty members within in this study expressed concerns regarding faculty training and support to effectively implement online instruction to their students. Most participants with no online teaching experience were not familiar with how to teach online courses, which lead to the perception that these courses are difficult to organize. As one faculty member with an overall positive outlook towards online teaching indicated, "I have in the past just relied on colleagues' advice, but there must be a better form of training for someone to be tempted to teach more classes online."

Faculty members with positive experiences towards online teaching indicated that faculty acceptance is one of the biggest barriers of online delivery. One faculty member indicated that there is "a lack of acceptance of some (faculty) that online learning is a viable means of teaching." Another faculty member expressed the following.

> (A Barrier is) faculty and administration beliefs about online instruction. The research literature shows no difference in student achievement outcomes. There is a belief by many faculty members that the quality is lower as indicated by college created committees that seek to evaluate the "quality" of online offerings. This debate has been over for five years at most universities.

The previous response was consistent with feedback from participants who had never taught online. One these faculty members believed that "online teaching will never be as effective as traditional classroom teaching," Another participant with no online teaching experience noted that "my biggest barrier with solely online learning is that the material cannot be completely covered. A lot of conceptual questions cannot be asked." One instructor went on to state "my personal bias is that it is a crappy way to educate students." Perhaps some faculty with no online teaching experience would be willing to consider this method of delivery as indicated by the following response. "Since my learning style would not be conducive to an online course, I am naturally biased against it. However, because I am not familiar with how to teach an online course, perhaps there is a way to minimize this bias with effective teaching techniques."

**DISCUSSION**

Faculty is perhaps the single greatest resource of any university. Faculty support for any new initiative such as online learning is critical to its success. The growing demand for online courses (Britt, 2006; Tallent-Runnels et al., 2006) has a resultant demand for faculty to design and deliver coursework. This study supports research that suggests training in and familiarity with online instruction is important in developing a faculty's acceptance and utilization of this instructional delivery option (Britt; Hinson & LaPrairie, 2005; Sherron, 1998). Training, whether formal or informal, increased the likelihood that faculty would utilize online delivery. Almost half of faculty who had taught online felt they had received sufficient training in online instruction, whereas only 13% (6) of respondents who had never taught an online course felt they had received sufficient training to deliver online instruction.

Interestingly, while only 30% (26) of all respondents felt they had received sufficient training to teach online, 50% (43) of the respondents felt comfortable implementing online instruction and 61% (53) of all respondents felt qualified to teach online. It appears that faculty is learning to teach online from other faculty, using trial-and-error or other informal methods in addition to formal training and does not equate qualification to teach online with formal training or level of comfort. In general, faculty who chose to teach courses using online formats found the experience to be a positive one.

Most respondents clearly saw the value of presenting lecture, case studies and research in online formats. However, almost half of the respondents did not feel that group discussion and group activities could effectively be presented in an online format. When the data are disaggregated, those who had never taught online were not comfortable with including group discussion and group activities online. Traditional classrooms have frequently assigned research and case studies as outside class activities so it is expected that these assignments would be seen as easily transferred online. Additionally, lecture notes and power points are commonly provided to students. Teachers who have had little training and no experience in designing online courses viewed classroom activities through the traditional classroom lens of understanding. On the other hand, most university faculty

 

members who had taught online recognized the potential of online instruction and believed group discussion and group activities could be effective online.

Perceptions of teaching and learning outcomes were strongly influenced by experience teaching online. Clearly, those who had positive online experiences felt the teaching and learning outcomes were equivalent to traditional classrooms while those who had never taught online, or had previously negative experiences, did not feel the teaching and learning outcomes were essentially the same. Participants with positive online experiences strongly supported that online classes enhance the university's ability to serve students and believed that most students prefer online classes.

**CONCLUSION**

This study examined faculty perceptions of online learning to determine if they valued online learning as a viable teaching and learning environment. Results from this study characterized a faculty in transition. When examined in the aggregate, respondents seemed to be evenly split in regards to the value of online teaching. However, disaggregated data revealed the divide between those who had taught online and those who had not. Participants in the study who had successfully taught courses online were advocates for this instructional delivery method while faculty members who had not taught online tended to have reservations about the system. Few participants were comfortable with teaching entire courses online, but almost all respondents saw value in using online availability to enhance the traditional classroom environment.

Training was an issue for both those who had taught online and those who had not. Only 30% (26) of all respondents felt they had received sufficient training to successfully teach online. Without sufficient training, it is unlikely that most faculty member would attempt to teach online or see the value of this approach. Thus, a program of initial and continuous training is essential to address both the misconceptions about online learning and to provide the skills necessary for successful online course design and delivery. Adult learning theory should be an integral part of this training. Too few of the participants in this study were clearly aware of the needs of adult learners that could be addressed through quality online courses. Along with this lack of awareness of adult learning theory was a lack of understanding of online instruction. Between one-fourth and one-half of respondents disagreed or strongly disagreed with any positive value statements about online teaching and learning. This strong negative response to an instructional system that is clearly a significant part of 21st Century post-secondary education indicates a need for focused conversations about the reality of online instruction. While all faculty will probably not use or embrace online instruction, all faculty should be aware of the positive aspects of this option so they can make informed decisions about teaching and learning.

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**Appendix A**

*Distribution of Faculty Responses*

| Item | Faculty with Positive Experiences M (SD) | Faculty with Negative Experiences M (SD) | Faculty with No Experiences M (SD) | All Faculty M (SD) |
|---|---|---|---|---|
| Comfort Levels and Training | | | | |
| Comfortable implementing | 4.16 (.78) | 3.50 (1.07) | 2.33 (1.24) | 3.09 (1.38) |
| Consider self qualified | 4.26 (.68) | 3.88 (.99) | 2.98 (1.28) | 3.52 (1.23) |
| Sufficient training | 3.42 (.96) | 3.00 (1.41) | 2.17 (1.12) | 2.69 (1.23) |
| Desire to teach some online | 4.03 (.87) | 1.75 (.46) | 2.56 (1.25) | 3.01 (1.33) |
| Future plans to teach online | 4.61 (.56) | 2.25 (1.16) | 2.75 (1.31) | 3.37 (1.43) |
| Student Learning Outcomes | | | | |
| Advocate for online teaching | 4.19 (.83) | 2.13 (1.13) | 2.46 (1.22) | 3.05 (1.38) |
| Equivalent to traditional | 3.94 (1.06) | 2.25 (1.16) | 2.38 (1.14) | 2.92 (1.34) |
| Beneficial to most students | 3.97 (1.11) | 1.75 (.71) | 2.31 (1.13) | 2.85 (1.38) |
| Complements adult learning | 4.07 (.93) | 2.63 (.52) | 3.08 (1.03) | 3.39 (1.08) |
| Most students prefer online | 3.77 (1.20) | 1.75 (.46) | 2.52 (.97) | 2.90 (1.23) |
| Enhances student service | 4.26 (.96) | 2.00 (1.07) | 2.54 (1.20) | 3.10 (1.41) |
| Delivery of Academic Tasks | | | | |
| Lecture | 3.81 (1.19) | 2.50 (.93) | 2.92 (1.35) | 3.20 (1.34) |
| Case studies | 4.29 (.78) | 2.88 (1.25) | 3.06 (1.26) | 3.48 (1.26) |
| Group discussion | 4.03 (.80) | 1.75 (.46) | 2.42 (1.30) | 2.93 (1.37) |
| Group activities | 3.71 (1.01) | 2.00 (.76) | 2.10 (1.15) | 2.67 (1.32) |
| Research | 4.16 (.69) | 2.13 (.83) | 2.90 (1.32) | 3.28 (1.29) |

*Note.* 1 = strongly disagree. 2 = disagree. 3 = neutral. 4 = agree. 5 = strongly agree.

**Appendix B**

*Comfort Levels and Training*

| Item | Strongly disagree % (N) | Disagree % (N) | Neutral % (N) | Agree % (N) | Strongly agree % (N) | Total % (N) |
|---|---|---|---|---|---|---|
| Comfortable Implementing | | | | | | |
| Positive experiences | 0% (0) | 6% (2) | 3% (1) | 59% (18) | 32% (10) | 100% (31) |
| Negative experiences | 0% (0) | 25% (2) | 13% (1) | 50% (4) | 13% (1) | 100% (8) |
| No experiences | 35% (17) | 21% (10) | 23% (11) | 17% (8) | 4% (2) | 100% (48) |
| Consider Self Qualified | | | | | | |
| Positive experiences | 0% (0) | 3% (1) | 3% (1) | 59% (18) | 35% (11) | 100% (31) |
| Negative experiences | 0% (0) | 13% (1) | 13% (1) | 50% (4) | 25% (2) | 100% (8) |
| No experiences | 21% (10) | 8% (4) | 33% (16) | 27% (13) | 10% (5) | 100% (48) |
| Sufficient Training | | | | | | |
| Positive experiences | 0% (0) | 19% (6) | 32% (10) | 35% (11) | 13% (4) | 100% (31) |
| Negative experiences | 25% (2) | 13% (1) | 0% (0) | 63% (5) | 0% (0) | 100% (8) |
| No experiences | 38% (18) | 23% (11) | 27% (13) | 10% (5) | 2% (1) | 100% (48) |
| Desire to Teach Some Online | | | | | | |
| Positive experiences | 0% (0) | 6% (2) | 16% (5) | 46% (14) | 32% (10) | 100% (31) |
| Negative experiences | 25% (2) | 75% (6) | 0% (0) | 0% (0) | 0% (0) | 100% (8) |
| No experiences | 25% (12) | 25% (12) | 27% (13) | 15% (7) | 8% (4) | 100% (48) |
| Future Plans to Teach Online | | | | | | |
| Positive experiences | 0% (0) | 0% (0) | 3% (1) | 32% (10) | 65% (20) | 100% (31) |
| Negative experiences | 37% (3) | 13% (1) | 37% (3) | 13% (1) | 0% (0) | 100% (8) |
| No experiences | 23% (11) | 23% (11) | 19% (9) | 27% (13) | 8% (4) | 100% (48) |

**Appendix C**

*Student Learning Outcomes*

| Item | Strongly disagree % (N) | Disagree % (N) | Neutral % (N) | Agree % (N) | Strongly agree % (N) | Total % (N) |
|---|---|---|---|---|---|---|
| Advocate for Online Teaching | | | | | | |
| Positive experiences | 0% (0) | 3% (1) | 16% (5) | 39% (12) | 42% (13) | 100% (31) |
| Negative experiences | 37% (3) | 25% (2) | 25% (2) | 13% (1) | 0% (0) | 100% (8) |
| No experiences | 29% (14) | 23% (11) | 25% (12) | 19% (9) | 4% (2) | 100% (48) |
| Equivalent to Traditional | | | | | | |
| Positive experiences | 3% (1) | 6% (2) | 19% (6) | 35% (11) | 35% (11) | 100% (31) |
| Negative experiences | 25% (2) | 50% (4) | 0% (0) | 25% (2) | 0% (0) | 100% (8) |
| No experiences | 23% (11) | 42% (20) | 15% (7) | 17% (8) | 4% (2) | 100% (48) |
| Beneficial to Most Students | | | | | | |
| Positive experiences | 3% (1) | 10% (3) | 13% (4) | 35% (11) | 39% (12) | 100% (31) |
| Negative experiences | 37% (3) | 50% (4) | 13% (1) | 0% (0) | 0% (0) | 100% (8) |
| No experiences | 29% (14) | 31% (15) | 21% (10) | 17% (8) | 2% (1) | 100% (48) |
| Complements Adult Learning | | | | | | |
| Positive experiences | 0% (0) | 6% (2) | 19% (6) | 35% (11) | 39% (12) | 100% (31) |
| Negative experiences | 0% (0) | 37% (3) | 63% (5) | 0% (0) | 0% (0) | 100% (8) |
| No experiences | 13% (6) | 6% (3) | 46% (22) | 31% (15) | 4% (2) | 100% (48) |
| Most Students Prefer Online | | | | | | |
| Positive experiences | 6% (2) | 13% (4) | 6% (2) | 46% (14) | 29% (9) | 100% (31) |
| Negative experiences | 25% (2) | 75% (6) | 0% (0) | 0% (0) | 0% (0) | 100% (8) |
| No experiences | 17% (8) | 29% (14) | 42% (20) | 10% (5) | 2% (1) | 100% (48) |
| Enhances Student Service | | | | | | |
| Positive experiences | 3% (1) | 3% (1) | 6% (2) | 39% (12) | 49% (15) | 100% (31) |
| Negative experiences | 37% (3) | 37% (3) | 13% (1) | 13% (1) | 0% (0) | 100% (8) |
| No experiences | 25% (12) | 27% (13) | 19% (9) | 27% (13) | 2% (1) | 100% (48) |

