

Exploring ICT Usage Among AIOU Students and Gratification of Their Academic Needs

Babar Hussain Shah
Prof. Dr. Ghulam Shabir

Abstract

This research deals with ICT usage among AIOU students and Gratification of their academic needs. It is beyond any doubt that ICT is playing central role in facilitating and promoting Distance Education. This research is supported by the Uses and Gratification of Mass Communication. The researcher chose a sample of 367 students enrolled at AIOU. A closed ended questionnaire was developed by the researcher. Out of 367, majority 334 (91%) questionnaires were completely filled in and returned by the respondents. The findings of this research documented that majority of the respondents (74.9%) were using ICT for educational purposes. It was also observed that most of AIOU students (63.8%) were using laptop to meet their academic needs. The findings of the research also supported that majority of respondents were satisfied with ICT usage for performing their different academic tasks ranging from understanding of subjects to preparation of assignments and presentations. The mean value of students' gratification with ICT was (3.3565) which was above average value of 3. It means that students were gratified with ICT to a greater extent.

Introduction

Education is considered the backbone for the success and prosperity of any society. In fact road to progress and prosperity lies in educating the nation properly and effectively. Education is of vital importance for the development of any country and nation. As far as issue of education in developing countries is concerned it is not possible for the government to reach each and every individual through formal education. In this situation distance education seems as a ray of hope as an alternative of formal education because it provides an alternative to formal education. It goes saying beyond any doubt that Information Communication Technologies have revolutionized the academic world and has helped to resolve issues related to it. When distance education system of developing countries is looked upon it is concluded that still most of these countries are heavily relying on printed matters a little accompanied by media like radio and television (Lawry Trevor-Deutsch and Lyndsay Green, 2002). In fact, ICT has helped to improve and has resulted increase to information resulting an enabling environment for the students. Thus ICT has resulted in greater and wider participation of the students in learning process (Laurillard, 2000; Koller 2012). Gonzales, S, Rosemarie, (2015) argues that our new generation is well equipped with the variety of ICT gadgets like TV, computers and cell phones. They are of the view that has ICT has deeply seeped into our lives so it is very much important that learners must be provided with appropriate experience of ICT so they may engage themselves in adept and effective use of technology. So it is need of hour to integrate ICT in teaching and learning as well. In fact, ICT has helped to improve and has resulted increase to information resulting an enabling environment for the students. Thus ICT has resulted in greater and wider participation of the students in learning process (Laurillard, 2000; Koller 2012).

Allama Iqbal Open University, Islamabad is the pioneer institution in distance education in Pakistan which caters the academic need of almost 1.3 million students. This university was established in May 1974 under Act No. XXXIX passed by the Parliament of Pakistan. The university is offering variety of programs from Metric to Masters' level. The

teaching strategy of the university comprises of tutorials, assignments and workshops for its students. They are assigned tutor for each course who provide them guidance during tutorial. They are also provided books and other ICT allied material like CD which helps them to write their assignments. The University has Institute of Educational Technology as well which is responsible for preparing media contents of all courses. This department is working efficiently and runs its own FM with name of FM 91.6. The IET is effectively producing radio and TV programs for the students of all levels. The university is also equipped with a Multimedia and Electronic Course Development Centre (MECDC) which makes arrangement for producing course contents in soft forms like CDs and DVDs. The university also arranges workshop for the students by making effective use of Video Conferencing and enables students to learn in their own cities with the help of ICT. Even university also conduct viva voce of the students through usage modern media technology like Skype. Some of the programs are also being offered online which include Col MBA/ MPA and B.Com Associate Degree. Overall the university is well equipped with the state of the art ICTs. It can be inferred that the university is quite successfully making effective use of ICT to disseminate education among the students.

Research Objectives

This research has been conducted to achieve the following objectives.

- i. This study aims at identifying basic purpose of using ICT among AIOU students.
- ii. It further aims at exploring ICT usage patterns among AIOU students.
- iii. It will explore the extent to which ICT gratifies the academic needs.

Research Questions

- Q1.** What is the basic purpose of using ICT by AIOU students?
- Q2.** What are the patterns of ICT usage among AIOU students?
- Q3.** To what extent does ICT gratifies the academic needs of AIOU students?

Literature Reviews

Many researches have been conducted across the globe which aims at exploring the relationship between ICT and distance education. Before discussing about this relationship it is of vital importance to explain basic terms of Information Communication Technology and Distance Education.

