



**Daffodil**  
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**University**

**PSYCHOSOCIAL ASPECTS OF THE  
LEARNING ENVIRONMENT IN  
INFORMATION TECHNOLOGY RICH  
CLASSROOMS**

By  
**MADINA TUL JEBA**  
**151-35-864**

A thesis submitted in partial fulfillment of the requirements for the  
Degree of Bachelor of Science in Software Engineering.

**Department of Software Engineering**  
**DAFFODIL INTERNATIONAL UNIVERSITY**

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## APPROVAL

This Thesis titled “Psychosocial Aspects of the Learning Environment in Information Technology Rich Classrooms”, submitted by Madina Tul Jeba, ID (151-35-864) to the Department of Software Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc in Software Engineering and approved as to its style and contents.

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**Professor and Head**

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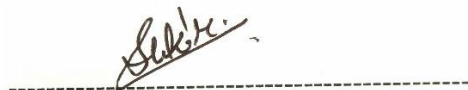
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**Assistant Professor**

Department of Software Engineering  
Faculty of Science and Information Technology  
Daffodil International University

**Internal Examiner 1**



-----

**Asif Khan Shakir**

**Lecturer**

Department of Software Engineering  
Faculty of Science and Information Technology  
Daffodil International University

**Internal Examiner 2**



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**Dr. Md. Nasim Akhtar**

**Professor**

Department of Computer Science and Engineering  
Faculty of Electrical and Electronic Engineering  
Dhaka University of Engineering & Technology, Gazipur

**External Examiner**

## DECLARATION

I hereby declare that, this thesis has been done by me under the supervision of **Mohammad Khaled Sohel, Assistant Professor**, Department of Software Engineering (SWE), Daffodil International University. I also declare that neither this study nor any part of this thesis has been submitted elsewhere for award of any degree or diploma.

**Submitted by:**



---

**Madina Tul Jeba**

**ID: 151-35-864**

Department of Software Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Certified by:**



---

**Mohammad Khaled Sohel**

**Assistant Professor**

Department of Software Engineering  
Faculty of Science & Information Technology  
Daffodil International University

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# TABLE OF CONTENTS

<b>APPROVAL</b>	ii
<b>DECLARATION</b>	iii
<b>ACKNOWLEDGEMENT</b>	iv
<b>TABLE OF CONTENTS</b>	v-vi
<b>LIST OF TABLES</b>	vii
<b>LIST OF FIGURES</b>	viii
<b>LIST OF ABBREVIATIONS</b>	ix
<b>ABSTRACT</b>	x
<b>CHAPTER 1: INTRODUCTION</b>	1-3
1.1 Background	1
1.2 Motivation of the Research	1
1.3 Problem Statement	2
1.4 Research Questions	2
1.5 Research Objectives	2
1.6 Research Scope	3
1.7 Thesis Organization	3
<b>CHAPTER 2: LITERATURE REVIEW</b>	4-11
2.1 Related Works	4
2.2 The Idea of Psychological Characteristics: Satisfaction	8

2.3	Research Gap	11
2.4	Challenges	11
<b>CHAPTER 3: RESEARCH METHODOLOGY</b>		<b>12-14</b>
3.1	Conceptual Model	12
3.2	Procedure	12
3.3	Sample Size	13
3.4	Measure	13
3.5	Data Collection	13
3.6	Research Process	14
<b>CHAPTER 4: RESULTS AND DISCUSSION</b>		<b>15-19</b>
4.1	Psychosocial Environment	15
4.2	Associations Between Psychosocial Factors with Satisfaction	16
4.3	The Most Significant Effect of Psychosocial Factors with Satisfaction	17
<b>CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS</b>		<b>20-21</b>
5.1	Findings and Contributions	20
5.2	Recommendation for Future Work	20
<b>REFERENCES</b>		<b>22-25</b>
<b>APPENDIX A</b>		<b>26-31</b>

## LIST OF TABLES

<b>TABLE</b>		<b>PAGE</b>
Table 4.1	Mean and Standard Deviation summary of psychosocial data	16
Table 4.2	Associations between psychosocial scales and satisfaction in terms of simple correlations ( <i>R</i> ) and standardized regression coefficients ( $\beta$ ).	18
Table 4.3	Effect size of psychosocial factors with satisfaction	19

## LIST OF FIGURES

<b>FIGURE</b>		<b>PAGE</b>
Figure 2.1	Association among personality function, environment and human behavior by Lewin (2013)	7
Figure 2.2	Productivity Model by Walberg (1981)	8
Figure 2.3	Educational productivity model by Zandvliet (2001)	9
Figure 3.1	A reasonable model for concentrate educational conditions (adapted from Gardiner (1989))	13
Figure 3.2	Graphical representation of research procedure	14
Figure 4.1	Graphical representation of structural model	20



## LIST OF ABBREVIATIONS

<b><u>Abbreviation</u></b>	<b><u>Explanation</u></b>
SC	Student Cohesion
IV	Involvement
AT	Autonomy
TO	Task Orientation
COP	Cooperation
SAT	Satisfaction
SD	Standard Deviations

## ABSTRACT

The students ought to be capable together with their teachers to work in a sheltered, effective and pleasant way and in addition to well-disposed use of computing sources in IT classrooms. The engineering students have to spend their most of the time occupying the computer networked classrooms. Although, the IT-rich classrooms provide technological supports but it also points out that human factors like psychosocial factors are responsible for a student's fulfillment with the conditions and overall environment. This study investigated the relationships between psychosocial characteristics such as Student Cohesion, Involvement, Autonomy, Task Orientation, Cooperation and satisfaction of the engineering students in digital learning environment who are studying in different private universities in Bangladesh. Another depiction was to find those factors who make the most significant association with satisfaction of engineering students. The target group is a total of 1000 students from undergraduate level, Department of Software Engineering, Department of Computer Science and Engineering and Department of Electrical Engineering from Daffodil International University (DIU), American International University of Bangladesh (AIUB) and BRAC University. What is happening in the class? (WIHIC) questionnaire was adopted for surveying the students about the psychosocial factors and their satisfaction level in IT-rich classrooms. The factors then analyzed and regressed against satisfaction. The findings revealed that psychosocial factors have weak but significant and positive association with student satisfaction. It also proves that, the changes in psychosocial factors have a huge effect on positive and also negative satisfaction significance level. The learning environment of engineering universities impacts the students' satisfaction according to psychosocial aspects which includes course curriculum, teaching methods, relationship with other students, self-efficiency and tasks clarification. Finally, the theoretical and experimental outcomes of this study make a clear vision that in Bangladesh, the leading private universities offering undergraduate engineering studies providing their students classrooms with proper digital and empirical support which results in positive students' satisfaction although there are lot more areas has left to be explored to make the IT-rich classrooms environment more sufficient.

**Keywords:** Human Factors, Student Satisfaction, Psychosocial Behavior, Learning Environment

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Data innovation (IT) utilize is expanding in about all aspects of life in the creating scene and its utilization is currently advancing quickly in numerous institutional organizations. Synopses of research on grown-up clients of IT, fundamentally in office situations, Kroemer and Grandjean (1997), have demonstrated that its execution can have conceivably negative and beneficial outcomes on client's well-being, fulfillment and profitability. Right now there is next to no exploration on its ergonomics use by students. Computers have its predominant use in the educational field which can fundamentally upgrade execution in learning. Indeed, even separation learning is made beneficial and successful through web and video-based classes. Numerous educationists have underlined the significance of coordinating innovation based instructing into educational modules of engineering education in Bangladesh. They trust that it has "the potential to change training if educators change their instructional practices to draw in students in important learning and utilization of 21st-century learning and aptitudes", Morrison and Lowther (2010). Educators' absence of time, preparing, and intrigue are the fundamental boundaries for coordinating innovation into instructing. On the other hand the vast majority of the students incline toward utilization of advancements for educational purposes. One key purpose behind this might be the way that they are depended more on innovation based instruments for every day employments. While a few reports have started to examine this issue in classrooms, couple of far reaching ergonomics thinks about have been embraced. All things considered, its usage in engineering universities proceeds with apace and this has changed numerous classrooms into 'technological learning conditions', the place where students spend an extensive part of their day utilizing computers.