**Appendix D**

*Delivery of Academic Tasks*

| Item | Strongly disagree % (N) | Disagree % (N) | Neutral % (N) | Agree % (N) | Strongly agree % (N) | Total % (N) |
|---|---|---|---|---|---|---|
| Lecture | | | | | | |
| Positive experiences | 3% (1) | 19% (6) | 3% (1) | 42% (13) | 32% (10) | 100% (31) |
| Negative experiences | 0% (0) | 75% (6) | 0% (0) | 25% (2) | 0% (0) | 100% (8) |
| No experiences | 23% (11) | 19% (9) | 8% (4) | 44% (21) | 6% (3) | 100% (48) |
| Case Studies | | | | | | |
| Positive experiences | 0% (0) | 3% (1) | 10% (3) | 42% (13) | 45% (14) | 100% (31) |
| Experiences | 13% (1) | 25% (2) | 37% (3) | 13% (1) | 13% (1) | 100% (8) |
| No experiences | 17% (8) | 17% (8) | 19% (9) | 39% (19) | 8% (4) | 100% (48) |
| Group Discussion | | | | | | |
| Positive experiences | 0% (0) | 6% (2) | 10% (3) | 58% (18) | 26% (8) | 100% (31) |
| Negative experiences | 25% (2) | 75% (6) | 0% (0) | 0% (0) | 0% (0) | 100% (8) |
| No experiences | 31% (15) | 29% (14) | 13% (6) | 21% (10) | 6% (3) | 100% (48) |
| Group Activities | | | | | | |
| Positive experiences | 3% (1) | 10% (3) | 19% (6) | 48% (15) | 19% (6) | 100% (31) |
| Negative experiences | 25% (2) | 50% (4) | 25% (2) | 0% (0) | 0% (0) | 100% (8) |
| No experiences | 38% (18) | 35% (17) | 8% (4) | 17% (8) | 2% (1) | 100% (48) |
| Research | | | | | | |
| Positive experiences | 0% (0) | 0% (0) | 16% (5) | 52% (16) | 32% (10) | 100% (31) |
| Negative experiences | 25% (2) | 37% (3) | 37% (3) | 0% (0) | 0% (0) | 100% (8) |
| No experiences | 25% (12) | 13% (6) | 14% (7) | 44% (21) | 4% (2) | 100% (48) |

# PERCEPTIONS OF STUDENTS ON THE APPLICATION OF DISTANCE EDUCATION IN PHYSICAL EDUCATION LESSONS

Metin YAMAN, PhD.
Gazi University
School of Physical Education and Sports
Ankara, TURKEY
metinyaman@gazi.edu.tr

**ABSTRACT**
The purpose of this study is to identify the viewpoints of the candidates of Physical Education and Sports Teachers and Sports Managers; and to examine these viewpoints with respect to sex, class, accommodation of the family, monthly income of the family, computer and internet facilities. Survey method was used to carry out the study. The sample of the study consisted of the students attending Department of Physical Education and Sports at Educational Faculty and Sports Management Department of Physical Education and Sports High School in Sakarya University. In order to gather data, a questionnaire was developed by the researcher and it was applied to 330 students. Several statistical techniques such as frequency, percentage, t-test and ANOVA were used to analyze the data depending on the qualities of the variables. The results of the study indicated that the students think that by the implementation of distance education, global education and equality of opportunity would be succeeded. They also think they should have general skills about computer hardware, software and internet usage in order to take the advantage of distance education. According to the students, providing distance education in practical lessons of the physical education field is almost impossible, because the compensation of the failures in physical movements on time is not possible by distance education.

**Keywords:** Physical Education, Distance Education, Perceptions.

## INTRODUCTION

Distance education is expanding at a steady rate in many institutions, ranging from the families who decide to home-school their children to elementary and secondary schools, colleges and universities, and major corporations. While the number of those who are involved in various forms of distance learning may still pale in comparison with those who are learning in traditional ways, the important factor is the steady rate at which distance learners are increasing (Saba, 2005).

Historically, in the 1800s, the physical distance that prevented face-to-face education in many parts of the world led to education via mail, and, later in the century, telephone or radio. In the 1950s and 1960s, the more technologically advanced countries turned to audio-teleconferencing (multiple participants on one phone line) and television to increase access to education when distance was a barrier. In the 1980s and the 1990s, video tapes and computer instruction become more prevalent (Brown and Brown, 1994).

In 1989, Niper (1989) identified three generations of distance education: the first was correspondence teaching; the second was multi-media teaching - integrating the use of print with broadcast media, cassettes and to some degree computers; and the third generation was identified with the new interactive communication technologies (Guri-Rosenblit, 2005).

Today, increased and improved access to the Internet has allowed more students to communicate from their homes to teachers, schools, and other students around the world (Gilbert, 2000). In today's educational systems, the goals of distance education have been to provide degree granting programmes, to battle illiteracy in developing countries, to provide training opportunities for economic development, and to offer curriculum enrichment in non-traditional educational settings (McIsaac and Blocher, 1998).

Distance means where the teacher and the student are separated by space and/or time (Kearsley, 2000). There are two general criteria for judging the type of distance: geographical location and time (Miller and King, 2003). Many researchers argue that distance education is the key to expanding educational opportunities to rural areas (Hodder and Carter, 1997). Since, it enables larger numbers of people to have access to education and training (Grill, 1999). Learners, regardless of the country in which they live, study in four types of locations when taking a course delivered by distance education: The home, the workplace, study centers, and classrooms (Roberts, 1996). Synchronous and asynchronous distance education courses offer students the opportunity to enroll in classes where it might not otherwise be possible due to time and/or distance conflicts with course schedules (Dunning et al. 2000).

Moore and Kearsley (1996, p. 2) defined distance education as "planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements".

Isman (1998, p. 18) also defined distance education as "an education system model which realizes teaching-learning activities between students and teachers in different locations through communication technologies and postal services, implying the existence of loose communication between the organization and the students".

**Features of Distance Education**

Distance education is typically characterized as having four features (Verduin and Clark, 1991, p. 8): (1) Teacher and learners are separated during at least a majority of the instructional process; (2) an educational organization influences the process, including some form of student evaluation; (3) educational media [technologies] are used to unite teacher and learner and to carry course content; and (4) two-way communication is provided between teacher, tutor, or educational agency and learner.

Crooks (1983, p. 329-330) identified some advantages of distance education in terms of the courses provided:

- Flexibility in the curriculum and content of learning materials through, for example, modular structures or credit systems;
- the conscious design of learning materials for independent study, incorporating, for example, clearly-formulated learning objectives, self-assessment devices, student activities and the provision of feedback from students to course writers and tutors and vice versa;
- the planned use of a wide range of media and other resources, selected from those available in the context of the system and suited to the needs of the students; these media may include specially prepared correspondence texts, books, newspaper supplements, posters, radio and television broadcasts, audio and video cassettes, films, computer-assisted learning experimental kits, local tuition and counseling, student self-help groups, lending library facilities and so on.

**Advantages of Distance Education**

Advantages of distance education to the students are considerable. Distance education is especially advantageous because it makes learning accessible to students all day, every day. This 24-hour accessibility allows students immense control over their own learning schedules and encourages active involvement from students in making decisions regarding their learning process (Dede, 1996). Through increasing access to distance education, students can meet their needs appropriately regardless of the present limitations and border lines (Verduin and Clark, 1994).

Some advantages of distance education to the student include: increased access to higher education (particularly for the non-traditional student), flexible scheduling of personal time, convenient location, individualized attention by the instructor, less travel, and increased time to think about, and respond to (via e-mail or discussion boards), questions posed by the instructor.

There are also some advantages of distance advantages to the institution. It increases enrollment, attracts new teaching staff (those interested in distance education), reduces the need to build and maintain university campuses and buildings, offers a new level of communication with students, requires the university to keep abreast of new technology, and signals the public that the institution is forward thinking and technologically advanced (Matthews, 1999).

Crooks (1983, p. 331) argued that distance education has the potential to:

- provide education and training for large numbers of people more rapidly than traditional methods alone;
- make better use of scarce resources, not least in adult literacy, tap new resources, and be significantly more cost-effective in comparison to conventional education;
- generate outputs relevant and appropriate to the different needs of major sectors of society, particularly rural development programmes to increase the quality of life of rural populations, and teacher training for the primary level.

**Technology and Media Usage in Distance Education**

Distance education has evolved from early correspondence education using primarily print-based materials into a worldwide movement using various technologies (McIsaac and Blocher, 1998).

It relies heavily on technologies of delivery. Print materials, broadcast radio, broadcast television, computer conferencing, electronic mail, interactive video, satellite telecommunications and multimedia computer technology are all used to promote student-teacher interaction and provide necessary feedback to the learner at a distance (McIsaac and Blocher, 1998). Interactive videoconferencing provides the opportunity for a faculty member to teach a class in a traditional classroom setting while concurrently instructing a different group of students in another classroom via interactive video. Introducing an audio link from the remote site back to the lecturer allows live interaction and enables questions. Teaching based on videoconferencing is pedagogically close to traditional university teaching (Matthews, 1999).

Distance education also employs media in many forms and to varying extents. It includes mail, facsimile, radio, television, satellite broadcasts, videotapes, teleconferencing and, most recently, the Internet. Electronic networks, remote databases, and collaborative working are becoming important. In addition, support materials include study packs, TV and radio programs, audio tapes and tutorials (Matthews, 1999).

**Distance Education for Physical Education**

In today's education world, almost every university or college is involved in some type of distance education (Moore and Kearsley, 1996). The rapid improvements in the computer technology have made the lesson activities easier for students and have increased their motivation. In addition technologies about distance education can be seen as a way to facilitate learning and improving interaction with the students in physical education.

The students in physical education departments can cooperate with the students from other classrooms or the other schools can do the projects through internet (Mohnsen, 2001; Sheingold and Hadley 1990). For instance the forums on the internet can increase the group interaction and web-pages can make the students reach huge piles of information easily. The use of e-mail is a beneficial way for informal communication between teachers as well (Knapper, 2001). The use of internet in the field education provides the information to spread fast improves communicative and writing skills and facilitates motivation for learning.

By using technological developments and internet in an organized way; students, teachers, athletes and trainers, doctors and patients may come together even if they are in different countries. Using web-pages, teleconference, e-mail and Msn, schools can be more than being just a building with walls and can become something that has a connection with every phase of life. The methods like Msn, pps and video might provide education to be more effective and enjoyable

Moreover, supervision of student teachers can be held by several methods such as videotaping, e-mailing, and creating a program-specific web site (Nabors, 1999; Souviney and Saferstein 1997; Wittenburg and McBride, 1998).

Nowadays, distance education programs are used in lots of countries for teacher's pre-service and in-service training. In Kenya, Mauritus, Indonesia, and Sri-Lanka, it is used for in-service training while in Zimbabve and Kenya it is used in preparatory teacher training programs (Sherestha, 1997). Teachers generally benefit from these pre-service and in service programs to complete the classes about their specialties and teaching methods, to be propped by inspectors and other teachers, and to communicate with them (Murphy, 1993).

According to these trends in higher education field, the purpose of this study is to identify the viewpoints of the candidates of Physical Education and Sports Teachers and Sports Managers; and to examine these viewpoints with respect to sex, class, accommodation of the family, monthly income of the family, computer and internet facilities.

**METHOD**

The study was carried our by using survey method. The sample of the study consisted of the students attending Department of Physical Education and Sports at Educational Faculty and Sports Management Department at Physical Education and Sports High School o Sakarya University. In order to gather the necessary data, the questionnaire named "The Students' Attitudes Towards Distance Education", which

was developed by the researcher, was applied to sample group consisted of 330 students by the researcher himself after completing validity and reliability analysis. In the questionnaire, the students were asked to reply 32 questions regarding the students' sex, class, place where the family live, monthly income of the family, if they have a computer, if they have internet connection and their attitudes towards computer and distance education, learning environment, roles of the students, learning methods, communication and distant learning system. The data was analyzed making use of SPSS 11.0 (Statistical Package for the Social Sciences).

**Population and Sample**

The population of the study consisted of 1st, 2nd, 3rd and 4th grade university students at Department of Physical Education and Sports at Educational Faculty and Sports Management Department at Physical Education and Sports High School of Sakarya University. The sample consisted of the 330 students from the mentioned groups.

*Data Collection Tools*

In order the collect the data, the questionnaire continuing 26 items developed by the researcher and evaluating the students' attitudes towards distance education named "The Students' Attitudes Towards Distance Education" was used. During the preparation stage of the questionnaire, firstly the related literature was reviewed and the subjects connected with the students' attitudes to distant learning were defined. Moreover, detailed information was taken from the experts on distant learning by interviewing them. Then, the information gathered with these studies was transformed into questionnaire items to see the attitudes. The prospect physical education teachers and sports managers stated their opinions about the items in the questionnaire selecting one of the categories as Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly Agree (5).

The questionnaire has two parts. In the first part, thee are demographical questions concerning the sample students' sex, class, accommodation of the family, monthly income of the family, computer and internet facilities; as for the second part, there are 26 likert type questions on the attitudes towards distance education. 330 questionnaires were distributed to the sample and 297 of these were accepted valid and taken into consideration.

**Validity and Reliability of the Questionnaire**

For the validity of the data collection tool, principal component analysis was applied. According to the results of this analysis, the students' attitudes were seen to gather fewer than six dimensions as: Computer and distance education, learning environment, students' roles, teaching methods, general opinions about communication and distance education system (Table: 1). Cronbach Alpha value of the questionnaire is found to be 0.8372.