Information Communication Technology can be defined as

“ICT includes diverse set of technological tools and resources that are used to communicate, and to create, disseminate, store, and manage information” (Blurton C, 1999).

According to Boer, (2005) ICT consist of all those technologies which are aimed at manipulation and communication of information.

Hence, it can be concluded that ICT consist of the technologies that facilitate communication of information.

Different educationists have defined Distance Education in different ways.

According to Hilary Perraton, (1988) distance education is an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner.

In the words of Michael Moore, (1994) “Distance Teaching consists of Instructional Methods that execute teaching behaviours apart from learning behaviour, creating such a situation in which communication between students and teacher should be sponsored by

Print, electronic, mechanical or some other devices.”

Distance Education is basically an institution based education in which students are separated from their teachers and hence it makes effective usage of different communication technologies and telecommunication systems for the purpose of connecting students and teachers (Simonson, 2006).

From different definitions of distance education it can be concluded that

- i) There is overall physical separation between students and teachers in the whole process of learning.
- ii) Distance education demands for an institution which acts as a role of mediator between the students and teachers.
- iii) Further, it can also be inferred that in fact ICT helps to facilitate teaching and learning in the overall process of Distance Education.

These definitions of ICT and Distance Education help to formulate a symbiosis between ICT and Distance Education.

When use of ICT in developing countries is analysed it is commonly observed that mostly printed matter is used among the students belonging to Distance Education with the traces of radio and television and to some extent audio/ video cassettes are being used as supplements. Along with the above telephone and fax are also being used for tutorial support (Lawry Trevor-Deutsch and Lyndsay Green, 2002).

Gonzalez-Aller, (2015) argues that ICTs are helpful in students’ performance and motivation. He is of the view that ICTs are the powerful tools which aid in extensive educational opportunities and lifelong learning. He opines that ICT is a miracle for traditionally excluded communities like minorities, women and persons with the physical disabilities. He believes that it is ICT that have helped teachers and students independent in teaching and learning. So they don’t have to rely on traditional means of learning like books and other tangible materials available in the libraries.

Oliver, R. (2002) argues that ICT has a greater role to play in higher education. In his research he seeks the ways how future programs will be offered in the universities keeping the rapid pace of ICT in mind. He examines that despite financial constraints both students and teachers are gaining greater access to higher bandwidth. Hence the students and teachers are gaining more access to sharable resources. He further proposes that ICT has helped to cross the barriers of “When and Where to learn” and it has proven helpful for learners and educators as well.

Reeves & Jonassen, (1996) believe that ICT has resulted in student-centred learning approach because ICT tools encourage independent learning and thus more and more students are motivated to use ICT in the learning activities. Vygotsky, (1978) argues that ICT has resulted that learning is the outcome of the active construction of knowledge. He concludes that usage and application of ICT is following constructivism in which learning is done through social interaction by enabling the students to interact with each other by using different gadgets of ICT.

Voogt, (2003) discloses that ICT has resulted in technology has resulted in transformation of traditional pedagogy into emerging pedagogy of information. He supports his argument with the following statements. ICT provides a variety of activities to the learners which are determined by the students keeping their own pace of learning in their minds. He further argues that ICT encourages innovativeness, solution to the problems and interactivity between theory and practices.

Smeets, E. (2005) has worked on the contribution of ICT in creating powerful learning environments. He is of the view that one of the major benefits of ICT is active

learning as facilitates the learners to do learning where and when quite freely. He further elaborates that Apart from real world learning ICT is helpful for increasing opportunities to work together crossing the barriers of geography.

It is argued that ICT usage in education is quite helpful in promoting in the manipulation of existing information and thus resulting in creation of real-world products. (Kalusopa,2005).Matthew and Eliot Elfner, (2002) has conducted his research on "Analysing student satisfaction with instructional technology techniques". It was a survey research in which respondents were asked to rate the degree to which use of ICT has increased their class room behaviours which are strongly related to students learning. It was concluded that all of the behaviours were positively affected by use of IT. It was reported that application of ICT in education has quite helped to increase the quality of their presentation.

It has been verified that using ICTs in education gratifies various academic needs of students like better understanding of course contents, positive interaction with their class fellows, peers, teachers and instant access to the authentic and relevant academic information. It is further understood that aids in preparing assignments, presentations, and examination (Kubala, T., 1998; Turnbull, A. P., 1995).