### 1.2 Motivation of the Research

The evident analogies between ergonomics in business and industry situations and examinations of the learning condition has propelled the reasonable view utilized for this investigation of computer learning situations. Dalton (2009) inferred from his examination result that "teachers should change their job into 'facilitator' as opposed to the 'supplier of-information' and advance more gathering work and loosening up learning situations". As to students' new jobs, they need to take part in online task based learning. At last, the utilization of an instructive profitability model, for example, the one embraced by Walberg (1991) was valuable while considering an extensive variety of critical components working inside classrooms. In this study, it was accepted that an assortment of elements taken together impact students fulfillment. Ergonomists have generally utilized research models that incorporate a

thought of psychosocial factors. This methodology likewise reflects the genuine multifaceted nature of the present electronic classroom conditions that have as of recently to a great extent disregarded psychosocial factors as they may impact students' satisfaction and efficiency in their learning.

### **1.3 Problem Statement**

Advanced education can open and extend our mind while innovation causes us to bring the world at our fingertips. Education without innovation is fragmented in the present quick paced world as it causes us both for educating and learning. The developing nation like Bangladesh is quickly moving towards the advanced age to adapt up to the present world. Utilizing the innovation based gear in the classroom or online assets, our future ages will effectively deal with the difficulties or obstructions in advanced education. In the meantime they will likewise confront a few difficulties in utilizing totally new furthermore, modern essentials in day to day life while learning in the new technological environment. The use of new technologies in classrooms influence students' satisfaction with learning in the new settings. Particularly, physical and psychosocial factors impact the satisfaction level. According to these factors, there is no proof that whether the engineering studying environment is positively significant for students or not in Bangladesh with respect to technological enriched classrooms they use which is the focused area of this study.

### **1.4 Research Questions**

To meet the requests of value training for all, the advanced education frameworks have developed definitely amid the most recent couple of decades in Bangladesh. Notwithstanding colossal incorporation of innovation and instruction, a great number of difficulties are avoiding far reaching compelling usage. A portion of these difficulties are methodical also, some are identified with the advances themselves. In Bangladesh, the usage of information and technology is increasing with the rising number of engineering students with lots of more possibilities. Universities are offering digital arrangements for the students to cope up with the moving era. But,

- Are the engineering students satisfied with the classroom environment in respect of psychosocial factors like cohesiveness, involvement, task orientation, autonomy and cooperation?

### **1.5 Research Objectives**

- To initially depict the present circumstance in IT-rich classrooms in engineering universities in Bangladesh.

- To explore connections between psychosocial factors, for example, the level of student cohesion, cooperation, task orientation and satisfaction.

## **1.6 Research Scope**

This study is mainly focused on the undergraduate level engineering students studying at different private universities in Bangladesh. Within 80 private universities (in Bangladesh) most of them are offering engineering studies in the current scenario. But I selected mostly the engineering studies that includes compulsory course works done in computer laboratories.

## **1.7 Thesis Organization**

This report is organized as following,

Chapter 1 gives the synopsis of this thesis. Background study is the key term of this first part. Aside from, what motivated me to do such an examination based research is clarified well in this part too. The most critical piece of this part is the purposes for the issue of the thesis. At that point, what are the research questions and what are the goals are discussed in the last segment of this chapter.

Chapter 2 consists of the reviews from relatable works in this sector and describes previously conducted studies about what is done and what can be done. Also, this section denotes the challenges.

Chapter 3 is only the hypothetical discussion on this intended work. To talk about the hypothetical piece of the methods, this part expounds the measurable techniques for this work. Moreover, this section shows the step by step statistical methods on how to acquire the outcome for this study to validate the concept.

Chapter 4 is connected with the result of the entire research and the venture. Some test pictures are available in this part to make understand the task.

Chapter 5 depends on end points of the study. This part is capable to demonstrate the entire task report sticking to proposal. The section is closed by demonstrating the constraints of works that can be the future extent of other people who need to work in this field.

## **CHAPTER 2**

### **LITERATURE REVIEW**

Educational institutions like high school and universities especially engineering institutions are progressively looking to IT as a specialized guide in the advancement of new models of educating and learning. This strain to execute instructive advancements is both societal and furthermore identified with new thoughts regarding educating and adapting now creating inside the engineering research network. This incorporates patterns towards more noteworthy individualization in taking in, the utilization of co-agent learning gatherings, reconciliation of branches of knowledge and an expanding center around higher request thinking aptitudes (Organization for Economic Co-activity and Development [OECD] 1987). Adams et al. (1990) expressed that the effective utilization of computers implies including students and teachers in the learning procedure in new ways. Similarly as with any medium, the essentialness of technological use in universities relies upon great instructing. Proficient learning about student learning, educational module and classroom association should supplement other vital data on powerful, beneficial and safe computer use by students. Be that as it may, a hunt of the literature uncovers couple of exhaustive reports on the protected and beneficial utilization of IT in engineering schools.

#### **2.1 Related Works**

The utilization of networked computers has formed into a prevalent and helpful instructional vehicle for various reasons, including its availability, adaptable capacity and show choices, capacity to help and show sight and sound, and usability. In an investigation of school classrooms by Berge and Collins (1995), numerous advantages of utilizing computers intervened correspondence were accounted for including expanded open doors for co-agent learning, enhanced social connections and expanded social mindfulness with respect to students. Eklund (1995) states that the intensity of instructive figuring lies basically in the kinds of discovering that it can bolster. He contends that it advances student focused learning, inspiration and

investigation, all components connected to higher-ordered learning. Essentially, while numerous elements point to the expanding utilization of computers as a groundbreaking instructive device, computers (as machines) are themselves constrained by their very own innovative needs (e.g. web association wiring, area of intensity supply). Care must be taken that these don't supersede the critical sociocultural, mental and physiological human elements identified with educating and learning.

While there have been numerous cases that expanded utilization of IT encourages adapting, just a couple of studies could be discovered that inspected physical results of computer use by understudies. Harris and Straker (2000) studied 314 students going to three Australian high-schools with mandatory workstation programs. The examination discovered moderate measures of computer use by students (mean day by day computer utilization of 3.2 h going up to 15 h and mean week by week workstation utilization of 16.9 h going up to 80 h). Curiously, 60% of students announced uneasiness related with workstation utilize and greatest time on assignment was emphatically identified with the inconvenience experienced. Oates et al. (1998) assessed the stance of 95 students and related computer workstations in three schools in the USA. None of the workstations were flexible and all surpassed the measurements suggested. All of the students' stances were in the unsatisfactory range, as surveyed by RULA, McAtammney and Corlett (1993). Their outcomes illustrated that critical enhancements in student's stance were reachable with properly balanced adjustment.