**Table 1: Principal Component Analysis**

| | Component | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| *Computer and Distance Education* | ,893 | 6,034E- | 7,885E- | -7,30E- | 8,593E- | -6,74E- |
| | ,889 | -2,88E- | 3,668E- | ,104 | 4,601E- | -3,61E- |
| | ,804 | ,178 | -1,43E- | ,129 | ,115 | 5,640E- |
| | ,451 | ,250 | -8,79E- | 9,020E- | ,332 | ,186 |
| *Learning Environment* | 7,087E- | ,785 | ,155 | 4,174E- | 2,134E- | ,185 |
| | 8,865E- | ,711 | 1,635E- | -2,22E- | -8,87E- | ,243 |
| | ,119 | ,647 | 6,804E- | ,111 | ,191 | 4,172E- |
| | 7,869E- | ,635 | ,241 | ,117 | -7,96E- | ,318 |
| | -6,60E- | ,555 | ,263 | ,413 | -5,16E- | -3,35E- |
| *Roles of Students* | 4,941E- | 8,013E- | ,811 | ,158 | -7,45E- | ,113 |
| | ,134 | ,154 | ,781 | -3,29E- | 6,880E- | ,144 |
| | -4,46E- | 8,512E- | ,647 | ,122 | -9,50E- | ,204 |
| | -8,01E- | ,282 | ,625 | ,367 | -5,74E- | -8,00E- |
| *Teaching Techniques* | 4,592E- | 7,564E- | 6,336E- | ,850 | -5,97E- | ,249 |
| | -3,05E- | 9,930E- | ,234 | ,767 | -,156 | ,137 |
| | ,129 | ,150 | 8,258E- | ,625 | ,209 | -1,44E- |

| | | | | | | |
|---|---|---|---|---|---|---|
| | ,332 | -8,67E- | ,102 | ,495 | ,323 | ,157 |
| *Communication* | 6,803E- | -3,49E- | -,105 | 9,686E- | ,837 | -4,53E- |
| | 9,191E- | 7,177E- | 2,406E- | -8,09E- | ,780 | 2,403E- |
| | ,123 | 4,479E- | -4,46E- | 7,644E- | ,775 | 8,014E- |
| | ,135 | ,111 | -1,39E- | ,162 | 2,355E- | ,813 |
| *System of Distance Education* | -2,33E- | ,165 | ,118 | 2,225E- | ,137 | ,729 |
| | 1,510E- | ,195 | ,202 | ,118 | -7,94E- | ,639 |
| | -4,64E- | ,295 | ,314 | ,128 | 6,183E- | ,492 |

**Analysis of the Data**

For the analysis of the data collected through the questionnaire, SPSS 11.0 statistical package was used. In the definition of the students' personal qualities, frequency (f) and percentage (%); in order to find out about the differences between the students' attitudes based on personal qualities t-test and one-way ANOVA were used depending on the qualities of the variables.

**FINDINGS**

**Demographic Characteristics of the Participants**

Demographic Characteristics of the Participants are presented in Table: 2.

**Table 2: Demographic Characteristics of the Participants**

| INDIVIDUAL VARIABLES | PHYSICAL EDUCATION AND SPORTS | | SPORTS MANAGEMENT | |
|---|---|---|---|---|
| | Number | % | Number | % |
| *Sex* | | | | |
| Female | 51 | 39,5 | 72 | 43,1 |
| Male | 78 | 60,5 | 95 | 56,9 |
| Total | 129 | 100 | 167 | 100 |
| *Class* | | | | |
| 1 | 26 | 20,2 | 55 | 32,9 |
| 2 | 36 | 27,9 | 35 | 21 |
| 3 | 45 | 34,9 | 33 | 19,8 |
| 4 | 22 | 17,1 | 44 | 26,3 |
| Total | 129 | 100 | 167 | 100 |
| *Family's Accommodation* | | | | |
| City | 68 | 52,7 | 103 | 61,7 |
| Town | 37 | 28,7 | 50 | 29,9 |
| Village | 24 | 18,6 | 14 | 8,4 |
| Total | 129 | 100 | 167 | 100 |
| *Family's Monthly Income* | | | | |
| 400 YTL and below | 34 | 26,4 | 33 | 19,8 |
| 401-800 YTL | 32 | 24,8 | 68 | 40,7 |
| 801-1001 YTL | 34 | 26,4 | 37 | 22,2 |
| 1001-1500 YTL | 16 | 12,4 | 16 | 9,6 |
| 1501 YTL and more | 13 | 10,1 | 13 | 7,8 |
| Total | 129 | 100 | 167 | 100 |
| *Existence of Computer at Home* | | | | |
| Yes | 73 | 56,6 | 82 | 49,1 |
| No | 56 | 43,4 | 85 | 50,9 |
| Total | 129 | 100 | 167 | 100 |
| *Internet Connection at Home* | | | | |
| Yes | 65 | 50,4 | 68 | 40,7 |
| No | 64 | 49,6 | 99 | 59,3 |
| Total | 129 | 100 | 167 | 100 |

**Items Analyses**

Frequencies of the responses to the items of the questionnaire are presented in Table: 3.

**Table: 3. Frequencies**

| | PHYSICAL EDUCATION AND SPORTS | | | | | SPORTS MANAGEMENT | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Strongly Disagree | Disagree | No Comment | Agree | Strongly Agree | Strongly Disagree | Disagree | No Comment | Agree | Strongly Agree |
| I think distance education is a useful education system | 12 %9,3 | 25 %19,4 | 28 21,7 | 51 %39,5 | 13 10,1 | 24 %14,4 | 70 %41,9 | 37 %22,2 | 23 %13,8 | 13 %7,8 |
| By distance education, I can receive feedback on my effective skills. | 3 %2,3 | 31 %24 | 37 %28,7 | 49 %38 | 9 %7 | 5 %3 | 56 %33,5 | 50 %29,9 | 49 %29,3 | 7 %4,2 |
| My ideas about the usage of Internet in distance education are positive. | 8 %6,2 | 10 %7,8 | 16 %12,4 | 70 %54,3 | 25 %19,4 | 8 %4,8 | 28 %16,8 | 36 %21,6 | 75 %44,9 | 20 %12,2 |
| I appreciate the application of distance education in all our lessons (including our practical lessons). | 22 %17,1 | 42 %32,6 | 18 %14 | 29 %22,5 | 18 %14 | 27 %16,2 | 47 %28,1 | 34 %20,4 | 37 %22,2 | 22 %13,2 |
| Distance education gives me more responsibility for learning. | 11 %8,5 | 52 %40,3 | 35 %27,1 | 25 %19,4 | 6 %4,7 | 21 %12,6 | 68 %40,7 | 35 %21 | 27 %16,2 | 16 %9,6 |
| Distance education makes me feel as if I achieve an important thing. | 9 %7 | 52 %40,3 | 26 %20,2 | 37 %28,7 | 5 %3,9 | 19 %11,4 | 67 %40,1 | 41 %24,6 | 28 %16,8 | 12 %7,2 |
| By distance education, I can receive enough feedback on my poor skills. | 6 %4,7 | 34 %26,4 | 27 %20,9 | 50 %38,8 | 12 %9,3 | 15 %9 | 56 %33,5 | 35 %21 | 48 %28,7 | 13 %7,8 |
| I think it is more effective than traditional classroom learning. | 18 %14 | 56 %43,4 | 20 %15,5 | 24 %18,6 | 11 %8,5 | 33 %19,8 | 64 %38,3 | 27 %16,2 | 33 %19,8 | 10 %6 |
| Learning independent from time and place makes my performance better. | 13 %10,1 | 46 %35,7 | 24 %18,6 | 30 %23,3 | 16 %12,4 | 27 %16,2 | 61 %36,5 | 31 %16,8 | 28 %16,8 | 20 %12 |
| It makes me ask questions comfortably which I hesitate to ask in traditional classrooms. | 4 %3,1 | 25 %19,4 | 10 %7,8 | 70 %54,3 | 20 %15,5 | 11 %6,6 | 36 %21,6 | 25 %15 | 69 %41,3 | 26 %15,6 |
| Questions towards discussion facilitate reinforcement. | 4 %3,1 | 22 %17,1 | 23 &17,8 | 65 %50,4 | 15 %11,6 | 10 %6 | 35 %21 | 34 %20,4 | 70 %41,9 | 18 %10,8 |
| Discussion activities by e-mail, chat and electronic bulletins provides me new viewpoints. | 4 %3,1 | 16 %12,4 | 24 %18,6 | 70 %54,3 | 15 %11,6 | 12 %7,2 | 19 %11,4 | 30 %18 | 80 %47,9 | 26 %15,6 |
| In distance education, there is no oppressiveness which I experience in traditional classes. | 7 %5,4 | 37 %28,7 | 28 %21,7 | 36 %27,9 | 21 %16,3 | 22 %13,2 | 50 %29,9 | 27 %16,2 | 45 %26,9 | 23 %13,8 |
| I know that in order to receive distance education, I must know computer software very well. | 10 %7,8 | 20 %15,5 | 14 %10,9 | 64 %49,6 | 21 %16,3 | 17 %10,2 | 33 %19,8 | 11 %6,6 | 73 %43,7 | 33 %19,8 |
| I know that in order to receive distance education, I must know computer hardware very well. | 9 %7 | 31 %24 | 8 %6,2 | 59 %45,7 | 22 %17,1 | 16 %9,6 | 39 %23,4 | 17 %10,2 | 70 %41,9 | 25 %15 |
| I know that in order to receive distance education, I must know the Internet very well. | 10 %7,8 | 18 %14 | 14 %10,9 | 63 %48,8 | 24 %18,6 | 14 %8,4 | 34 %20,4 | 17 %10,2 | 68 %40,7 | 34 %20,4 |
| Distance education reduces the expenses of communication and travel. | 5 %3,9 | 33 %25,6 | 16 %12,4 | 52 %40,3 | 23 %17,8 | 19 %11,4 | 41 %20,4 | 35 %26,9 | 50 %29,9 | 19 %11,4 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| In distance education process, studying at home causes motivational problems, conflicts in the family and reduction of attention. | 6 %4,7 | 27 %20,9 | 28 %21,7 | 47 %36,4 | 21 %16,3 | 19 %11,4 | 34 %20,4 | 45 %26,9 | 50 %29,9 | 19 %11,4 |
| In distance education communication with teaching staff is difficult. | 9 %7 | 23 %17,8 | 29 %22,5 | 50 %38,8 | 18 %14 | 17 %10,2 | 39 %23,4 | 23 %13,8 | 58 %34,7 | 30 %18 |
| In distance education process, in-class interaction and discussion medium will be less. | 8 %6,2 | 16 %12,4 | 9 %7 | 75 %58,1 | 21 %16,3 | 18 %10,8 | 31 %18,6 | 28 %17,4 | 66 %39,5 | 23 %13,8 |
| In distance education, modern teaching methods are used. | 6 %4,7 | 26 %20,2 | 39 %30,2 | 50 %38,8 | 8 %6,2 | 9 %5,4 | 48 %28,7 | 61 %36,5 | 42 %25,1 | 7 %4,2 |
| Courses taken through distance education are stable in the mind. | 11 %8,5 | 50 %38,8 | 40 %31 | 20 %15,5 | 8 %6,2 | 25 %15 | 53 %31,7 | 57 %34,1 | 22 %13,2 | 10 %6 |
| Deficiencies of course materials in schools can be eliminated by distance education. | 10 %7,8 | 46 %35,7 | 33 %25,6 | 32 %24,8 | 8 %6,2 | 20 %12 | 46 %27,5 | 53 %31,7 | 34 %20,4 | 14 %8,4 |
| Through distance education, global education and equality of opportunity in education can be provided. | 8 %6,2 | 15 %11,6 | 28 %21,7 | 50 %40,3 | 26 %20,2 | 15 %9 | 30 %18 | 44 %26,3 | 45 %26,9 | 33 %19,8 |

**Effects of Different Variables on the Ideas about Distance Education**

**Gender**

As a result of the analysis, there was no meaningful difference at the level of p<0,05 for the department of Physical Education and Sports in terms of the variable of gender. In students of the department of Sports Management, however, women gave more positive responses than men to the items "*It helps me ask questions which I refrain from asking in classroom environment"* (*0,031)* and *"Distance education enables equal opportunities by realizing global education" (0,031)*.

**Having Computer at Home**

For the variable of having computer at home, it was seen at the end of the analysis that students of the department of Physical Education and Sports who have computers at home gave more positive responses to the variables "*I can receive sufficient feedback for areas on which I am weak in distance education*" (*0,046*) and "*It helps me ask questions which I refrain from asking in classroom environment"* (*0,038*). There was no meaningful difference for the department of Sports Management for the variable of having computer at home at the level of p<0.05.

**Having Internet at Home**

For the variable of having Internet at home, it was seen that students of the department of Physical Education and Sports who have Internet at home gave more positive responses to the variables "*Discussion activities carried out through e-mail, chatting, and electronic bulletin board helps me develop new viewpoints*" (*0,048*) and "*I suppose there will be less classroom interaction and discussion opportunities in the process of distance education"* (*0,048*). There was no meaningful difference for the department of Sports Management for the variable of having Internet at home at the level of p<0.05.