From above literature it can be well concluded that ICT is quite helpful for students and helps to gratify their academic needs.

Theoretical Framework

The researcher sorted out the help of theoretical framework to justify the research topic of this study. The theory that supports this research work is the theory of Uses and Gratification.

Uses and Gratification Theory

The uses and Gratification Theory of Mass Communication is the most appropriate theory that seeks ICT usage among AIOU students and its gratification among them.

Most of the prior research studies and theories of Mass Communication deals with the powerful and immediate effects of mass media. Their central focus always lies on the powerful effects of media. These theories usually see media users as passive, inactive and non-responsive audience. But reality is that audience are not always inactive and passive and they have the ability to respond the messages. One classic study named as 'Obstinate audience' pointed out that audience is quite active (Bauer, 1964). "The notion of active communicator is rapidly preeminent status in the Communication discipline" Bryant & Street, (1988). The Uses and Gratification shift from receiver to user of media. This theory of mass media assume audience member as active and responsive to the media contents being presented to them. The term Uses and Gratification was first used by Elihu Katz (1959) in which he responded to a claim by Bernard Berelson (1959) that field of Communication as a discipline is dead

The Uses and Gratification was first elaborated in article by Elihu Katz (1959) in which he was expressing a reaction to a claim by Bernard Berelson (1959) that field of Communication research appeared to be dead. Katz argued that only to save Mass Communication is to turn it by answering the question, "What do people do to media?"

Blumler and McQuail (1969) used the Uses and Gratification as overall research strategy in the study of 1964 general election in Britain. This research was aimed to "find out why people watch or avoid party broadcasts; what uses they wish to make of them; and what are their preferences are between alternative ways of presenting politicians on television"(pp.10-11).

McQuail, Blumler, and Brown (1972) classified the categories of needs which individuals want to gratify through using media.

- i. **Diversion:** Here diversion means escape and emotional release from various daily life problems
- ii. **Personal relationships:** Here personal relationships mean using media to maintain and strengthening relationship with society fellows.
- iii. **Personal Identity:** It involves self-reference, reinforcement; self-understanding; and reality exploration. It also considers media characters as shadows of their real life problems
- iv. **Surveillance** function relates to information and knowledge about the things that can be helpful in doing or accomplishing something. It especially involves keeping a vigilant eye on happenings of the world due to security reasons and being well informed about the activities of the government.

Media was seen by Katz, Gurevitch and Haas (1973) as a means that help them to connect with others. They further have classified needs into the following categories: Cognitive needs, affective needs, personal integrative needs, social integrative needs and tension release needs.

Methodology

Research Methodology provides the blue prints that how the research is conducted and it offers a rationale behind the decision to use a particular research design in the study. “It is of vital importance for every researcher to understand the assumptions behind these techniques and procedures that will be applicable to certain problems and others will not.” (Kumar & Ranjit, 2005).

This research used a quantitative research design by surveying the students of Allama Iqbal Open University, Islamabad. After comprehensive review of literature research constructed a close-ended questionnaire that was comprised of all the related constructs of this research study. Further, this research is a case study which focused only on students of Allama Iqbal Open University Islamabad, Pakistan. Bryman (2008:52) describes a case study as one which “... entails the detailed and intensive analysis of a single case is tantamount with a particular location e.g. an organization”.

Population

Wimmer, R. D., & Dominick, J. R. (1994) define, “Population as a group or class of subjects, variables, concept, or phenomenon.” The population of this study consists of the students enrolled in M. Phil and Ph. D Programs of AIOU during the Autumn 2014, Spring 2015, Autumn 2015 and Spring 2016 semester.

Sample

According to Wimmer, R. D., & Dominick, J. R. (1994) Sample is a subset of the population that is representative of the entire population. Keeping the limitations and constraints of time and cost involved the sample was limited to only M. Phil and Ph. D students of the university enrolled in the specified semesters.

Sampling Technique

This research study used probability sampling technique keeping the nature of data in mind. The researcher used 95% confidence level and with a confidence interval of 5 while calculating sample size for the study. The sample size was determined by using the following formula.