The authors have a few signs of potential efficiency (learning) advantages of IT use by students, some proof on potential issues (and arrangements) with school computer workstation plans and some proof that expanding computer utilize is related with expanded discomfort. Mohd Azry (2017) states that, learning condition impact self-adequacy decidedly if physical and psychosocial learning condition have huge and positive associations with students' fulfillment. Psychosocial developing secured well-being aspects, great relationship, and independence in communicating thoughts, feeling and thought, stated by Nwanekez (2012). In later year, Lewin (2013) have considered the issues related with the person's inspiration and motivation inside the gathering. In view of his exploration, Lewin prescribed an equation that clarified about human conduct that is  $B = f(P, E)$ . In the formula, 'B' depicted as human

conduct which are shaped because of a person's personality functions (P) and environment (E). The method has recognized that the environment and connection with identity is a vital factor in deciding human behavior.

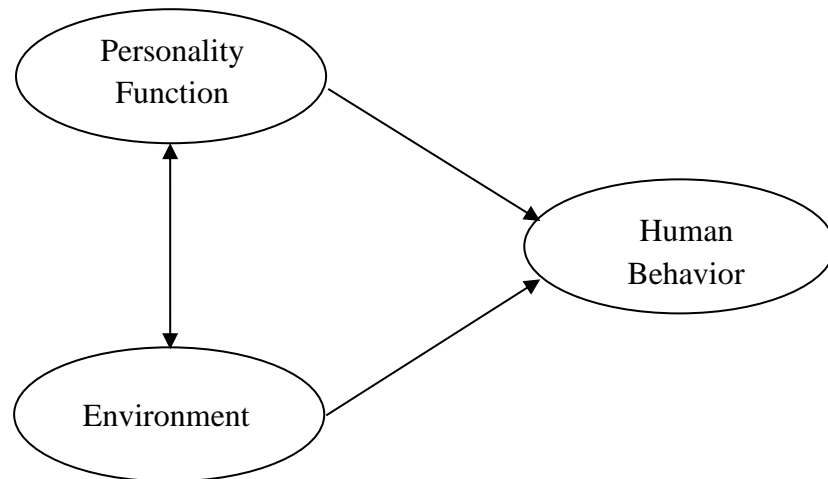


Figure 2.1: Association among personality function, environment and human behavior by Lewin (2013)

Study directed by Walberg (1981) delivered another learning condition demonstrate called productivity. The model featured about the essential of the learning environment. In the model, Walberg has recognized nine components that influence the instruction productivity and those components are associated to one another. As indicated by Walberg, nine of the components are tie together to shape three essential factors that impact the generation of learning. The elements are talent (ability, motivation, and dimension of development), teaching strategies (quantity of guidelines and quality of instructing) and environments (home, classroom, peer gatherings and media). These components are commonly comprehensive and give an immediate affect on the learning creation regarding molding the student's successful, intellectual and conduct. As proposed by Walberg (1981), teachers need to investigate those nine components to make powerful learning. The synopsis of connection between the factors associated with the productivity display is appeared in Figure 2.2.



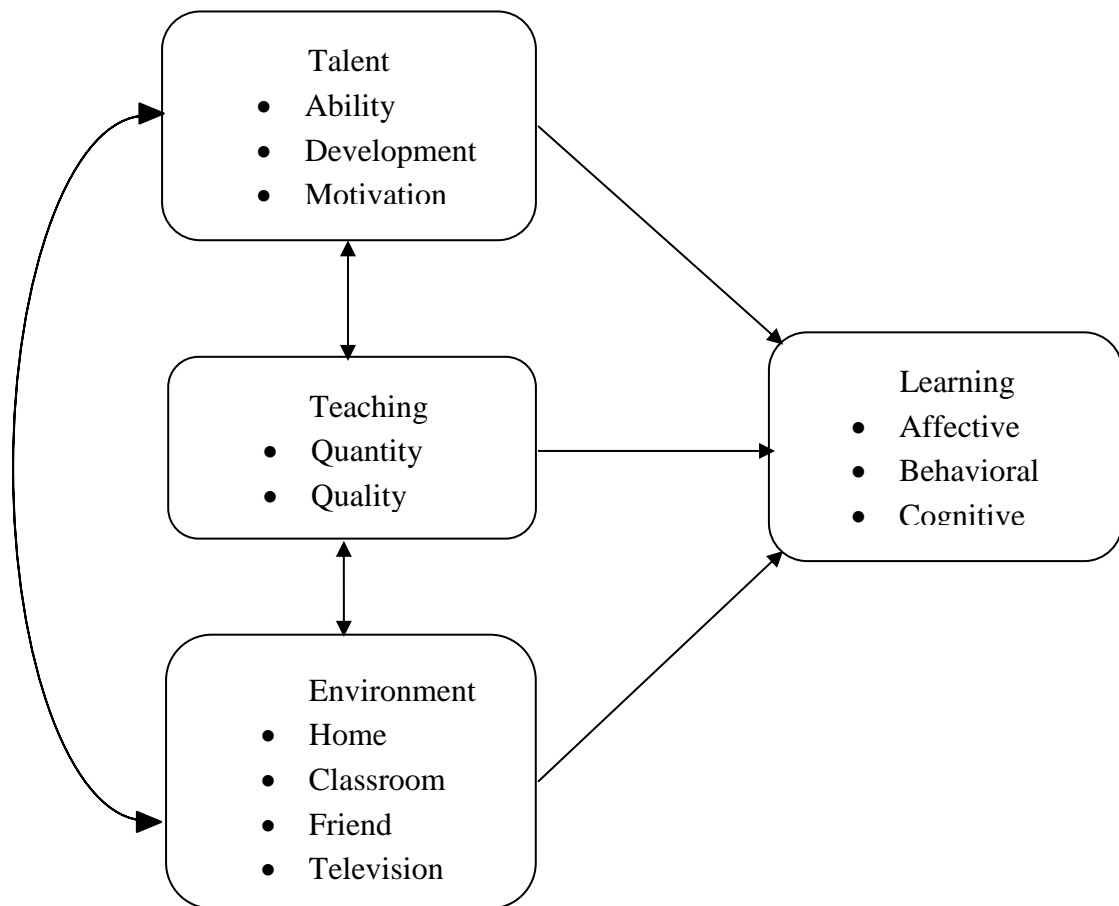


Figure 2.2: Productivity Model by Walberg (1981)

Gardiner (1989) turns out with a learning domain show that portrayed the connection between the physical, psychosocial and innovation learning condition. As per Gardiner, there are three covering hovers known as ecosfera, sociosfera and tecnosfera. Ecosphere related with the physical condition, sociosphere related with the result of individual collaborations with others in their condition, while tecnosphere depicted as an innovation learning condition. Gardiner referenced that understudies are the most unpredictable segment in the framework while they will be affected by each one of those three kind of conditions. In 1999 till 2001, Zandvliet made an extraordinary endeavored in the learning condition demonstrate improvement where he changed Gardiner Models, with the classroom physical condition as ecosphere, classroom psychosocial condition as sociosphere and usage of new instructive advancements speak to tecnosphere segment. The model demonstrates the noteworthy connection existed between the physical condition, psychosocial condition and utilization of data innovation. These factors likewise added to understudy

improvement. The model recommended that by controlling the environment, the efficiency in education yield can be made strides.