**Family Income Status**

At the end of the ANOVA analysis done for the students of the department of Physical Education and Sports for the variable of family income status, it was seen that people with a monthly income of 400 YTL and below gave more positive responses to the question "*I have positive opinions towards the use of Internet in distance education*" than those with an income between 801-1000 YTL, according to the LSD test results. People with a monthly income of 400 YTL and below gave more positive responses to the question "*I know that I have to be familiar with computer software well to receive distance education*" than those with an income between 401-800 YTL (*0,044*) and those between 1001-1500 YTL (*0,037*), while people with a monthly income of 1501 YTL and above gave more positive responses than those with an income between 1001-1500 YTL (*0,047*), according to the LSD test results. Finally, people with a monthly income of 400 YTL and below gave more positive responses to the question "*I know that I have to be familiar with computer hardware well to receive distance education*" than those with an income between 401-800 YTL (*0,025*), according to the LSD test results.

As to the students from the department of Sports Management, it was seen that people with a monthly income of 400 YTL and below gave more positive responses to the question "*I want that there is such an practice in all of our courses (including applied ones)*" than those with an income between 1001-1500 YTL (*0,003*), while people between 401-800 YTL (*0,037*) gave more positive responses than those between 1001-1500 YTL (*0,011*), according to the LSD test. People with a monthly income of 400 YTL and below gave more positive responses to the question "*Getting an education free from time and place increases my performance*" than those with an income between 801-1000 YTL (*0,036*) and an income of 1501 YTL and above (*0,020*), while those with an income between 401-800 YTL gave more positive responses than those between 801-1000 YTL (*0,041*), and those with 1501 YTL and above (*0,024*), according to the LSD test results. Last, people with a monthly income of 400 YTL and below gave more positive responses to the question "*Discussion activities carried out through e-mail, chatting, and electronic bulletin board helps me develop new viewpoints*" than those with an income between 1001-1500 YTL (*0,003*), those with an income between 401-800 YTL gave more positive responses than those between 1001-1500 YTL (*0,004*), and those with an income between 801-1000 YTL gave more positive responses than those between 1001-1500 YTL (*0,010*), according to the LSD test results.

**Family's Accommodation**

In terms of the variable of family's accommodation, among the students of department of Physical Education and Sports, those who live in cities gave more positive responses to the question "*I know that I have to be familiar with computer hardware well to receive distance education*" than those living in villages (*0,007*), according to the LSD test results, in terms of the variable of family's accommodation. Students who live in cities gave more positive responses to the question "*I suppose there will be less classroom interaction and discussion opportunities in the process of distance education"* (*0,016*) than those in villages. In addition, students in cities gave more positive responses to the question "*I suppose that contemporary methods are used in distance education"* than those in villages (*0,020*).

Among the students of the department of Sports Management, on the other hand, those living in cities and towns gave more positive responses to the question "*Distance education helps me feel as if I managed something important"* than those in villages (*0,016*) and (*0,003*) respectively; students living in villages gave more positive responses to the question "*It helps me ask questions which I refrain from asking in classroom environment"* than those in cities (*0,011*); and finally students living in villages gave more positive responses to the question "*I suppose that I have to be familiar with Internet well to receive distance education"* than those in towns (*0,025*), according to the LSD test results.

**Class**

At the end of the ANOVA analysis done for the students of the department of Physical Education and Sports for the variable of class, it was seen that juniors gave more positive responses to the question "*Distance education helps me feel as if I managed something important*" than freshmen (*0,022*) while juniors and seniors gave more positive responses to the question "*Discussion activities carried out through e-mail, chatting, and electronic bulletin board helps me develop new viewpoints* " than freshmen (*0,017*) and (*0,010*) respectively, according to the LSD test results. Juniors gave more positive responses to the question "*I know that I have to be familiar with computer hardware well to receive distance education*" than freshmen (*0,040*) and juniors gave more positive responses to the question "*I know that I have to be familiar with Internet well to receive distance education*" than freshmen (*0,024*), according to the LSD test results. Freshmen gave more positive responses to the question "*I suppose that it is difficult to establish communication with lecturer in distance education"* than sophomores (*0,032*) and seniors gave more positive responses to the question "*I suppose there will be less classroom interaction and discussion opportunities in the process of distance education*" than sophomores (*0,027*), according to the LSD test results. Finally, juniors gave more positive responses to the question "*I suppose the lack of materials and tools at school can be eliminated through distance education"* than freshmen (*0,034*), according to the LSD test results.

Among the students of the department of Sports Management, on the other hand, seniors gave more positive responses to the question "*I suppose that distance education is a useful educational system*" than freshmen and sophomores (*0,000*) and juniors (*0,015*), while juniors gave more positive responses to the question "*I can receive sufficient feedback for areas on which I am weak in distance education*" than freshmen (*0,015*) and sophomores (*0,040*) and seniors gave more positive responses than freshmen (*0,030*), according to the LSD test results. It was seen that seniors gave more positive responses to the question "*I can receive sufficient feedback for areas on which I am weak in distance education*" than freshmen (*0,027*)

 

and juniors (*0,002*), while seniors gave more positive responses to the question "*Getting an education free from time and place increases my performance*" than freshmen (*0,008*), sophomores (*0,019*), and juniors (*0,029*), according to the LSD test results. Sophomores, juniors, and seniors gave more positive responses to the question "*I know that I have to be familiar with computer software well to receive distance education*" than freshmen (*0,013*), (*0,001*), and (*0,003*) respectively, according to the LSD test results. Finally, sophomores, juniors, and seniors gave more positive responses to the question "*I suppose there will be less classroom interaction and discussion opportunities in the process of distance education*" than freshmen (*0,006*), (*0,001*), and (*0,020*) respectively, according to the LSD test results.

**Comparison of the Averages**

Points that are effective in distance education have been classified and certain analyses have been conducted. The purpose of these analyses is to find out the opinions of the students under certain designated headings. Therefore, the issue has been studied in six dimensions as Computer and Distance Education, Learning Environment, Student Roles, Teaching Methods, Communication and Distance Education System, and Related Ideas.

At the end of the analysis conducted, no meaningful relation has been found between students of the Physical Education and Sports department and the above dimensions at the level of $p<0, 05$.

In the department of Sports Management, on the other hand, male students think that teaching methods used in distance education are better than traditional classroom teaching methods at the level of "*0,021*" compared to the female ones.

At the end of the analysis conducted, it has been found that sophomores in the department of Sports Management think that they should use computer well so that distance education is successfully utilized at the level of "*0,008*" compared to freshmen, while seniors think that learning environment in distance education is better than traditional classroom environment at the level of "*0,009*" compared to freshmen.

Again, seniors have stated that they think teaching methods used in distance education are more effective than traditional classroom teaching methods at the level of "*0,025*" compared to the freshmen. Finally, seniors have said that they think the system of distance education is more effective at the level of (*0,001*) compared to freshmen and (*0,001*) compared to sophomores.

**CONCLUSION**

Usage of modern technologies is suggested as a remedy to the problems of traditional education's limitations. Performing education free of time and place constraints, conveying it to larger numbers of people and doing all these in an economic manner is now possible. As a result, models of distance education are on agenda in our country and in the world nowadays, and they are preferred during the education of students, staff and larger groups of people.

As a result of this study, the students from both departments who took the questionnaire think that in order to benefit from distance education; they should have general skills about computer hardware, software and internet usage. Based on this result, adapting some courses on computer literacy and internet usage in these departments' curriculum can be suggested. While students from Physical Education and Sports Department think that distance education is a useful education system, students from Sports Management Department have some negative ideas on distance education.

Students from both departments mostly think that global education and equality of opportunity would be succeeded by the implementation of distance education. But, they generally have negative ideas for taking *all lessons (theoretical and practical)* by distance education. The majority of students think that theoretical lessons would be given by distance education if appropriate software and tools are used. On the other hand, they generally think that in physical education field, compensation of failures on time is very important in practical lessons. If practical lessons are given by distance education, it is impossible to compensate the failures on time via distance education technologies.

Moreover, a research which is carried out in Akdeniz University, Faculty of Law revealed that the potential of distance education programs is very close to be powerful. As a result of this study, if proper equipment and atmosphere is provided, students develop positive beliefs on distance education (Ilter et al, 2005). So, some information would be useful for students of Physical Education and Sports and Sports Management in order to eliminate their hesitation on distance education.

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# TEACHERS' PERCEPTION OF THE ROLE OF MEDIA IN CLASSROOM TEACHING IN SECONDARY SCHOOLS

DR. Sunday TAIWO
Principal Lecturer And Head Of Department Of Curriculum And Instruction
*Federal College Of Education (Special), P.M.B. 1089 Oyo, Nigeria*
*E-MAIL- sunayotaiwo@yahoo.com*

**ABSTRACT**
This study is an evaluation of teachers' perception of the role of media in Oyo State of Nigeria. A total of 150 secondary school teachers of Oyo State participated in the study: 110 trained and 40 untrained teachers randomly selected from ten secondary schools at two gender level (70 females and 80 males). Two media roles were selected for the study: media used to supplement the teacher by enhancing his effectiveness in the classroom and media used to substitute the teacher through instructional media system. The research tested three hypotheses. The findings revealed that there were significant differences in the perceptions of teachers about each of the two roles of media identified for the study. In addition there was significant difference found between the perceptions of trained and untrained teachers. However, the teachers' gender was not significant. The article discusses the findings and makes some recommendations.

**Keywords**: Teacher's Perception, Media, Media Roles, and Technology

## INTRODUCTION

The way teacher view the role of media in classroom teaching will to a large extent determine the level and degree of its usage. Teacher forms an impression which is favourable or otherwise, depending on specific traits teacher attribute to media. Teacher perception of media is predicted upon what they feel media can do in teaching-learning process. However, evidence abounds that what teachers said were their reasons for not using media were not true (Zepp, 2005: Scrimshaw, 2004; Sugar, Crawley & Fine, 2004; Cohen, 1996; Hubbord, 1999).

Over the years, many research studies have pointed out various external deterrents for the utilization of audiovisual media. The major deterrents reported were budget difficulty in obtaining materials, lack of audiovisual classroom facilities and lack of trained audiovisual personnel (Higgins & Moseley, 2001; Richardson, 1996; Windschitl & Sahl, 2002).

It must be noted that perception can be influenced by the personality characteristics of the perceiver. It can also be influenced by the features of the thing/object perceived. Unfortunately, in any perception study, one is not sure which has more control over the other (Simonsen & Dick, 1997).

Fabos and Young (1999) reported that a 30 minutes sound film entitled "Wisconsin makes its law" was made available for a minimal rental fee and in sufficient qualities. They later found that it was used by more teachers in Winsconsin elementary schools than any other film. Yet it was not used by the majority of teachers teaching that topic in Winsconsin. Apparently, they concluded that the reasons of cost, unavailability or inappropriateness did not apply.

If constraints have lessened, why are media not used more fully? An answer may well lay within the broad topic of how media are "perceived" by the teacher, and how they feature in his thinking and organizational planning (Ross, Hogaboam-Gray & Hanney, 1999).

Eichoiz and Rogers (1994) have suggested that here are psychological components in teachers' perception of media. Aquino (1994) has found significant personality differences between acceptors and rejectors of new media. Other researchers have noted that some teachers appeared to perceive media as threatening and perhaps in human.

Lewis (1990) tested fifteen questions in an efforts to determine teacher perceptions relative to education media. Among his findings were that teachers perceive educational media as being readily available and that they perceive formal training in the area of audiovisual instruction as being unnecessary.

Romiszowski (1998) has grouped the roles of media into two. In the first instance media are used as instructional aids, here media are used exclusively to enhance or enrich the teacher's presentation. Media used in this way are basically one-way transmitters quite incapable of interpreting any messages that the learner may

 

transmit. Secondly, media are used as instructional systems. They are used to promote individualization of instruction in both conventional and non-conventional setting.

According to Morris (1962) the function of technological media is to supplement the teacher through enhancing his effectiveness in the classroom. Educational media are both tools for teaching and avenues for learning, and their function is to serve these two processes by enhancing clarity in communication, diversity in method, and forcefulness in appeal. Except for the teacher, these media will determine more than anything else the quality of our educational effort.

Studies have shown, however, that teachers generally have favourable disposition toward the role of media, in which media are used as instructional aids than media as instructional systems.

**LITERATURE REVIEW**

Though funding, equipment, lack of time, and knowledge are known obstacles to successful technology integration (Hardy, 1998; Lam, 2000, Simonsen & Dick, 1997), a critical component in meeting teachers, technology needs is responding to teacher's beliefs toward technologies. Hope (1997) wrote, "Teachers basically had to contend with two factors (with technology adoption); (a) the psychological effect of change and (b) learning to use microcomputer technology." (p. 158). Understanding teachers' beliefs towards technology play an essentials role in successful technology adoption.