**FORMULAE FOR DETERMINING
NEEDED SAMPLE SIZES**

POPULATION SIZE UNKNOWN:

$$\text{SAMPLE SIZE} = \frac{\left(\frac{\text{RANGE}}{2}\right)^2}{\left(\frac{\text{ACCURACY LEVEL}}{\text{CONFIDENCE LEVEL}}\right)^2}$$

Confidence Levels:

α	$\alpha/2$
.10 level = 1.28	1.64
.05 level = 1.64	1.96
.01 level = 2.33	2.58
.001 level = 3.09	3.29

Accuracy Levels:

Range X Desired Level of Accuracy (expressed as a proportion)

POPULATION SIZE KNOWN:

$$\text{SIZE} = \frac{X^2 NP (1-P)}{d^2 (N-1) + X^2 P (1-P)}$$

X^2 = table value of Chi-Square @ $d.f. = 1$ for desired confidence level
 .10 = 2.71 .05 = 3.84 .01 = 6.64 .001 = 10.83
 N = population size
 P = population proportion (assumed to be .50)
 d = degree of accuracy (expressed as a proportion)

This sample size was then matched with the sample provided by Krejcie and Morgan (1970) which was accurately similar to our calculated sample size. Cluster sampling technique was used to collect data from respondents. Below is given brief description of sample size.

Table 1: Sample Size Determination

Faculty	Population	Percentage Contribution	No. of Samples
SS&H	2333	34.08	122.7042
Science	2305	33.6	122.5266
Education	1004	14.66	47.05733
Arabic and Islamic std.	1203	17.5	57.71182
	6845	100	367

Delimitations of the Study

As AIOU is the Mega University with enrolment of 1.3 million students so it was not possible to reach each students. Keeping in mind limitations of time and cost and time involved this research study is only confined to the students of AIOU who are enrolled in MPhil and PhD programs of the university.

Data Analysis

Table 2: Demographic of Respondents

		Frequency	Percentage
Gender	Male	216	64.7
	Female	118	35.3
Age in Years	Below 25	22	6.7
	25-30	99	30.1
	31-35	80	24.3
	36-40	66	20.1
	Above 40	62	18.8
Residence	Rural	152	46.5
	Urban	175	53.5
Faculty Information	Faculty of Social Sciences and Humanities	124	36.8
	Faculty of Sciences	113	33.8
	Faculty of Education	47	14.1
	Faculty of Arabic and Islamic Studies	64	15.3

Above table provides brief over view of the respondents' gender, age, residence and faculty. From table it is quite evident that majority of the respondents are male (64.7%). Most of the respondents fall between the ages of 25-30. Very less number of students were below the age of 25 (6.7%). When area of residence was inquired it was found that (46.5%) respondents belonged to rural areas and (53.5%) were from urban backgrounds. As majority of the students are enrolled in Faculty of Social Sciences and Humanities so this faculty contributed to (33.8%) of the respondents. The faculty that contributed to the least number of respondents was the faculty of education (14.1%).

Descriptive Statistics

The researcher was interested to identify the basic purpose of using ICT, to explore ICT usage patterns and to explore the extent to which ICT gratifies academic needs among AIOU students. To fulfil the objective, tests for descriptive statistics were run. The results of descriptive Statistics are explained as follows.

Table 3: Purpose of Using ICT

Purpose of Using ICT	Frequency	Percentage
Education	250	74.9
Information	211	63.2
Entertainment	99	29.6
Any other	19	5.7

Table 3 reveals different purposes of using ICT. Table indicates that majority of the respondents (74.9. %) were using ICT for educational purposes. Information seeking was the second highest (63.2%) purpose of ICT usage. Least (29.6%) respondents were using ICT for entertainment related purposes. Respondents were also using ICT for some other purposes (5.7%).

Table 4: Usage Patterns of ICT among AIOU Students

Device	Frequency	Percentage
Desktop	120	35.9
Laptop	213	63.8
Smart phones	155	46.4
Printer	58	17.4
Scanner	27	8.1
Other devices	14	8.1

Table 4 documents usage pattern of ICT for different purposes. The table above shows that usage patterns of ICT with different gadgets varies. It shows that majority of the respondents were using laptop (63.8%) for different purposes. The second highest usage consisted of using smart phones (46.4%). At number third (35.9%) respondents were reported using desktop for different uses. It was found that (17.4%) respondents were using Printers, (8.1%) using scanners (8.1%) were found using other devices for different purposes.

Table 5: Gratification of Academic Needs with ICT Usage

Statistics	Gratification
Mean	3.3565
Std. Error of Mean	.05598
Std. Deviation	.83407

Table 4.5 documented the description of data i.e. average and its deviation from the average. Results of the above table elaborate the descriptive statistics of Students' gratification with ICT usage. The result of the above table shows that mean value of students' gratification with ICT is (3.3565) which is above average level of (3). Hence, it can be concluded that respondents feel themselves gratified with ICT usage for their academic purposes.