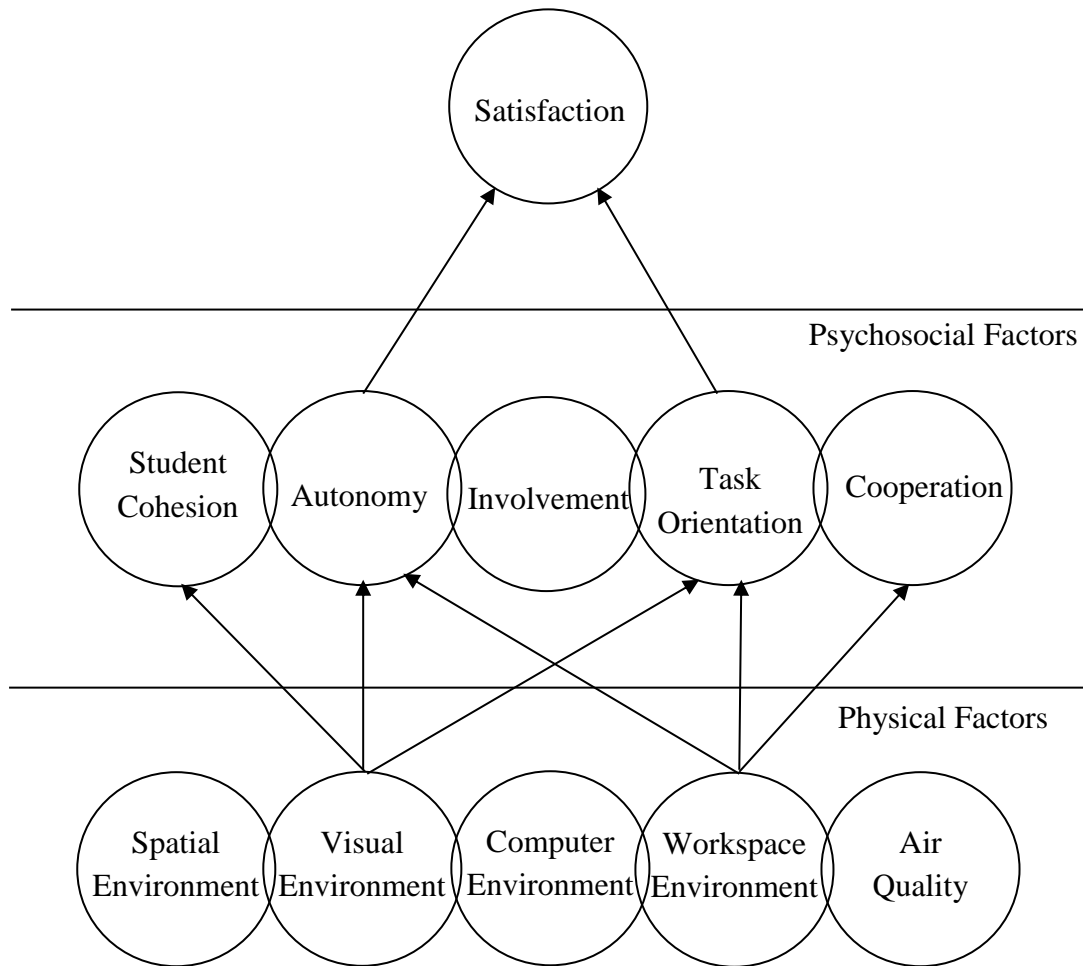


Figure 2.3: Educational productivity model by Zandvliet (2001)

## 2.2 The Idea of Psychological Characteristics: Satisfaction

Student's fulfillment or satisfaction should be seen in two distinct viewpoints, understood as a client to the organization called colleges and students as a 'yield' of the colleges. Student as a client will be talked about by quality administration viewpoint and student as a 'yield' ought to be examined by instructive point of view. In quality field, Deming (1986) focused on that client is the most extreme piece of the creation procedure. Truth be told, without somebody to buy the item or administration, the organization won't perform well in business. A similar thing runs with the colleges, without students, colleges likewise can't work typically. In this

manner, the capacity to satisfy the client/student ought to wind up the best need for the organization/colleges (1986). One of the quality expert, Juran (1991) characterizes consumer loyalty as the outcome achieved when the item or administration gave relate to the necessities of its clients. The organization is said to accomplish the dimension of consumer loyalty when it meets or surpasses client's desire over the lifetime of its item or administration. Oliver (1993) stresses that since the satisfaction is characterized based clients' point of view, satisfaction enhancement ventures must start by contemplating what the client/student needs and needs from an organization/college.

Prior specialist, Anderson (1973) suggested that client/student fulfillment is a component of desire and item or administration observation. At the point when an error exists between the clients' desires and their discernments, disappointment happens. Consumer loyalty with the organization can happen at various regions of connection between the organization and its client incorporating satisfaction with the item or administration quality, on-going relationship, and execution of an item (1998). With respect to Fornell (1992), he portrayed consumer loyalty as a generally speaking apparent assessment identified with the item or administration after the utilization. On the off chance that the apparent execution of the item or administration surpassed the normal execution, at that point the client is satisfied. Something else, the client isn't satisfied. The thought is upheld by Spreng et al. (1996) who focuses on that clients are contrasting the items' execution and their desire. A similar definition proposed by Zainudin Awang (2007), where creator fought that the sentiment of fulfillment emerges at the point when the clients' view of items' execution is more prominent than their earlier desires. In the event that the real execution surpasses their earlier desires, they are satisfied. The other way around, on the off chance that the real execution misses the mark concerning their earlier desire, they are disappointed. He additionally proposes that client/student satisfaction ought to be utilized as a main paradigm in deciding the administration quality execution really conveyed by the organization/college and experienced by its clients.

Returning to advanced education situation of this examination, student fulfillment can be characterized as the students view of how well is the nature of learning environment, the help framework and administration given by colleges add to their

scholarly achievement. As per Moore (2009), a student is viewed as satisfied when they are fruitful in the learning and is satisfied with their experience. Sweeney and Ingram (2001) bring a comparative definition where they characterized student fulfillment as the view of their satisfaction and achievement in learning. The two definitions concentrate on achievement and accomplishment in learning, delight and happiness with the learning encounter. In year 2002, Thurmond et al. in their examination portrayed student fulfillment as a results reflection that happens among students and educator. While in later investigation directed by Wu et al. (2010), fulfillment is alluded to the student frame of mind, feeling and would like to get a decent quality arrangement of learning environment. In view of the regularity in the definition by different analysts, it very well may be reasoned that student satisfaction mirrors student's examination of the quality in all instructive program perspectives (2007).

The reason of this examination intrigued to bring student satisfaction build into the model is due to its potential effect on individual conduct and subjective advancement. Numerous specialists concurred with the beneficial outcome of student satisfaction event. Student satisfaction is professed to be identified with a few result factors, for example, perseverance (2007), maintenance (1999), course quality (1996), and student achievement (1993). Booker and Rebman (2005) concurred with the case by bringing the proof in his investigation that student satisfaction is essentially impact student's maintenance and choice. Sinclair (2011) detailed that student satisfaction to be the most critical key to proceeding learning. Winberg and Hedman (2008) in their examination likewise referenced that understudy fulfillment is useful for guaranteeing students' scholarly achievement. Other than that, it has definitively been demonstrated that student satisfaction is a basic build that impacts the dimension of student inspiration (1998), (1997). More ongoing investigation likewise draw out that high fulfillment drives the students to wind up more predictable in learning and turn out to be high persuade understudy (2007). What's more, as indicated by American Psychological Affiliation (1997), fulfillment is one of the major mental components that decide student victory.

## **2.3 Research Gap**

The above discussion done on different types of studies and tasks from various research groups, it is being appeared to me that as of late, experiments about Ergonomics and Human Factors is expanding step by step. Researchers have been working on school, high school and university students in Canada, Australia and USA to figure out if the students are doing well off with the enriching technologies while they are in classrooms and in a group of same aged peoples. From the previous studies it is not clear that if the engineering study environment can impact the students' satisfaction. With the appropriate resources, more psychological, social and physical areas can be explored by experimenting the students' satisfaction level.