Previous studies employed a variety of methods and perspective to assess in-service teachers' technology beliefs. These methods included: Likert-scale questionnaires (e.g., Ross, Hogaboam-Gray & Hannay, 1999) case study methodology (e.g. Ertmer, Gopalakrishnan, & Ross, 2001). German and Sasse (1997) found that teachers who participated in a two-year technology integration program improved their technology self-efficacy and their interest in learning more about how technology could impact the curriculum. Ross, Hogaboam-Gray, and Hannay (1999) reported that access to technologies increased teachers' "opportunities for successful teaching experiences, thereby contributing to greater confidence in their instructional ability" (p.7). In addition, they also noted, "teachers who interpret their interactions with computers as indicative of high grow in self-confidence, regardless of their experience" (p.93). Research also reveals that before teachers use technology for instruction they must be personally convinced of its benefits and must see the utility of using a particular technology (Lam, 2000).

Before technology is used in the classroom teachers focus attention upon their students. They want to know what impact it will have on students' learning outcomes (e.g., Higgins & Moseley, 2001). Teachers use technology because it motivates students and offers a different mode of presentation. Instead of using computers for drill and practice, more confident teachers use technology as an instructional tool to enhance students' learning (Lam, 2000). Successful technology adoption in teachers' classrooms is dependent upon school administrators providing an individualized, differentiated process of training and implementation (Gray, 2001) Glean (1997) commented, "often districts rely upon a 'one size fits all' approach that meets the needs of only a few participants" (p.125). Teachers must see how technology fits within their localized classroom setting (Stein, Smith, & Silver, 1999).

Teachers' technology beliefs are influenced by their philosophy. Resistance to adopting new technologies stem from teachers' existing teaching beliefs (Norton, McRobbie, & Cooper, 2000). For technology adoption to be successful teachers must be willing to change their role in the classroom (Hardy, 1998). When technology is used as a tool, the teacher becomes a facilitator and students take a proactive role in learning. Niederhauser and Stoddart (2001) noted a "consistent relationship between teachers' perspectives about the instructional uses of computers and the types of software they used with their students" (p.27). Often, this change of teaching philosophy and methods focuses on learners-centered teaching and constructivist teaching practices (e.g. Rakes, Flowers, Casey, & Santana, 1999). In fact, Ertner, Gopalakrishnan, and Ross (2001) found that exemplary technology-using teachers exhibit more constructivist teaching practices. Successful integration of technology into teaching depends on transforming teachers' belief and philosophy concurrently (Windschitl & Sahl, 2002).

**STATEMENT OF THE PROBLEM**

Specifically the study sought answer to the following questions:

1. How do the secondary school teachers perceive the role of media identified for the study?
2. To what extent do male and female teachers differ in their perception of these media roles?
3. Are teachers trained in the use of media more likely to differ from untrained teachers in their perceptions of media role?

 

**PURPOSE OF THE STUDY**

Both the federal and state governments of Nigeria contribute immensely to instructional technology by providing various educational resource centres. In Oyo State alone between 1999 and May 2003, a total of 33 Learning Resource Centres were built with each local government area having at least one.

In view of the above, this study seeks to look into how teachers, who are expected to use these media in their teaching perceive the role of media.

Therefore, the study was designed in the first place to measure and analyse secondary school teachers' perception of the role of media. It will also explore possible relations between teachers' perceptions and selected characteristics like training and the gender of the teacher.

**METHOD**

**Sample and Sampling Procedure**

In Oyo State, there are 33 Local Government Areas (LGA). For this study, the local government areas were divided into five major zones – Ibadan, Ibarapa Oyo, Ogbomoso and Oke-Ogun zones. The stratified proportional random sampling procedure was used to select 10 LGA, from the 33 LGAs. The simple random sampling procedure was then used to select 2 secondary schools in each of the 10 selected LGAs.

The simple random sampling procedure was used to select 10 teachers from each secondary school. A total of 200 teachers participated in the study. However, out of these 200 teachers, only 150 completed usable questionnaire.

**Research Instruments**

Data for the study were collected using two instruments:

1. Questionnaire – Media Perception Evaluation Scale (MPES).
2. Interview.

Media Perception Evaluations scale (MPES): is a collection of 45 statements developed by the writer about the two media roles selected for this study the MPES has an introductory section where the following biographical information was demanded from each teacher:

a. Whether the teacher offered instructional technology/educational technology at college or not.
b. Number of year for which instructional technology was offered at college
c. Number of years of teaching experience
d. Gender

The 45 items developed were given to four experts, two in psychology and the other two in Educational Technology. These experts were asked to indicate whether they agreed or disagreed with the classification of items under the media emphases. Items with less than 75 per cent agreement among the experts were selected from the list. Thus items were added later due to the advice of the experts.

In other words, 31 items were chosen, distributed as follows
Media as supplement to teachers – 15 items
Media as substitute for teachers – 16 items

These items were matched with a Likert – type scale having five categories of responses ranging from strongly agree 95 to Strongly Disagree (1) (See Appendix A)

**Interview:** The writer also used informal narrative interview to further gather information from participants. In the context of this paper, narrative interviews were in the form of a discussion of the research questions. Each participant was encouraged to narrate, the story of his/her experience in classroom teaching and the multiplier effects it had on his/her perception of media role. This style of interview creates a conversational encounter that allows the interviewee to tell a story in his/her own way and the interviewer the freedom to respond to new material raised during the interview.

**Validation of the Instrument**
The Media Perception Evaluation Scale (MPES) was subjected to face and content validity by four experts – two in psychology and the other two in Educational Technology. Irrelevant items were deleted as a result of their suggestions.

**Reliability of the Instrument**
The Spearman – Brown formula of finding the reliability of an instrument was employed for MPES. The co-efficient of the split-half reliability of 0.86 was then obtained, thereby making the instrument good enough for the study.

**Method of Data Collection**
All the twenty schools were approached by the researcher personally. The questionnaire (MPES) was filled in complete anonymity so as to avoid teachers presenting artificial behaviours that they would not have displayed in normal situations. The teachers were given a maximum of 20 minutes to fill out the questionnaire. They were assured that the completed questionnaires were confidential. The questionnaires were completed and collected on the spot.

**Analysis**
The first hypothesis was tested by applying chi-square test of one variable case. While the last two hypotheses were tested via chi-square of independence of categorical variables. The null hypotheses were rejected or not rejected, depending on whether the calculated F ratio was significant of the probability level of 0.05 (or 5%).

**RESULTS AND DISCUSSION**
**$HO^1$:** There will be no significant difference in perceptions of teachers about each of the two roles of media identified for the study.

**Table 1:** Perceptions of Teachers for the two roles

| | Media as a supplement | Media as a substitute | Total | df | Critical Value | p |
|---|---|---|---|---|---|---|
| Teachers | 80<br>(75) | 70<br>(75) | 150 | 1 | 3,841 | *0.05 |

Figures in brackets are expected value $X^2$ = *4.361 significant at p = .05

**$HO_2$:** There will be no significant difference in the perceptions of male and female teachers about the two roles of media.

**Table 2:** Chi-Square test on the Perception level of Teachers about the two roles of media by gender.

| Predictor Variable | Media as a supplement | Media as a substitute | Total | df | Critical Value | p |
|---|---|---|---|---|---|---|
| Male | f 45<br>% (40.1) | 35<br>(38.9) | 80 | 1 | 3.841 | *.05 |
| Female | f 32<br>% (35.9) | 38<br>(34.1) | 70 | | | |
| Total | 77 | 73 | 150 | | | |

Figures in brackets are expected values $X^2$ = 1.631 * Not significant of p = .05

**$HO_3$:** There will be no significant difference in the perceptions of trained and untrained teachers about the two roles of media.

**Table 3:** Chi-square test on the perception level of teachers about the two roles of media by training.

| Predictor Variable | Media as a supplement | Media as a substitute | Total | df | Critical Value | P |
|---|---|---|---|---|---|---|
| Trained | f 35<br>% (46.43) | 75<br>(63.06) | 110 | - | | |
| Untrained | f 29<br>% (17.06) | 11<br>(22.93) | 40 | 1 | 3.841 * .05 | |
| Total | 64 | 86 | 150 | | | |

Figures in brackets are expected values $X^2$ = 19.86 * significant at p = .05

After testing the first hypothesis, it was found that teachers' perceptions of media roles were related to the type of roles teachers thus perceived to be methodologically different.

Teachers, however, indicated more agreement with media as instructional aids (63%) than with media as substitute for teachers (37%). The finding that conventional/traditional use of media was more preferred to modern use may be partly explained in the current quasi-conception of media as "replacing teachers". This is consistent with the findings of Aquino (1994), Lewis (1990), Morris (1962), & Romiszowski, (1998). They found that teachers generally have favourable disposition toward the role of media, in which media are used as instructional aids than media as instructional systems.

Consistent with the findings from earlier studies (Lampe & Chambers, (2001); MacArthur & Malouf, (1991); & Zepp (2005), this study found that teachers had syncretic perceptions. Specifically, the proportion of teachers with eclectic preferences was 57%. That the percentage for traditional use of media was higher than the modern use of media explained the seemingly lack of knowledge about modern use of media. Most teachers were indifferent to it because they could not imagine how these media could be used without threatening the traditional role, or at best position of classroom teachers.

The effects of pre-service training on the perceptions of teachers were significant for the roles identified for the study. This conclusion was evident after the testing of null hypothesis three. The data for this hypothesis as set out in table 3 shows the proportions of teachers preferred media as a substitute to media as supplement, whereas, untrained teachers preferred traditional use of media to modern use. It is not surprising that this is so with respect to modern role of media, since those who were exposed to instructional technology while at College should better appreciate all the media, especially modern roles.

The effects of gender were not significant on the perceptions of teachers about the two media options. This was evident after testing of hypothesis two. This corresponds with the finding of Olawepo (1984). Olawepo found that gender as a variable did not affect teachers' perceptions of social studies orientation. These findings did not support conclusions from cognitive style studies which hold that female teachers are field-dependent and technophobia; while male teachers being field-independent, prefer application of media to instruction (Parker & Leonie, 2002; Haynie, 2003; Weber & Custer, 2005).

**CONCLUSION**

Eclecticism was evidenced in the findings of this study. In the first place, there was syncretism in teachers' perceptions because they tended to be in favour of both the traditional use of media and the modern use of media. In the second place, the influence of training was found to affect the level of teachers' perception. Thirdly, the study shows that the influence of gender did not affect the level of teachers' perception.

**LIMITATIONS**

Confining the study to teachers in one state is likely to prevent the researcher from generalizing the findings of this study freely outside Oyo State. Another limitation has to do with the nature of media roles. Media roles especially the two selected for this study are not end-points on a continuum. They are critical references which are orthogonal to each other, allowing an individual teacher to be in favour of both (or neither) of the roles.

**IMPLICATIONS FOR PRACTICE**

Though teachers had eclectic perception about the roles of media, one can use their perception as a guide to instructional technology course outlines construction by combing two roles of media together.

The use of media as instructional system emphasizes innovation and change in method over the use of media as instructional aids. In order to aid in the implementation of this new method, which is of high quality, teachers' guide and teaching aids must be produced for teachers.

Apart from making available to practicing teachers requisite instructional materials, teachers also need to be inducted into the new trends. The ministries of education in the 36 states of Nigeria in collaboration with the N.E.T.C. and N.E.R.D.C, should initiate in-service courses on the use of instructional media.

These in-service courses (or holiday courses) should be based in the College of Education and the Faculties of Education in our Universities where experts can be assembled. Attendance in these courses should count towards the salary increases or even promotion if teachers would be unenthusiastic and unwilling to attend them.

 

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## APPENDIX A
## MEDIA PERCEPTION EVALUATION SCALE (MPES)

Dear Teacher,

The following questionnaire is to be for research purposes only. Please help me to complete the questionnaire very well thanks.

NB:

a. The concept of "Media" is used here to mean Audiovisual aids in teaching –learning situations.
b. There are two major roles of media viz:
i. Media as a supplement to Teacher. Here media are used to enrich existing instruction. Hence the teacher must be physically present in the classroom.
ii. Media as a substitute for Teacher. Here media alone are used for instruction to improve overall productivity. Hence the teacher need not be physically present in the classroom.

### PART ONE

1. Number of years for which you studied instructional media/instructional technology when in College of Education and /or University.....
2. Total number of years for which you have been teaching .....
3. Gender (Male / Female).....

### PART B

The following statements describe the role of media in class-room teaching-learning situation. Please indicate how far you agree or disagree with each statement by circling one of the figure below:

1, 2, 3, 4, 5 where
5 = Strongly Agree
4 = Agree
3 = Uncertain
2 = Disagree
1 = Strongly Disagree

For example if l circle the number 5. It means l strongly agree with a statement. There are no wrong statements. Also, there can be no wrong answers. Therefore, please give your true views about all the items.