Table 6: Gratification of Different Academic Needs with ICT Usage

Statistics	Mean	Std. Error of Mean	Std. Deviation
Understanding of subject	3.44	0.061	1.097
Interacting with class fellows	3.45	0.052	0.941
Interacting with teachers.	3.44	0.052	0.944
Feeling relaxed about studies.	3.35	0.052	0.93
Credibility about the subject among fellows.	3.5	0.051	0.924
Being prominent among peers.	3.44	0.052	0.933
Preparing assignments, presentations and exams	3.55	0.054	0.974

Table 6 elaborated gratification of different academic needs of AIOU's students overall. Gratification was further grouped into different categories according to the categories of need. The above table documented mean values of different dimensions of gratification individually. First, it elaborates the mean value of students' understanding of the subjects. The mean value of students' understanding is (3.44) which is above average value which means ICT gratifies students' understanding of their subjects. The mean value of respondents' interaction with their class fellows is (3.45) which is also above average value which demonstrates that ICT gratifies the need of students' interaction with their class fellows. Similarly mean value of the students' interaction with their teachers is (3.44) that is above mean value. It is concluded that ICT gratifying the need of students' interaction with their teachers. Similarly it was found that students feel relaxed with ICT usage in their studies with mean value (3.35). When mean value of students' credibility about subjects among their class fellows was analysed it was found (3.5) which is above average value of (3) so it means that ICT usage also gratifies the students need of being more credible about their subject. The mean value of becoming prominent among fellows was (3.44) which was above (3). It means that ICT also gratifies students' need of becoming more prominent among their fellows. Preparing assignments, presentations and exams was also checked and its mean value was found (3.55) which is above average value of (3). So it was concluded that use of ICT for exams, assignments and presentations is satisfying students' need to a greater extent.

From the results of above table it can be concluded that students' all academic needs are being satisfied with ICT usage. But overall, ICT was found more helpful in assignment preparation, exams and presentations having mean value of (3.55).

Research Questions and Their Answers

Q1. What is the basic purpose of using ICT by AIOU students?

Answer: The answer to the Research Question. 1 can be found in Table 3. According to the results of the table it was found that AIOU's students were using ICT for four basic purposes namely education, information, entertainment and other than these three purposes. It can be found in Table 3 that the purpose for which most of students was using ICT was Educational purpose with the percentage of (74.9).

Hence it was concluded that most of the students were using ICT for educational Purposes.

Q2. What are the patterns of ICT usage among AIOU students?

Answer: The answer to the Research Question 2 can be seen in the results of Table 4. The table above shows that usage patterns of ICT with different gadgets varies. It shows that majority of the respondents were using laptop (63.8%) for different purposes. The second highest usage consisted of using smart phones (46.4%). At number third (35.9%) respondents were reported using desktop for different uses. It was found that (17.4%) respondents were using Printers, (8.1%) using scanners and (8.1%) were found using other devices for different purposes. Overall usage of laptop for different purpose was greater than any other device.

Q3. To what extent does ICT gratifies the academic needs of AIOU students?

Answer: The answer to the Research Question 3 can be found in Table 5 and Table 6. It is evident that mean value of students' gratification with ICT is (3.3565) which is greater than average value of 3. So it is concluded that students of AIOU are satisfied with ICT usage. Similarly mean value of different categories of need satisfaction in Table 6 are above the mean value of (3) which means that overall students feel themselves gratified with ICT usage.

Findings

It was basically a survey research which was based on Allama Iqbal Open University Islamabad, Pakistan as a case study. Results show that majority of the respondents (34.08%) belonged to faculty of Social Sciences and Humanities The findings of this research revealed that majority of the AIOU students were using ICT for educational purposes (74.9 %). As far as ICT usage patterns of the respondents are concerned it was revealed that majority of the respondents were using laptops (63.8%) for different purposes varying from education to information and entertainment. This research also tried to find out AIOU's students gratification with ICT usage for their academic needs. Results show that respondents feel themselves gratified with the ICT usage for academic purposes varying from understanding of subjects to preparation of assignments and presentations. The means value of students' gratification with ICT was (3.3565) which was above average value of (3) which means that students of AIOU feel themselves gratified with the ICT usage.