## **2.4 Challenges**

The challenge of this study is to find the psychosocial factors that are related to interaction between students who are using the digital classrooms provided by the universities. Another big challenge is to find the actual satisfactory level of students when they are interacting with the technological environment.

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 Conceptual Model

The study was a wide examination of the psychosocial factors working in 15 IT-enriched classrooms. Information on psychosocial factors were gotten utilizing a poll (Appendix A), which evaluated students' discernments about the psychosocial learning environment and additionally fulfillment or satisfaction with learning in the physical settings and course instructions provided by the university authority. Questionnaire information finished a detailed profile for the psychosocial conditions in every one of the chose classrooms. The consequences of this piece of the study are accounted for.

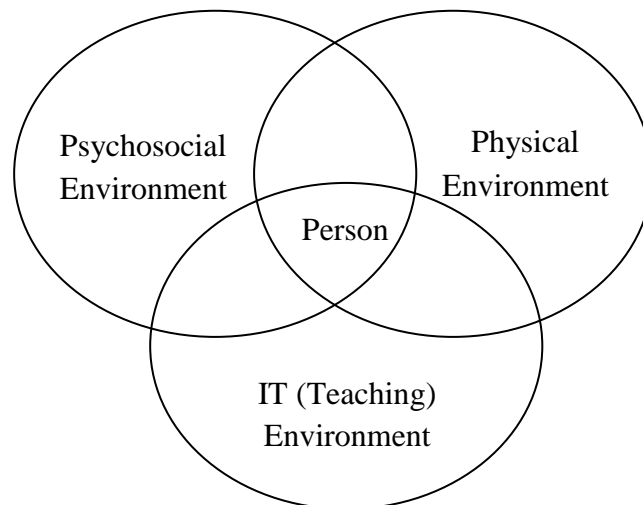


Figure 3.1: A reasonable model for concentrate educational conditions (adapted from Gardiner (1989))

#### 3.2 Procedure

To find the intended outcome first task is to choose an appropriate surveying method to explore the students' actions about the learning environment and how much they are satisfied with the surroundings and behavior. Therefore, it calls for a measurement

step which is a questionnaire and the particular chunks of students who operate with the digital classrooms in a regular basis for the survey. The next task is to analyze the survey data using statistical methods and find the effect size.

### **3.3 Sample Size**

An example of 1000 students in 15 haphazardly chosen undergraduate classes working in various physical settings in Dhaka were chosen for the investigation detailed here. These classroom situations had various arranged computers, with internet resources, that were utilized generously in conveying the educational programs offered by universities. People in these classes extended somewhere in the range of 18 and 25 years old.

### **3.4 Data Collection**

Since the target portion was students from undergraduate studies with engineering background and usually interact with the technology enriched classrooms, so the most appropriate samples can be found out from respective campuses. Randomly, Department of Software Engineering (SWE) and Department of Computer Science and Engineering (CSE) of Daffodil International University (DIU) as well as Department of Computer Science and Software Engineering (CSSE) of American International University of Bangladesh (AIUB) and Department of Electrical Engineering (EEE) of BRAC University were chosen for data collection both physically and by online survey.

### **3.5 Measure**

What is happening in this class? (WIHIC questionnaire): The psychosocial measures in the investigation were gotten by controlling five scales chose and adjusted from a learning situation instrument entitled the 'What is happening in this class?' (WIHIC) questionnaire by Fraser et al. (1996), Fraser (1998). In particular, the scales estimating Student cohesiveness, Involvement, Autonomy, Task orientation and Cooperation were chosen for this examination as they are reliable with the objectives of change

endeavors went for individualizing educational programs and guidance and expanding student connections. These assemblies are additionally predictable with factors viewed as imperative by ergonomists Grandjean (1988), Kroemer and Grandjean (1997). A further scale Satisfaction was included and included things chose and changed from the Test of Science Related Attitudes (Fraser 1981). The survey turned out to be a legitimate and dependable measure for deciding student impression of their learning environment stated by Zandvliet (1999).

### 3.6 Research Process

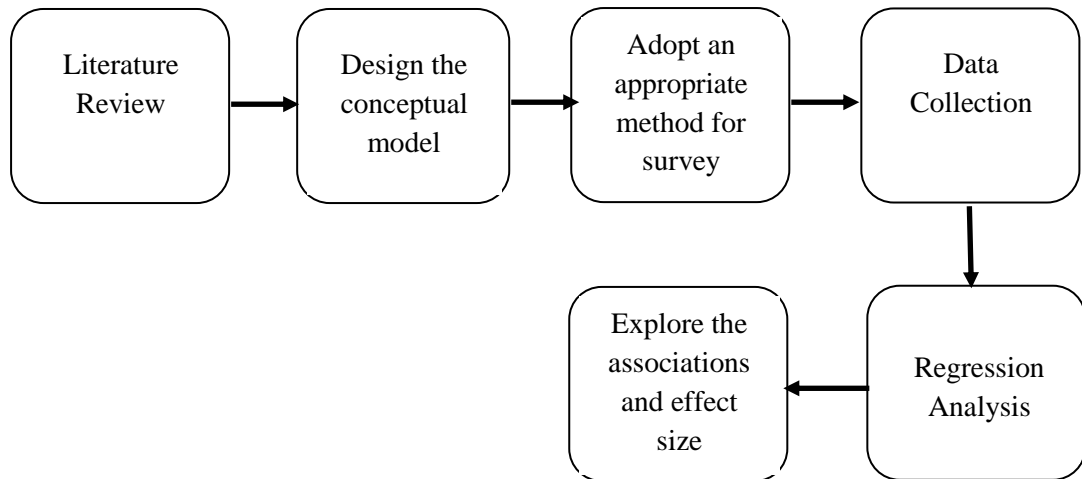


Figure 3.2: Graphical representation of research procedure

The examination got just the rundown of students from the institutions selected who were in the situation to give their supposition to things under the particular develop of the investigation. The survey was conducted physically and by using online survey form. In DIU, the students responded the survey while they were using the computer laboratory and digital classrooms outside of their normal class period. The students from AIUB and BRACU took part in the survey by responding the online questionnaire form made by Google Docs. The whole data collection process took 6 weeks. After collecting data from both surveys, two statistical software tools were used to find out the associations between the psychosocial factors and students' satisfaction respectively. The tools used for the statistical analysis,

- IBM SPSS Statistics 21.0
- SmartPLS 3.2.7



## CHAPTER 4

### RESULTS AND DISCUSSIONS

#### 4.1 Psychosocial Environment

The fruition of surveys by understudies in a wide assortment of modernized learning situations gave some great spellbinding data about how these learning situations were seen by the students. Generally speaking, the investigation demonstrates that they saw their learning surroundings decidedly and that these situations were portrayed by moderately large amounts of Student cohesiveness, Involvement, Autonomy or Independence, Task Orientation and Satisfaction as appeared in table 4.1. Be that as it may, students evaluated the measure of Satisfaction in these settings as low. This low evaluating might be to a limited extent because of any number of obliging components, incorporating noted lacks in physical elements, educational programs requirements, or maybe the freshness of instructors in this moderately new educating setting.