### STATEMENT

1. I believe l can teach well even when media are not available ..... 1, 2, 3, 4, 5
2. Students are dehumanised when media alone are used in instruction..... 1, 2, 3, 4, 5
3. Media should be considered by the teachers as a solution to problem of teachers shortage ..... 1, 2, 3, 4, 5
4. In any teaching-learning situation teacher is all in all, he needs no help from any source ..... 1, 2, 3, 4, 5
5. Television adds interest but teaches little..... 1, 2, 3, 4, 5
6. The use of media per se makes teacher redundant..... 1,2,3 4,5
7. Media should be considered by the teacher as a device which saves teacher preparation ..... 1, 2, 3, 4, 5
8. Media like Television, Radio, Video cassette, etc are manufactured not for learning but for relaxation..... 1,2,3,4,5
9. It is against the interests of our children education as a matter of experiment ..... 1, 2, 3, 4, 5
10. Courses of instruction taught by programmed texts are bad because they displace teacher from his traditional role ..... 1, 2, 3, 4, 5
11. The use of media per se does not make better use of teacher's time and sooner or later the teacher may be declared unwanted ..... 1, 2, 3, 4, 5
12. Media dictates to the teacher, and thus limit his freedom ..... 1, 2, 3, 4, 5
13. Course of instruction taught by Radio, Tapes and Records are bad because they do not specify what the role of teacher will be ..... 1, 2, 3, 4, 5
14. Computer-assisted instruction is ineffective because it does not make better use of teacher's time ..... 1, 2, 3, 4, 5
15. The use of media per se should be discouraged because it threatens the position of teachers ..... 1, 2, 3, 4, 5

16. Whether we like it or not, at least, in the foreseeable future, teacher will still dominate the classroom because it is meant only for him ..... 1, 2, 3, 4, 5
17. The major use of media is to assist the teacher by enhancing his effectiveness in the classroom ..... 1, 2, 3, 4, 5
18. Students learn best when media are used with teacher because the teacher in the classroom maintains discipline than is possible when media alone are used ..... 1, 2, 3, 4, 5
19. The use of media should be encouraged in school because they enhance the work of teachers ..... 1, 2, 3, 4, 5
20. Teachers use media because they see them as partner in progress ..... 1, 2, 3, 4, 5
21. l believes l can only teach well when l use media..... 1, 2, 3, 4, 5
22. Both media and teacher are indispensable to each other ..... 1, 2, 3, 4, 5
23. The effectiveness of any teaching-learning situation depends on the amalgam of teacher and media ..... 1, 2, 3, 4, 5
24. Students learn best when media are used with teacher because the teacher is in the classroom and hence there is interpersonal relationship between them ..... 1, 2, 3, 4, 5
25. No matter what methods a teacher employs, without the use of media the quality of such learning is poor ..... 1, 2, 3, 4, 5
26. Media when used with teacher give the teacher the opportunity to determine the students' level of understanding by virtue of his presence in the classroom than is possible when media alone are used ..... 1, 2, 3, 4, 5
27. Media used, when the teacher is physically present in the classroom help to enrich existing instruction only ..... 1, 2, 3, 4, 5
28. Media, when used with teacher, provides the teacher with the means of extending the horizon of experience ..... 1, 2, 3, 4, 5
29. Instruction, whereby media are used with teacher is defective because teacher still dominates the classroom .....1, 2, 3, 4, 5
30. Media when used with teacher limit the power of student to think for themselves ..... 1, 2, 3, 4, 5
31. Media when used with teacher do not provide for individualised learning and hence is defective ..... 1, 2, 3, 4, 5

Thanks,
Dr. Taiwo S.A.

# THE EFFECT OF APPLYING ELEMENTS OF INSTRUCTIONAL DESIGN ON TEACHING MATERIAL FOR THE SUBJECT OF CLASSIFICATION OF MATTER[1]

Dr. Zehra ÖZDİLEK Prof. Dr. Muhlis ÖZKAN
Uludag University, Education Faculty
zozdilek@uludag.edu.tr, muozkan@uludag.edu.tr

**ABSTRACT**
The aim of this study was to examine the effect of instructional materials for the subject of classification of matter as solids, liquids and gases that were developed using a holistic instructional design model on student achievement. In the study a pre-test/post-test with control group experimental design was used. The study was conducted in the 2004-2005 school year using a sample of 120 students in the 7th grade (Experimental group 1=30, Experimental group 2=30, Control group 1=30, and Control group 2=30). At the beginning of the study a prior knowledge test, science attitude scale and Multiple Intelligence Fields Determination Scale were completed by the students. At the end of the study an achievement determination questionnaire was completed by the students in the experimental and control groups. Instructional material including student worksheets, student practice questions and a teacher guide were prepared by the researchers on the Freehand MXa program. In teaching the subject to the experimental groups, a holistic instructional approach was used that combined reliance on multiple intelligence theory, a constructivist approach, deliberate use of analogies and an emphasis on science process skills. In addition, concept maps and an animation were used. The data were analyzed using descriptive statistics, one-way analysis of variance, Cohen's size effect, and the Scheffe Test with the SPSS 11.00 program at the .05 significance level. At the beginning of the study, it was found that while there was no statistically significant difference between the students of the experimental and control groups, at the end of the study levels of achievement of the students on this subject in the two experimental groups were higher than both control groups.

**Key Words:** Instructional Design, Design Principles, Holistic Approach, Matter, Animations, learners' characteristics

## INTRODUCTION

Instructional design is a systematic process aimed at helping students learn more easily. McArdle (1991) reported that an efficient instructional design greatly increases students' success. Up to the present several instructional design models have been developed by different researchers. In general, the processes of instructional design models consist of analysis, designing, development, implementation, and evaluation steps (Dooley, 2005). When undertaking instructional design it is possible to apply a single model, or it is also possible to combine more than one model (Işman, Çaglar, Dabaj, & Ersözlü, 2005). In the current study a combination of instructional design models were used to develop instructional materials. These include the models described by Dick, Carey, and Carey (2005), Kemp, Morrison, and Ross (2005), Smith and Ragan (1998), and ADDIE (cited in Zheng & Smaldino, 2003; Dooley, 2005). These models have common steps, which were emphasized by Dooley (2005), and four common components that were pointed out by Zheng and Smaldino (2003); learner considerations, content organization, instructional strategies, and evaluation. Within the framework of these common points we will examine how we can develop an effective instructional design that holistically integrates various attributes.

Various studies have shown that to be effective, instructional design must consider the learners' characteristics. Moallem (2007) emphasized that learners' individual differences are very important in learning and instruction. Similarly, Carnie (1997) suggested that the potential cause of students' low achievement level is that their learning characteristics do not match the design of instructional materials and teaching practices. Therefore, it would be very important to consider learners' needs when organizing the content in ways that increase the likelihood of students achieving learning objectives (Zheng and Smaldino, 2003). The instructional objectives describe skills and knowledge that the learners will have developed, upon completion of the instructional unit (Hashim, 1999). Dick, Carey, and Carey (2005) state that:

[1] This article is adapted from the first author's doctoral dissertation. "Instructional design of the 'Travel to the Inner Structure of Matter' unit within the science course in primary education" submitted to Uludağ University under the supervision of Prof. Dr. Muhlis Özkan.
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> The most important aspect of an instructional goal is the description of what learners will be able to do, that description is not complete without an indication of (1) who the learners are, (2) the content in which they will use the skills, and (3) the tools that will be available. (p.25)

Many researchers pointed out that efficient teaching and learning of any topic depends on the teaching methods, and that students learn better where more than one teaching method was used (Mahajan and Singh, 2003). Joseph and Gayle (1998) reported that using multiple teaching strategies and methods during instruction increased the cognitive learning of students with different learning styles. Powell and Wells (2002) proposed that using multiple methods provided teachers with flexibility, and enhanced activities to be appropriate for different learning styles.

Also, using media such as computer animations and visualizations has a positive effect on students' answers to conceptual questions about particular phenomena (Kelly & Jones, 2007). Russomanno and Goodwin (2007) suggested that animation and visualization tools make the learning more exciting than the traditional paper-pencil techniques. However, Sanger (2000) found that when computer animations were applied alone they were not sufficient in answering either the students' verbal or visual questions in instruction. Kelly and Jones (2007) found that after the teaching with animations learners' explanations increased in quality. However, some prior misconceptions were retained and new misconceptions emerged. The researchers implied that when using an animation for teaching a topic, instructors should plan class discussions to augment the visual media.

Stein, Stuen, Carnine, and Long (2001), proposed that better design of instructional materials has a positive impact on low performing students. The quality of instructional designs may be improved to a large extent when considering the design principles being used. For this reason we can say that one of the most important steps in teaching is deliberately designing the instructional methods and materials. Rotter (2006) stated that:

> Rules of graphic design can help teachers prepare their instructional materials to make them easier for students to read, to organize information more clearly, and to improve comprehension (p.273)

The basic principles of design contain numerous dimensions, such as balance, alignment, repetition, emphasis, proximity, focus, organization, movement of the reader's eye, contrast, alignment, spacing, simplicity, proportion, rhythm, variety, unity, organization and image. In addition to this, various sub-dimensions including font choice, highlighting, position of information, graphics, and use of color are contained in these dimensions (Rotter, 2006).

Chambliss and Calfae (1989) suggested that if the instructional materials such as science textbooks are well developed, the level of students' understanding of the concepts can improve. However, the principles of instructional design of teaching materials that are used in developing science instructional materials are not always beneficial for learners. For example, in the authors' country, Turkey, it has been found that ineffective features are present in instructional materials. The language of the instructional material is not clear and understandable, and the resources do not include new technologies and developments (Bakaç and Kesercioğlu, 2000). As well, the materials are not sufficient in terms of visual items such as graphics, pictures and figures (Bakaç and Kesercioğlu, 2000; Gökdere and Keleş, 2004; Dökme, 2004).

There are a very limited number of experimental studies on instructional design in science education in Turkey. For this reason, principles of instructional design were used to prepare material to support teaching on the subject of classification of matters as solids, liquids and gases. The concepts of classification of matter and particulate nature of matter are fundamental ideas of science and chemistry courses. Furthermore, numerous studies have been reported that many elementary school students and pre-service teachers have important difficulties related to understanding the structure of matter. When these studies are examined together, the common difficulties given below can be identified:

> A gas is composed of invisible particles
> There is empty space between the particles in a gas (Vos & Verdonk, 1996, p.658)
>
> Air is everywhere, fills all space. Solid, liquid and gas are three types of some substance. One disappears as the other appears. Matter is continuous, but contains particles" (Swackhamer, 2001)
>
> Solids can be only hard
> All liquids contain water (Jarvis, McKeon, & Taylor, 2005, p.22)

 

For this reason in the current study a holistic instructional design, using design principles and integrating multiple teaching methods, was used to design materials, which were also supplemented with a computer animation.

**Purpose of the Study**

The purpose of this study was to examine the effect of the design of instructional material for the subject of classification of matter as solids, liquids and gases on 7th grade students' achievement in a science course. In this study the following research questions were investigated:

1. Is there any difference between the pretest scores of the experimental (holistic design) group and the control group?
2. Is there any difference between the experimental group and control group with respect to the achievement level gained through the holistic instructional design versus the current traditional science curriculum?
3. The teacher guide effective for the application of the instructional design by different instructors?

**METHOD**

In this study, a pre-test/post-test with control group experimental design was used. The study was conducted in the fall semester of the 2004-2005 academic year. The participants of this study were 120 seventh grade students in four classes. There were 30 students in each of the two control groups. Each of the first and second experimental groups were also made of 30 students. The overall gender division of the participants was 51% girls (n=61) and 49% boys (n=59).

In order to investigate the effectiveness of instructional design when the materials were used by the different instructors and to eliminate the bias of the researchers in the current study, a researcher taught the topic to the first control group (I) and second experimental group (IV). A science teacher in the school taught the topic to second control group (II). A different science teacher in the school taught the topic to the first experimental group (III).

**Development of Instructional Design**

Various models of instructional design have been described. It has been suggested that these models tend to have four common components (Zheng & Smaldino, 2003).

**Learner Considerations:** In this area, a multiple intelligence determination scale, prior knowledge test and a science attitude scale were used to identify the learners' needs and characteristics in terms of a multiple intelligence fields profile, success level and attitudes towards the science course. Also, after the examination of science teaching programs used previously in Turkey, the challenges in this area were examined in a related subject. Then, the likely incorrect understandings of the students were determined through discussions with teachers and a literature review.

**Content organization:** The objective was defined as "(The student) classifies the matter by giving examples and describing the differences between them", which was found in the 2000 Turkish science teaching program, was considered on the focus topic. Teaching materials relating to this topic were developed, including a student worksheet, student practice questions, and teacher guide. These were prepared by the first author using a process of instructional design that holistically integrated approaches focused on several student considerations. The teaching materials consisted of questions asking students' prior knowledge, the theoretical framework to form the foundation of the teaching, hands-on activities to be used and detailed information regarding visual elements such as photographs, tables and figures. Photographs of experimental set ups were taken by the first author and then edited on Photoshop 8.0. For preparing the text-based instructional materials Macromedia Freehand Mxa were used, and animations were prepared using Macromedia Flash Mx. These were prepared to be consistent with the design principles under study, such as providing emphasis of key ideas, effective use of colors, and use of contrast and line balance. The animation that was used in instruction and text-based material examples can be seen in Figure 1 and Figure 2.