References

- Bauer, R. (1964). The obstinate audience: The influence process from the point of view of social communication. *American Psychologist*, 19(5), 319.
- Berelson, B. (1959). The state of communication research. *Public Opinion Quarterly*, 23(1), 1-2.
- Blumler, J. G., & McQuail, D. (1969). *Television in politics: Its uses and influence*. University of Chicago Press.
- Blurton, C., "New Directions of ICT-Use in Education" (1999). Available online <http://www.unesco.org/education/educprog/lwf/dl/edict.pdf>; accessed 7 August 2002.
- Boer, P. (2005). Towards education for all: The critical role of open and distance learning in national development Paper presented at the First open and distance learning conference in Namibia, Namibia. <http://www.col.org/resources/speeches/2005presentations/Pages/2005-08-30.aspx>

- Bryant, J. (1988). {From Reactivity to Activity and Action: An Evolving Concept and Weltanschauung in Mass and Interpersonal Communication
- *Gonzales, S, Rosemarie, 2015. ,” Importance of Information Technologies in our Daily Life”* retrieved from [http://ezinearticles.com/?Importance-of-Information-and-Communications-Technology-\(ICT\)-In-Our-Daily-Life&id=8967368](http://ezinearticles.com/?Importance-of-Information-and-Communications-Technology-(ICT)-In-Our-Daily-Life&id=8967368) on August 29, 2106
- Gonzalez-Aller, C. (2015). Using IT in the English classroom: Its impact on Swedish students' performance and motivation.
- Green, L., & Trevor-Deutsch, L. (2002). Women and ICTs for open and distance learning: Some experiences and strategies from the Commonwealth.
- Jonassen, D. H., Myers, J. M., & McKillop, A. M. (1996). From constructivism to constructionism: Learning with hypermedia/multimedia rather than from it. Constructivist learning environments: Case studies in instructional design, 93-106.
- Kalusopa, T. (2005). The challenges of utilizing information communication technologies (ICTs) for the small-scale farmers in Zambia. *Library Hi Tech*, 23(3), 414-424.
- Katz, E. (1959). Mass communications research and the study of popular culture: An editorial note on a possible future for this journal. *Studies in public communication*, 2, 1.
- Katz, E., Haas, H., & Gurevitch, M. (1973). On the use of the mass media for important things. *American sociological review*, 164-181.
- Koller D. (2012). “What we’re Learning from Online Education.” Available at: <http://www.youtube.com/watch?v=U6FvJ6jMGHU>
- Kubala, T. (1998). Addressing Student Needs: Teaching on the Internet (Internet/Web/Online Service Information). *THE Journal (Technological Horizons in Education)*, 25(8), 71.
- Laurillard, D. (2000). 8 New Technologies, Students and the Curriculum. *Higher education reformed*, 133.
- McQuail, D., Blumler, J. G., & Brown, J. R. (1972). The television audience: A revised perspective. *Media studies: A reader*, 271, 284
- Moore, M. (1994). Autonomy and interdependence. *The American Journal of Distance Education*, 8(2), 1–5.
- Oliver, R. (2002). The role of ICT in higher education for the 21st century: ICT as a change agent for education. *Retrieved April, 14, 2007*.
- Perraton, H. (1988). A theory for distance education. In D. Sewart, D. Keegan, & B. Holmberg (Eds.), *Distance education: International perspectives* (pp. 34–45). New York: Routledge.
- Roy, M. H., & Elfner, E. (2002). Analyzing student satisfaction with instructional technology techniques. *Industrial and Commercial Training*, 34(7), 272-277.
- Simonson, M. (2006). DESIGN-BASED RESEARCH Applications for Distance Education.
- Smeets, E. (2005). Does ICT contribute to powerful learning environments in primary education?. *Computers & Education*, 44(3), 343-355.
- Turnbull, A. P. (1995). *Exceptional lives: Special education in today's schools*. Merrill/Prentice Hall, Order Department, 200 Old Tappan Rd., Old Tappan, NJ 07675..
- Voogt, J. (2003). Consequences of ICT for aims, contents, processes, and environments of learning. In J.van den Akker, W. Kuiper & U. Hameyer (Eds.), *Curriculum landscapes and trends* (pp 217 –236). Dordrecht: Kluwer
- Vygotsky, Lev. (1978). "Interaction between learning and development." *Readings on the development of children* 23.3 (1978): 34-41.