Table 4.1: Mean and Standard Deviation summary of psychosocial data

	SC	IV	AT	TO	COP	SAT
N	1000	1000	1000	1000	1000	1000
Mean	3.5549	3.1993	3.2823	3.4094	3.4723	3.1568
Standard Deviation	0.65269	0.69465	0.64572	0.72321	0.76055	0.64498

*N* = 1000 Students

Without exact information to help purposes behind the prominent low evaluations of Satisfaction detailed by students many theoretical lines of clarification for this perception are advertised. The principal clarification may be identified with a conceivable natural nature of learning with computer innovation in that many contend that IT interestingly bolsters individualized learning and once students have had an essence of this, any interference by the educator could be viewed as an interruption

into their self-governing and singular learning. A second clarification may be identified with the educator's apparent ability with IT in these classroom settings. On the off chance that instructors trusted that they are less equipped in the imperative IT aptitudes associated with a learning action, they may be enticed to recover their power by expanding their dependence on more instructor centered classroom procedures along these lines clarifying negative or nonpartisan student recognitions. Both of these lines of request might be valuable in coordinating future research on learning in IT settings. The courses that are to be conducted in the technological enriched classrooms are not made interesting or more close to real life scenario may make the students not interested to attend the classes and the method of teaching those subjects may lack of resources for which the students are not really satisfied.

## **4.2 Associations between Psychosocial Factors with Satisfaction**

To find out the association between five psychosocial factors in respect of satisfaction, an elementary linear regression analysis was repeated using Satisfaction as a dependent variable in anticipation of five factors – Student Cohesion, Involvement, Autonomy, Task Orientation and Cooperation as independent variables regressed from the questionnaire data of 1000 students represented in table 4.2.

Data in table 4.2 shows the simple correlations and regression coefficients that was founded where p value for every variable is less than 0.01. The p-value informs us regarding the probability or likelihood that the distinction we find in test implies is because of chance. In this way, it truly is a statement of probability, with a value going from zero to one. Classical values for 'p' are 0.1, 0.05 and 0.01. This value is used to test hypotheses. In this study, the 'p' value states that the correlation between Satisfaction and each psychosocial factor is statistically significant as it is less than 0.01 for every regression done. Looking at the values of correlation R, it can be said that in sequential order Involvement, Task orientation, Autonomy, Cooperation and Student Cohesion make a weak uphill positive linear relationship with Satisfaction which is positively but not strongly significant.

Table 4.2: Associations between psychosocial scales and satisfaction in terms of simple correlations (R) and standardized regression coefficients ( $\beta$ ).

Psychosocial Factors	R	$\beta$
Student Cohesion	0.222	0.220
Involvement	0.318	0.295
Autonomy	0.347	0.347
Task Orientation	0.320	0.285
Cooperation	0.353	0.300

$N = 1000$  Students

$p < 0.01$

On the other hand, the values of regression coefficient states that, all the variables made positive association with Satisfaction following the range -1 to +1. The coefficients portray the numerical connection between every independent variable and the dependent variable. It means, if the value of independent variables increase than the mean value of dependent variable will be likely to increase. Therefore, it can be clearly stated that, association between psychosocial factors and satisfaction is statistically significant in the perspective of engineering students in Bangladesh.

### **4.3 The Most Significant Effect of Psychosocial Factors with Satisfaction**

To explore the psychosocial factor or factors that make the most significant connection in terms of satisfaction, the five psychosocial factors were regressed against satisfaction using PLS Algorithm. Partial Least Squares regression is an addition for multiple linear regression models. Partial least squares regression is likely the least associative of the various multivariate development of the multiple linear regression model. This workability makes it to be used in states where the use of regular multivariate methods is critically limited, such as when there are scarcely observations than predictor variables. Moreover, partial least squares regression can be used as an investigative analysis tool to select satisfactory predictor variables and to discover deviations before traditional linear regression.

Table 4.3: Effect size of psychosocial factors with satisfaction

Psychosocial Factors	Satisfaction
Student Cohesion	0.000
Involvement	0.008
Autonomy	0.011
Task Orientation	0.064
Cooperation	0.024

Data in table 4.3 represents the f square values for five psychosocial factors against satisfaction regressed. As we know, F test evaluate multiple coefficients concurrently. Here, in this study, F test discovered the largest effect on students' satisfaction. From table 4.3 we can clearly assume that Task Orientation holds the largest value for f test which is 0.064. In a sequential manner, right after that Cooperation holds the second largest value which is 0.024, Autonomy holds 0.011, Involvement holds 0.008 and Students Cohesion holds 0 which is not meaningful. So, it is obvious that students have a good knowledge about particular course works and they are satisfied with the flow of regular tasks and assignments. Task orientation and Cooperation are the two factors that effects significantly than rest of the factors.

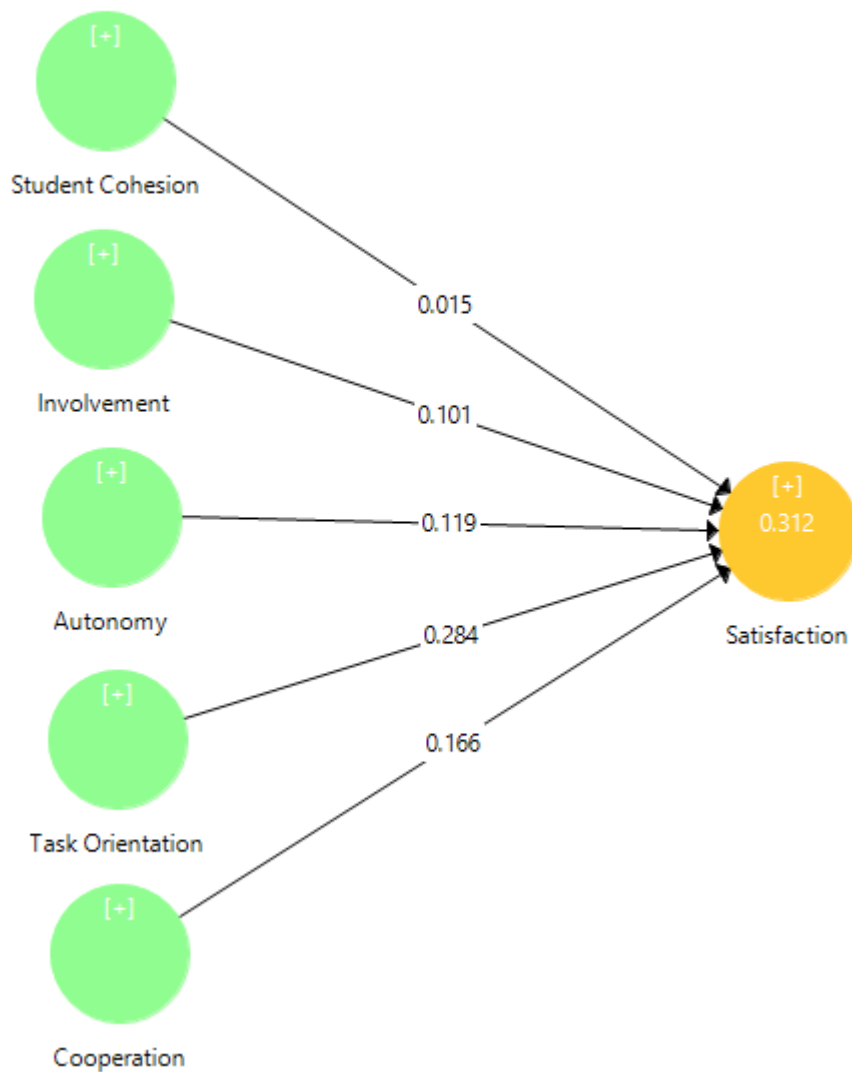


Figure 4.1: Graphical representation of structural model

Figure 4.1 shows the regression weights of psychosocial factors in terms of satisfaction is explored. The predictor variable Task Orientation occupies the greatest value to predict the outcome which is satisfaction proves that it has a significant influence on Satisfaction. It means, this factor makes the most effect in outcome variable and the changes in this predictor variable will change the effect size mostly of outcome variable. All the predictor variables created a significant or positive association in terms of student satisfaction with a value of 0.312.