**Instructional strategies:** Because of the reasons discussed earlier, varied methods were integrated into a holistic approach to instruction. The materials were designed to support a teaching approach that synthesized elements from multiple intelligence theory (Armstrong, 2000) and a constructivist approach. Strategies that were used include a learning cycle (Bevevino & Dengel, 1999; Marek, 2000; Wilder & Shuttleworth, 2005; Lindgren & Bleicher, 2005), hands-on activities, instructional analogies (Bosak, 2000), an emphasis on science process skills (Gabel, 1993), concept mapping (Novak & Gowin, 1984) and an animation. This multi-faceted teaching

 

approach was used for teaching the subject to the experimental groups while the control groups received the instruction as is typically done in the school. With regards to the teaching material for the control group, four of the activities that were found in science textbook were done with the learners. The students were divided into groups of 4-5 and the textbook instructions were followed by the researcher and science course teacher of the school. Questions in the book were assigned as homework for the students. Teaching of the subject was carried out in three lessons just as it was defined in the annual plan.
The experimental groups, however, were taught using the holistic instructional design developed by the researchers. Application of the instructional design to the experimental groups was conducted so that all teaching methods mentioned for the three lessons were combined and used together at the same time as follows:

*Engagement Phase:* Students are presented with several real-world questions such as; "How can we classify different examples of matter considering their states?", "What are the properties of solids, liquids and gases?", "What are the differences and similarities among solids, liquids and gases?" These questions served to interest students in the topic so that they were motivated to continue the exploration. In this phase, the aim was to determine the students' prior knowledge and motivate them to engage with learning the topic.

*Exploration Phase*: Learners were clustered into groups composed of four or five. They participated in two hands-on activities directly related to the questions of engagement. Explanations about the concepts were not given to students during in this phase. Also, the activities were meant to elicit the use of science process skills such as observing, measuring, classifying, inferring, predicting, communicating, defining operationally and collecting data during hands-on activities. Then students took part in an analogy activity in which students role-played molecules in solids, liquids and gases (Bosak, 2000). Additionally, students were taken into a computer laboratory to watch "States of matter" animation, which can be found on an Internet website (http://www.harcourtschool.com/activity/states_of_matter/). It was revised using Macromedia Flash Player, translating it into Turkish. Students viewed the action, pattern and arrangement of molecules in the solid, liquid and gas state according to the changes of the temperature in the animation. Thus, the instructional approach actualized multiple intelligence theory in the classroom including the intelligences referred to as interpersonal (by doing hands-on activities together), bodily-kinesthetic (by dramatizing solids, liquids and gas particles), verbal-linguistic (by discussing animations in ways that operationally defined the terms of solids, liquids and gases) logical-mathematical (by doing science experiments, applying science process skills like observing, predicting and inferring) and visual-spatial intelligence (by presenting an animation).

*Explanation Phase***:** Students were given study questions to discuss with each other. The students were asked to share similarities and differences between solids, liquids and gases. Then students were asked to classify various examples of matter as solids, liquids and gases, using the criteria that they studied in the previous lesson phase. So, the verbal/linguistic area (analyzing and organizing information by communicating and defining operationally), logical/mathematical intelligence (by inferring, classifying) and interpersonal intelligence (by discuss the topic collaboratively) were actualized as part of developing an explanation of states of matter.

*Elaboration Phase*: Students used their new knowledge in a different situation. Several questions were asked such as, "In that sugar takes the shape of container, they are like liquids, so sugar is a liquid?", "You can compress a sponge, which is like gases, so is a sponge a gas?", and "Describe the properties of the cornstarch and water mixture". These questions encouraged students to analyze and explain the attributes of the states of matter as shown in the examples. In the last question it must be noted that the cornstarch and water mixture is referred to as a non-Newtonian liquid, in that it has properties that cross the characteristics of solids and liquids. In this hands-on activity students, are asked, "Is your new matter solid or liquid? Why?"

*Evaluation phase:* The students constructed individually a concept map using the words *matter*, *solid*, *liquid*, *gas*, *ice*, *water*, *water vapor*, *compressible*, *keep the volume*, *flow*, *spread out*, *regular pattern*, *irregular pattern*, *move rapidly.* As well, students were given homework in which they were given the choice to prepare a topic-related story, song lyrics, picture or billboard. This was in keeping with the premises of multiple intelligence theory.
*Formal Evaluation*
After the intervention a formal evaluation in the form of an achievement test was applied to both experimental and control groups at the same time. The findings from these tests will be discussed below in the Results section.

**Measurement Tools**
Four data collection tools were used in this research. Detailed information about each data collection tool is presented below.

 

**Prior knowledge test:** The test developed by Özdilek and Özkan (2005), was applied to determine the students' level of past science achievement and whether or not there was a difference between the prior knowledge of the experimental and control groups. Average item difficulty of the test was measured as .43 and the average item discrimination index was established as .46. Also, Cronbach's alpha reliability coefficient of the test was found to be .71 (see Özdilek & Özkan, 2005).

**Science Attitude Scale:** The survey developed by Özdilek and Ö+zkan (2005) was used to determine the students' science attitude and whether or not there was a difference between the science attitude of experimental and control groups. Cronbach's alpha reliability coefficient of the survey was found to be .88.

**Multiple Intelligence Fields Determination Survey:** This survey, which was suggested by Saban (2004), was applied to determine the students' multiple intelligence fields and whether or not there was a difference between the multiple intelligence fields of the experimental and control groups. Cronbach's alpha reliability coefficient of the survey was calculated as .94.

**Achievement Test:** This test was developed by the researchers in order to determine whether or not there is a difference between the achievement level of students in both experimental and control groups. First, the opinions of two science teachers and a science education professor were taken into consideration to ensure the content validity of 17 questions. The science teachers had 23 years and 25 years of experience, while the science professor had 32 years of teaching experience. This study was piloted on 32 seventh grade students who attended a different school than that used in the study. The test consisted of 10 multiple choice items and 7 open-ended questions. For the calculation of the reliability of this test, item analyses on the multiple choice questions was conducted, and the inter-rater agreement on open-ended questions was assessed. After the pilot study, two questions that have item discrimination index values less than d <.02 were eliminated. The average item difficulty level was measured as .44; average item discrimination index .58 and a Cronbach's alpha reliability coefficient as .74 was found.

A rubric was prepared to evaluate the results of each open-ended question. Each question was evaluated using a scale of 0-3 (0=completely wrong or unanswered, 1=mixture of correct and incorrect information given, 2= correct but incomplete, 3= completely correct). Open ended questions were coded by two judges. The first author and the science teacher scored the answers of 73 students (61% of the participants) on the achievement test. The achievement tests that each scorer assessed were randomly selected. The percentage of the agreement between their scores for each of the 2 questions and four dimensions ranged from 82% to 91%. Thus, the post-test consisted of 15 questions, 8 of which are multiple choice items, and 7 are open-ended questions. In the assessment of the test students were awarded 1 point for each correct answer in the multiple choice questions, and they were scored 0-3 points for each open-ended question. Consequently possible achievement scores of the participants ranged from 0 to 29.

**Data Analysis**

The data were analyzed with descriptive statistics, one way ANOVA, variance homogenity, Cohen's effect size, and Scheffe Tests using the SPSS 11.00 program at .05 significant levels.

**RESULTS**

Prior to the study, a one way ANOVA test was used to determine whether there was a statistically significant difference between the experimental and control groups on pretest scores. No statistically significant difference between the four groups was found with respect to prior knowledge level ($F_{(3;116)}$=2.481 and p=.064), attitudes toward science ($F_{(3;116)}$=2.036 and p=.113), verbal-linguistic intelligence fields ($F_{(3;116)}$=2.401 and p=.071), mathematical/logical intelligence fields ($F_{(3;116)}$=.762 and p=.518), visual/spatial intelligence fields ($F_{(3;116)}$=1.404 and p=.245), bodily/kinesthetic intelligence fields ($F_{(3;116)}$=.513 and p=.674), musical intelligence fields ($F_{(3;116)}$=.391 and p=.760), inter-personal intelligence fields ($F_{(3;116)}$=.400 and p=.753), intra-personal intelligence fields ($F_{(3;116)}$=2.434 and p=.068) and naturalist intelligence fields ($F_{(3;116)}$=.829 and p=.481). These results indicated that students in both experimental and control groups were similar regarding the pretest scores (see Table 1).

 

**Table 1.** One Way ANOVA Pretest Results between Experimental and Control Groups

| Test | Group | N | Means | SS | F | p |
|---|---|---|---|---|---|---|
| Prior Knowledge | I | 30 | 44.0 | 14.65 | 2.481 | .064 |
| | II | 30 | 48.0 | 19.55 | | |
| | III | 30 | 42.83 | 17.10 | | |
| | IV | 30 | 54.17 | 19.39 | | |
| Attitudes towards science Scale | I | 30 | 80.23 | 11.71 | 2.036 | .113 |
| | II | 30 | 86.67 | 12.06 | | |
| | III | 30 | 83.70 | 8.71 | | |
| | IV | 30 | 85.60 | 10.58 | | |
| Verbal-linguistic intelligence field | I | 30 | 21.10 | 6.04 | 2.401 | .071 |
| | II | 30 | 24.56 | 5.55 | | |
| | III | 30 | 23.23 | 4.60 | | |
| | IV | 30 | 22.07 | 4.63 | | |
| mathematical/logical intelligence field | I | 30 | 24.90 | 6.48 | .762 | .518 |
| | II | 30 | 26.73 | 7.13 | | |
| | III | 30 | 25.00 | 4.32 | | |
| | IV | 30 | 26.43 | 5.59 | | |
| visual/spatial intelligence field | I | 30 | 28.40 | 7.93 | 1.404 | .245 |
| | II | 30 | 27.13 | 7.11 | | |
| | III | 30 | 25.20 | 6.32 | | |
| | IV | 30 | 25.67 | 5.25 | | |
| bodily/kinesthetic intelligence field | I | 30 | 25.93 | 7.42 | .513 | .674 |
| | II | 30 | 27.27 | 6.09 | | |
| | III | 30 | 25.80 | 5.78 | | |
| | IV | 30 | 27.40 | 6.61 | | |
| musical intelligence field | I | 30 | 22.60 | 8.51 | .391 | .760 |
| | II | 30 | 22.87 | 8.01 | | |
| | III | 30 | 24.40 | 5.81 | | |
| | IV | 30 | 23.97 | 7.62 | | |
| inter-personal intelligence field | I | 30 | 23.13 | 6.72 | .400 | .753 |
| | II | 30 | 22.97 | 6.94 | | |
| | III | 30 | 22.13 | 6.28 | | |
| | IV | 30 | 24.07 | 7.45 | | |
| intra-personal intelligence field | I | 30 | 22.53 | 7.44 | 2.434 | .068 |
| | II | 30 | 25.97 | 6.76 | | |
| | III | 30 | 21.67 | 5.21 | | |
| | IV | 30 | 23.37 | 6.47 | | |
| naturalist intelligence field | I | 30 | 26.07 | 6.94 | .829 | .481 |
| | II | 30 | 27.17 | 6.61 | | |
| | III | 30 | 24.53 | 6.66 | | |
| | IV | 30 | 25.53 | 6.18 | | |

First Control Group=I, Second Control Group=II, First Experimental Group=III, Second Experimental Group=IV

After the study, it was found that there were significance differences between the achievement test scores of students in the two experimental groups when compared with the two control groups using the one way ANOVA test ($F_{(3-116)}$ =27.912 and p=<.05). Following the ANOVA test (because of the homogeneity of variance tests p values >.05) a Scheffe test was conducted in order to determine which groups have significance differences. The test results revealed that levels of achievement of the learners in the two experimental groups were higher than both of the control groups. However, there were no statistically significant differences among the two experimental groups and among the two control groups.

Cohen's effect size and average percentages were also calculated in order to compare the mean average scores of experimental groups (III and IV) with those of the control groups (I and II). Average percentages of the four groups indicated that experimental groups scores (III=23.13/29=80%; IV=22.13/29=76%) were much higher than the control groups (I=9.90/29=34%, II=13.96/29=45%). Cohen's effect size was found to be 1.614, which is very high. An effect size of 1.614 means that the score of the average person in the experimental groups is

 

1.614 standard deviations above the average person in the control groups. Hence an average person in the experimental groups would score higher than 95% of all students in the control groups (Coe, 2002).

Using the mean achievement score, it is possible to say that the instructional design is more effective than the current science teaching program at the elementary school level. Also, it appears that the teacher guide is effective in terms of establishing consistent instruction irrespective of the individual teachers, since there is no significance difference among the two experimental groups. The results are presented in Table 2.

**Table 2.** One Way ANOVA and Scheffe Posttest Results between Experimental and Control Groups

| Group | N | Means | Standard Deviations | F | p | Scheffe Test |
|---|---|---|---|---|---|---|
| I | 30 | 9.90 | 6.34 | 27.912 | .000* | I, II< III, IV |
| II | 30 | 13.96 | 6.44 | | | |
| III | 30 | 23.13 | 7.31 | | | |
| IV | 30 | 22.13 | 6.43 | | | |

*p<0.05

**CONCLUSIONS AND DISCUSSION**

In the previous study it was found that an instructional design based on a holistic approach used in a science unit entitled *"Travel to the Inner Structure of Matter"* was effective on supporting students' achievement, retention and attitudes towards science course when we compared this design with the traditional approach (Özdilek, 2006).