## CHAPTER 5

### CONCLUSION AND RECOMMENDATION

#### 5.1 Findings and Contribution

The study found that learning environment in IT-rich classrooms has a significant and direct influence on students' psychological characteristic such as satisfaction. The study attempts to make several contributions. Firstly, the empirical findings of this study will help to clarify the impact of psychosocial factors in learning environment on the psychological characteristics development focusing on satisfaction. Therefore, by understanding the relationship, systems could be produced to upgrade nature of the learning condition in universities. For policy makers, this result may assist in assessing and determining the appropriateness of the existing quality of learning environment that regulate good satisfaction of students. Two psychosocial factors Task Orientation and Cooperation made significant association with Satisfaction. So, the Satisfaction level will be mostly significant when all the five factors will occupy strongly in positive manner which will also ensure the significance of learning environment in digital classrooms settings.

#### 5.2 Recommendation for Future Work

The study suggests the same direction for future researches in this area. First, the respondents of this study consist of only the undergraduate engineering students. Since the universities consists of many sectors of studies, the study recommends future research to include all study sectors so that the comparison can be made between groups of sectors. And since different sectors have distinct course background, the result might be interesting. Second, this study focused only on the Faculty of Computer Science, Software Engineering and Electrical Engineering, and hence the generalization might not be appropriate to other faculties. This study also only focuses on IT based education. Future researches should include more faculties in the universities so that comparisons can be made between faculties. Since different faculties require different academic facilities, such as social sciences, pure sciences, and arts, the information obtained would be useful to the management of a university

for their strategic planning. Third, this study was carried out in only three private universities in Bangladesh. The future research should include all private universities so that the comparisons can be made between all private universities. All the more significantly, how the old universities perform contrasted with the recently settled universities, to the extent nature of learning condition is concerned. Last but not least, this study was done on the private university. The findings might not be generalizable on public universities even though both types of universities are in the same service industry. Today, the quantity of private universities has outperformed the quantity of public universities. Thus future researches should include both types of universities. The result might be interesting since these two types of universities have distinct characteristics such as the facilities, cost of study, and the source of financing.

## REFERENCES

- Adams, D., Carlson, H., & Hamm, M. (1990). Cooperative Learning and Educational Media: Collaborating with Technology and Each Other. *Englewood Cliffs, NJ: Englewood Technology Publications.*
- Allen, I., Elaine, & Jeff, S. (2007, October). Online nation: Five years of growth in online learning. *Sloan Consortium.*
- Anderson, R., E. (1973, February). Consumer dissatisfaction: The effect of disconfirmed expectancy on perceived product performance. *Journal of marketing research: 38-44.*
- Berge, Z. L., & Collins, M., P. (Eds) (1995), Computer Mediated Communication and the On-Line Classroom. *Cresskill, NJ: Hampton Press.*
- Booker, Q. E., & C. E. Rebman. (2005). E-student retention: Factors affecting customer loyalty for online program success. *Issues in Information Systems 6, no. 1: 183-189.*
- Chute, A. G., Burton H., & Melody T. (1998). The McGraw-Hill Handbook of Distance Learning: A "how to Get Started Guide" for Trainers and Human Resources Professionals. *McGraw-Hill, Inc.*
- Dalton-Puffer, Christiane, Huettner, Julia, Schindelegger, Veronika and Smit, Ute (2009). Technology-geeks speak out: what students think about vocational CLIL. *International CLIL Research Journal, 1 (2), 17-26.*
- D. B. Zandvliet & Leon M. S. (2001). Physical and psychosocial aspects of the learning environment in information technology rich classrooms. *Ergonomics, 44:9, 838-857.*
- Debourgh, G. A. (1999). Technology Is the Tool, Teaching Is the Task: Student Satisfaction in Distance Learning. *Society for Information Technology & Teacher Education International Conference (pp. 131-137).*
- Deming, W. E. (1986). Out of the crisis. *MIT Center for Advanced Engineering Studies, Cambridge, MA (1982).*
- Donohue, Tandra L., & Eugene H. W. (1997). Achievement motivation and college satisfaction in traditional and nontraditional students. *Education 118, no. 2: 237.*
- Eklund, J. (1995). Cognitive models for structuring hypermedia and implications for learning from the World Wide Web, in R. Debreceeny and A. Ellis (Ed.), *Ausweb95: Innovation and Diversity [Online], 111 - 117.*
- Fraser, B. J. (1981). Test of Science Related Attitudes. *Melbourne: Australian Council for Educational Research.*



- Fraser, B. J. (1994). Research on classroom and school climate. *D. Gabel (ed.), Handbook of Research on Science Teaching and Learning (New York: Macmillan)*, 493 - 541.
- Fraser, B. J. (1998). Science learning environments: assessment, effects and determinants. *B. J. Fraser and K. G. Tobin (eds.), International Handbook of Science Education (Dordrecht, The Netherlands: Kluwer Academic Publishers)*, 527 - 564.
- Fraser, B. J., Fisher, D. L., & McRobbie, C. J. (1996, April). Development, validation and use of personal and class forms of a new classroom environment instrument. *Annual meeting of the American Educational Research Association, New York*.
- Fornell, C. (1992). A national customer satisfaction barometer: The Swedish experience. *The Journal of Marketing*: 6-21.
- Gardiner, W. L. (1989). Forecasting, planning, and the future of the information society. *P. Goumain (Ed.), High Technology Workplaces, Integrating Technology, Management, and Design for Productive Work Environments (New York: Van Nostrand Reinhold)*, 27 - 39.
- Grandjean, E. (1988). Fitting the Task to the Man: A Textbook of Occupational. *Ergonomics, 4th ed. (London: Taylor & Francis)*.
- Harris, C. & Straker, L. (2000). Survey of physical ergonomics issues associated with school children's use of laptop computers. *International Journal of Industrial Ergonomics*, 26, 337 - 347.
- Juran, J. M. (1991). World-War-II And The Quality Movement. *Quality Progress* 24, no. 12: 19-24.
- Keller, J. M. (1983). Motivational design of instruction. *Instructional design theories and models: An overview of their current status* 1, no. 1983: 383-434.
- Kroemer, K. & Grandjean, E. (1997). Fitting the Task to the Human: A Textbook of Occupational Ergonomics. *5th ed. (London: Taylor & Francis)*.
- Lewin, K. (2013). Principles of topological psychology. *Read Books Ltd*.
- Mohd, A. A. M., Mazlini, A., Norafefah, M. S., Amri, A. R., Jasrul, N. G. (2017). The relationship between learning environment and psychological characteristics in higher education. *Journal of Advanced Research in Social and Behavioural Sciences*.
- Moore, J. C. (2009, December). A synthesis of Sloan-C effective practices. *Journal of Asynchronous Learning Networks*, 13(4), 84-94.
- Moore, J. C. (2007, July). The Sloan Consortium quality framework and the five pillars. *The Sloan Consortium*. Retrieved July 15 (2005): 2007.

- Moore, M. G., & Kearsley, G. (1996). Distance education: A systems view. *Belmont, CA: Wadsworth Publishing Company.*
- Nwanekezi, A. U., & B. R. Iruloh. (2012). Assessing Learning Environment for Achieving Standard in Primary Education: Implication for Counselling for Human Capacity Development. *African Research Review* 6, no. 2: 274-289.
- Oates, S., Evans, G., & Hedge, A. (1998). An anthropometric and postural risk assessment of children's school computer work environments. *Computers in the Schools*, 14, 55 - 63.
- Oliver, R. L. (1993). Cognitive, affective, and attribute bases of the satisfaction response. *Journal of consumer research* 20, no. 3: 418-430.
- Organisation For Economic Cooperation And Development (OECD) 1987.
- Ross, S. M., Morrison, G. R., & Lowther, D. L. (2010). Educational technology research past and present: Balancing rigor and relevance to impact school learning. *Contemporary Educational Technology*, 1(1), 17-35.
- Sinclair, J. K. (2011). Student satisfaction with online learning: Lessons from organizational behavior. *Research in Higher Education Journal* 11: 1.
- Spreng, R. A., Mackenzie, S. B., & Olshavsky, R. W. (1996). A Re-Examination of the Determination of Consumer Satisfaction. *Journal of Marketing*, 60, 15-32.
- Sweeney, J. C., & Deborah I. (2001). A comparison of traditional and web-based tutorials in marketing education: An exploratory study. *Journal of Marketing Education* 23, no. 1: 55-62.
- Tax, S. S., Stephen W. B., & Murali C. (1998). Customer evaluations of service complaint experiences: implications for relationship marketing. *The journal of marketing* (1993: 60-76).
- Walberg, H. J. (1981). A psychological theory of education productivity. *Farley, F.H. & Gordons, N. (Eds.), Psychology and Education* (81-110). *Chicago: National Society for the Study of Education.*
- Walberg, H. J. (1991). Educational productivity and talent development. *B. J. Fraser and H. J. Walberg (Eds), Educational Environments: Evaluation, Antecedents and Consequences* (London: Pergamon), 93 - 109.
- Winberg, T. M., & Leif H. (2008). Student attitudes toward learning, level of pre-knowledge and instruction type in a computer-simulation: effects on flow experiences and perceived learning outcomes. *Instructional science* 36, no. 4: 269-287.

- Wu, Jen-Her, Robert D. T., & Tzyh-Lih H. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education* 55, no. 1: 155-164.
- Zandvliet, D. B. (1998, April). The learning environment in technology-rich classrooms. *Annual meeting of the National Science Teachers' Association, Las Vegas, Nevada.*
- Zandvliet, D. B. (1999). The physical and psychosocial environment associated with classrooms using new information technologies - a cross-national study. *Unpublished doctoral dissertation, Curtin University of Technology, Perth.*
- Zainudin, A. (2007). The influence of Service Quality and Corporate image on Students' Loyalty in Higher Education: The case study of a local university. *Unpublished PhD Thesis, University Malaysia Terengganu, Malaysia.*

## APPENDIX A

### WHAT IS HAPPENING IN THE CLASS (WIHIC) (IT-RICH CLASSROOMS)

#### Directions

This survey contains proclamations about practices that could happen in this class while it is utilizing computers. You will be asked how regularly each training happens. There are no 'right' or 'wrong' answers. Your sentiment is what is needed.

Consider how well every announcement portrays what this class resembles for students. At that point, draw a hover around or tick the ideal answer:

- 1 if the action takes place: **Almost never**
- 2 if the action takes place: **Seldom**
- 3 if the action takes place: **Sometimes**
- 4 if the action takes place: **Often**
- 5 if the action takes place: **Almost always**

Make sure to give a response for all inquiries. On the off chance that you alter your opinion around an answer, simply cross it out and circle another.

A few proclamations in this survey are genuinely like different explanations.

Don't stress over this. Essentially give your conclusion pretty much in all announcements.

#### WIHIC Questionnaire

Student cohesion		Almost Never	Seldom	Some times	Often	Almost Always
1	Friendships are made among students in this class	1	2	3	4	5
2	Students in this class know each other	1	2	3	4	5
3	Members of this class do favors for one another	1	2	3	4	5
4	Members of the class are friends	1	2	3	4	5
5	Students help each other with homework	1	2	3	4	5

6	Students help each other in this class	1	2	3	4	5
7	Class members work well with each other	1	2	3	4	5
8	Students help other class members who are having trouble with their work	1	2	3	4	5
9	Students in this class like each other	1	2	3	4	5
10	In this class, students are able to depend on each other for help	1	2	3	4	5

Involvement		Almost Never	Seldom	Some times	Often	Almost Always
11	Students discuss ideas in class	1	2	3	4	5
12	Students give their opinions during class discussions	1	2	3	4	5
13	The teacher asks students questions	1	2	3	4	5
14	Students' ideas and suggestions are used during classroom discussions	1	2	3	4	5
15	Students ask the teacher questions	1	2	3	4	5
16	Students explain their ideas to one another	1	2	3	4	5
17	Students discuss with each other how to go about solving problems	1	2	3	4	5
18	When starting a new topic, students discuss what they already know about it	1	2	3	4	5
19	Students are asked to explain how they solve problems	1	2	3	4	5
20	Students discuss different answers to questions	1	2	3	4	5

Autonomy/Independence		Almost Never	Seldom	Some times	Often	Almost Always
21	Students have a say in how their class time is used	1	2	3	4	5
22	Students have a say in deciding what activities they do	1	2	3	4	5
23	Students have a say in deciding how their learning is assessed	1	2	3	4	5
24	Students are told how to do their work	1	2	3	4	5
25	The teacher decides when students are to be tested	1	2	3	4	5
26	The teacher decides how much movement and talk students are allowed	1	2	3	4	5
27	The teacher decides when the class moves on to a new topic	1	2	3	4	5
28	Students are given a choice of topics for assignments	1	2	3	4	5
29	Students are given a choice in which investigations they do	1	2	3	4	5
30	Students work at their own pace	1	2	3	4	5

Task Orientation		Almost Never	Seldom	Some times	Often	Almost Always
31	Students know what has to be done in this class	1	2	3	4	5
32	Getting a certain amount of work done is important to this class	1	2	3	4	5
33	Class assignments are clear so everyone knows what to do	1	2	3	4	5
34	Students do as much as the class sets out to do	1	2	3	4	5
35	Each student knows the goals for this class	1	2	3	4	5

36	Students are ready to start this class on time	1	2	3	4	5
37	Students know what they are trying to accomplish in this class	1	2	3	4	5
38	Students pay attention during this class	1	2	3	4	5
39	Students try to understand the work in this class	1	2	3	4	5
40	Students know how much work they have to do	1	2	3	4	5

Cooperation		Almost Never	Seldom	Some times	Often	Almost Always
41	Students cooperate with each other when doing assignment work	1	2	3	4	5
42	Students share books and resources with each other when doing assignments	1	2	3	4	5
43	When students work in groups in this class, there is teamwork	1	2	3	4	5
44	Students work with each other on projects in this class	1	2	3	4	5
45	Students learn from each other in this class	1	2	3	4	5
46	Students work with each other in this class	1	2	3	4	5
47	Students cooperate with each other on class activities	1	2	3	4	5
48	Students work with each other to achieve class goals	1	2	3	4	5
49	Students work in groups in this class	1	2	3	4	5
50	During group work, students do their share of the work	1	2	3	4	5

Satisfaction		Almost Never	Seldom	Some times	Often	Almost Always
51	I look forward to this class	1	2	3	4	5
52	The lessons in this class are fun	1	2	3	4	5
53	I dislike this class	1	2	3	4	5
54	This class bores me	1	2	3	4	5
55	This is one of the most interesting school subjects	1	2	3	4	5
56	I enjoy the lessons in this class	1	2	3	4	5
57	The lessons in this class are a waste of time	1	2	3	4	5
58	The lessons make me interested in this subject	1	2	3	4	5