In the current study the aim has been to examine the effect on learners' achievement of the holistic instructional design material, using design principles and integrating multiple teaching methods, which were also supplemented with a computer animation on the classification of matter. It was revealed that materials developed to support a holistic approach to instructional design (including a student worksheet, student practice questions and teacher guide) that synthesized several elements of effective instructional design were more successful at supporting student achievement, when compared to the previous program being used in the school, which helped the students in reaching the instructional objectives. It was also found that the teacher guide is effective for the of application the instructional design by different instructors.

These results showed that the instructional design is highly effective since, as suggested by McArdle (1991), an efficient instructional design greatly increases students' success. The holistic instructional design approach included deliberate integration of multiple teaching methods to improve the success, multi-faceted instructional materials prepared for the topic and supporting the instruction further by the use a computer animation. The result that we attained in our study is consistent with the suggestions of Joseph and Gayle (1998), Powell and Wells (2002), and Mahajan and Singh (2003) that more than one teaching method should be used in instruction. It resonates, too, with researchers who argue that learners' characteristics and needs must be considered in instruction (Carnie, 1997; Hashim, 1999; Zheng & Smaldino, 2003; Dick, Carey, and Carey, 2005; Moellem, 2007), that media such as computer animations should be used in instruction (Kelly & Jones, 2007; Russomanno & Goodwin, 2007), and that instruction should be designed according to design principles (Stein et.al, 2001). This study indicates that the holistic instructional design approach, which addressed all of these dimensions, supported the students in the experimental group to be more successful compared to the ones in the control group.

Summerville and Reid-Griffin (2007) stated that the use of instructional design models to deliver technology-enhanced instruction can lead to effective teaching and there are few models for developing design skills that integrate technology within the education curriculum. Marriage of technology integration and the use of technology as a tool through instructional design offers the students numerous opportunities to engage in lesson-building activities. As it was mentioned before using media such as computer animations and visualizations has a positive effect on students' achievement (Kelly & Jones, 2007) and motivation to learn (Russomanno & Goodwin 2007). It is thought that using animation with integrated multiple teaching methods helped students learn the topic more successfully than other approaches. Also this method eliminated the challenges indicated before by Sanger (2000) and Kelly and Jones (2007) when computer animations and visualizations were applied alone. Additional to the fact that there is a tendency to use multiple teaching methods together to improve the success in education, the instructional design prepared for the topic, using these methods in a way that they are integrated and supported by an animation is also a new attempt.

 

In sum, it can be said that if instructional materials on other topics in science were prepared in a way that integrates elements of multiple effective teaching methods and according to the design principles such as emphasis, effective colors, use contrast and lines balance the teaching is likely to be more effective.

**IMPLICATIONS**

It is hoped that this study will be helpful for researchers who study the instructional design of science materials and also will be beneficial for elementary school students and pre-service teachers in order to provide them with much more understanding of effective instruction on the structure of matter and related topics in science. The animation that was used in instruction and text based material examples can be seen in Figure 1 and Figure 2. This is so that instructional designers and researchers can have some idea of the design principles that were implemented.

Also, the effectiveness of the instructional designs as in our study should be investigated by being applied by different science teachers, because persons who apply instructional designs in the schools are science teachers rather than professors at universities, as was the case for some of the students in this study. Besides, researchers' bias can be diminished if someone other than the researcher implements the instruction.

However, among of these factors and especially teaching methods and strategies have been used in instruction in a holistic way such as multiple intelligence theory, a constructivist approach, a learning cycle, science process skills, inquiry teaching method, an analogy, concept mapping, and a computer-based animation. Thus, it is not possible to say that each teaching method contributed individually to student achievement. This limitation needs to be taken into account when considering the contributions of the study. It may be that for the sake of efficiency some smaller group of instructional methods could be employed with the same (or, conceivably, even greater) student achievement gains. The implications of this study are clear that a combined, holistic approach to instructional design, which makes use of multiple teaching methods, is beneficial. Determining just which combination of teaching methods might be most efficient and effective will require further research. The approach of using multiple teaching methods so as to increase the likelihood of matching with learner characteristics and teaching strategies seems warranted by this study. For this reason planning the instruction based on holistic approach and implementation of this accordingly by teachers is very important to ensure an effective instruction. Corresponding to this it seems important to holistically modify both the student materials and the teacher materials so as to develop a coherent approach to integrating the different methods used.

The study was also limited to the topic of classification of matter, a typical topic at 7$^{th}$ grade in Turkey and elsewhere. For this reason it is recommended that researchers prepare and investigate other instructional designs at different grades, topics and units using a similar holistic approach.

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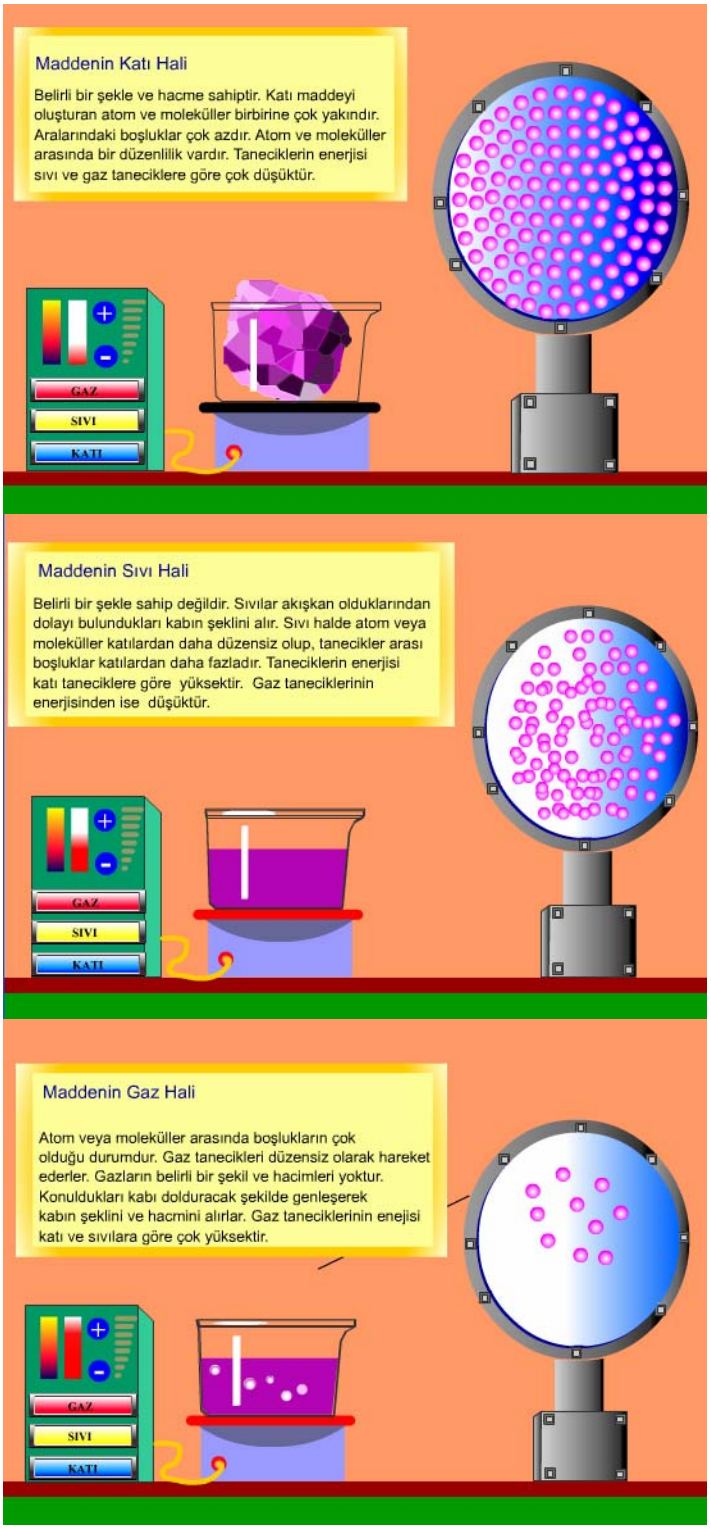


Figure 1. Animation of Solids, Liquids, and Gases Pictures

## Etkinlik: Çeşitli Maddelerin Katı, Sıvı ve Gaz Olarak Sınıflandırılması

**Amaç:** Çeşitli maddeleri katı, sıvı ve gaz olarak sınıflayabilme

**Etkinlik Öncesi Sorular:**
1. Toz şeker, bulunduğu kabın şeklini aldığına göre sıvı mıdır?

2. Sünger sıkıştırılabildiğine göre gaz mıdır?

3. Mürekkep su içinde tanecikler halinde yayılabildiğine göre gaz mıdır?

**Gerekli Malzemeler:** Kesme şeker, toz şeker, sünger, mürekkep, bardak, su, saat camı

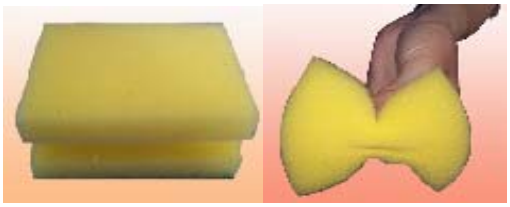
**Etkinliğin Yapılışı:**
1. Kesme şekeri cam kaba koyarak gözlem yapınız.

2. Toz şekeri cam kaba koyarak gözlem yapınız.

3. Süngeri elinizle sıkarak gözlem yapınız.

4. İçi su dolu olan bir bardağa birkaç damla mürekkep damlatarak gözlem yapınız.

Kesme Şeker Toz Şeker



Sünger Sıkıştırılmış sünger

Mürekkep Suya damlatılan mürekkep

**Sonuçlar:**

1. Toz şeker, bulunduğu kabın şeklini aldığına göre katı veya sıvı olduğuna nasıl karar verirsiniz?

2. Sünger, gazlar gibi sıkıştırılabildiğine göre katı veya gaz olduğuna nasıl karar verirsiniz?

3. Mürekkep, su içinde gazlar gibi yayıldığına göre sıvı veya gaz olduğuna nasıl karar verirsiniz?

**Etkinlik: Katı, Sıvı ve Gaz Halindeki Maddeleri Öğrenelim**

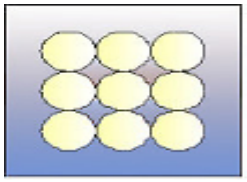
**Amaç:** Maddelerin yapısını öğrenmek

**Etkinlik Öncesi Sorular**: Katı, sıvı ve gaz halindeki maddelerin yapısı nasıldır?

Katı:

Sıvı:

Gaz:

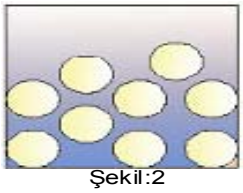


Şekil:1

**Gerekli Malzemeler:** Tebeşir ve dokuz öğrenci

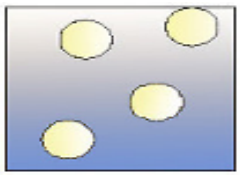
**Etkinliğin Yapılışı:**

Şekil: 1'deki gibi kare çizilen bir alan içinde birbirinize çok yakın bir şekilde durarak olduğunuz yerde titreşim hareketi yapınız. Sizler katı bir maddenin taneciklerisiniz. Şimdi size ısı enerjisi veriyoruz. Isındığınızı hissediyorsunuz. İleri ve geri doğru sallanmaya başladınız. Biraz daha fazla sallanıyorsunuz. Eriyorsunuz. Sıvı olmaya başladınız.



Şekil:2

Şekil:2'deki gibi durunuz. Şimdi sıvı hale geçtiniz. Yavaş bir şekilde sallanmaya devam edin. İleri ve geri doğru yürüyün ve çizgi içinde kalın. Çünkü siz bir kavanozun içindeki sıvı taneciklerisiniz.



Şekil:3

Şekil:3'te size biraz daha fazla ısı enerjisi veriyoruz. Şimdi karenin içini hızla terk etmeye başlayın. Şu anda çok sıcak ve siz karenin içinde duramıyorsunuz. İşte şimdi gaz tanecikleri oldunuz.

**Sonuçlar:**

1. Bir maddenin katı, sıvı ve gaz halinin tanecik düzeni nasıldır?

2. Bir maddenin katı, sıvı ve gaz halinin hangisinde tanecik enerjisinin daha fazla olduğunu düşünürsünüz? Neden?

Üç etkinlik sonucunda elde ettiğiniz verileri aşağıdaki tabloya yazınız.

| Madde | Kütle | Hacim | Şekil | Akışkanlık | Sıkıştırılma | Tanecik Düzeni | Tanecik Enerjisi | Arayüz |
|---|---|---|---|---|---|---|---|---|
| **Katı** | | | | | | | | |
| **Sıvı** | | | | | | | | |
| **Gaz** | | | | | | | | |

Yukarıdaki tabloya göre katı, sıvı ve gaz halinde bulunan maddelerin özelliklerini yazınız.

**Katı:**

**Sıvı:**

**Gaz:**

Figure 2. Text Based Material Examples