Competencies of Teachers' use of Technology in Learning and Teaching Processes

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***Abstract*—This research has been done on how the teachers will use technology in teaching-learning processes. Teachers' use of educational technologies in teaching-learning processes has caused alteration in teaching qualification and teacher role. Technology has enabled students to learn in more different dimensions by removing time-place limitations in teaching and learning. Teachers have not only been the source of information as in traditional education methods, but also advisors, counselors and pathfinders who guide students to information and redirect them at reaching information. Using technology in education can be possible via its integration to teaching-learning processes, so teachers use technology in arranging teaching-learning processes. Utilized technology is selected harmoniously for education purposes and environments. Technology must be such as to supply teaching-learning process, not a basis model, and must be eligible to be integrated into teaching-learning processes.**

***Index Terms*—Education technology, teaching process, technology learning, teacher training, use of technology.**

I. INTRODUCTION

Along with advancements in science and technology, efforts of mankind to dominate the environment to rule and to understand it are continuing rapidly and it is going to continue in the future, too. Surprising improvements in science and technology are pushing countries into a big and secret competition, willingly or unwillingly. Countries are struggling to upgrade their own people to advanced technology and information gathering level. The most important instrument to upgrade to this level is being seen as education incontestably [1].

In today's education-teaching applications, new concepts like distance learning (TV-internet, web), technology based teaching, computer supported teaching are not only in literary but also become a part of basic activities like education, teaching and applications. At the same time, stated concepts and education technologies have also gained functionality about preparing teaching programmers' and bringing up qualified people by applying programmers' in learning environments. Such a formation, on one hand, is obliging creation of modern teaching environments, on the other hand, is becoming a source for forming interactive, participant oriented and procreative learning-teaching processes. Following rapid improvements of teachers in science and technology, it is possible to realize their technological literacy. Teachers can transfer improved and rapidly changed new technologies to their students quickly owing to educational technologies. The students can also learn new improvements instantly. If individual learning and teaching environments can be made available to students, then equality of opportunity for education can be provided to an extent. Educational technologies provide learning environments to students according to their individual skills. These environments can motivate students effectively, and thus effective learning is actualized. Students can effectively learn information and improve ability which they need in a short time. Even though educational technologies provide these stated opportunities; teachers are taking the most important role here. Teachers are expected to come to a level that they can use educational technologies effectively. Educational Technologies provide educators with a variety of choices in order to ease the teaching-learning processes about subjects such as communication theories, qualified learning, method, techniques and etc.

This research has been realized to determine the competency of teachers' use of educational technologies in teaching-learning processes [1]–[3].

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II. IMPORTANCE OF THE RESEARCH

The research is important in terms of detecting competency of teachers' use of technology in learning and teaching processes and so improving the suggestions intended for research and raising awareness about the use of teaching technologies by teachers and reflecting technological improvements in learning and teaching environments. At the same time, it is also important because education system is thought to encourage teachers to form in-service training programmers' intended for realizing technological improvements.

III. IMPORTANCE OF EDUCATIONAL TECHNOLOGY

Generally speaking, technology is understood as different information and methods used for improving people's skills and accomplishing their needs and desires satisfactorily. It is seen that term of 'educational technology' is used with different meanings in issued books, contributive and radio-television speaking.

Although educational technology is associated with teaching circumstances that are the critical item of program development, its scope isn't limited to only this item. The items that composed the program are organically connected with each other. Basically, educational technology is several events of putting a specific content into practice through suitable processes and assessment of application results. Daily, owing to educational technologies diffusion area, flow and flow rate of information are increasing.

If educational technologies is used in learning and teaching environments which are planned for teaching lessons, permanent and effective learning's can be achieved. Nowadays, use of educational technologies has become an unavoidable circumstance [1], [2]. It is needed to use educational technologies for high quality education.

IV. TECHNOLOGIES USED IN TEACHING AND TEACHING PROCESSES BY TEACHERS

As to educational equipment's, tools related to special teaching of every lesson exist in their own classrooms, and tools that will be used commonly in all lessons are provided by learning centers as needed. Although it is the most continuously and frequently used technology's textbook, the most discussed technology is use of personal computers. One way of instrumentally classification of tools using in education for the purpose of planning them, is listing them as quite traditional and at the same time nicely used ones, modern and having potential of being immediately usable ones, and in a way tools for future, but at the same time promising ones as suitable Technologies for education.

TABLE I. TOOLS USING IN EDUCATION.

Traditional tools	Modern tools	Tools of future
*Moving film *Slides/Film strips *Projections *Boards/Pictures/Graphical *Television Printed/Programmed Texts	* Microcomputers * Main-Frame computers * Modems * Tele communications * Electronic bulletin boards * Voice synthesizers * Optic Disc * Video Disc * Interactive Video * CDROM * DVD	* Voice control * Tele Video * Advanced networks * Knowledge basis * Laser * Advanced super computers (Interactive computer supported education)

Table I shown tools using in education. Teachers and educators learn how to use which equipment's and methods, in which conditions, based on which principles, to gain which type of behavior, to students at what level and have which properties by examining research results of behavioral sciences and apply. As a result, nowadays, research data of behavioral sciences have become base of educational technology. Use of suitable equipment fittingly will be increasing productivity of educational status. When looked at new technological systems, it is seen that these systems came into human life in wide range of dimensions from television to satellite and computer. From these systems, computer technology compared to other systems has become indispensable technology of today because of its data communication rate and versatile functionality. Basically, information technologies that have got new and different functional dimensions and created by integrating computers architecture have made world countries familiar to each other's. Numerical technologies, satellite and fiber optic cables are removing many obstacles to reach information. At the same time, there are some restraints of them, too.

V. RESEARCH MODEL

In this research, that target determination of competency of teachers' use of technology in teaching-learning processes, data obtained by scanning related area at national and international level (traditional and electronically environments) has been used to form theoretic basis of the research . At the same time, the research has been implemented according to relational scanning model. Relational scanning models are research models that target determination of existence of covariance between two and more variables and/or its grade.

VI. PREPARATION QUESTIONNAIRE FOR RESEARCH

A questionnaire has been formed using questions implying competency of teachers' use of technology in teaching-learning processes, which are thought as suitable for the objective of the research. The questions of questionnaire has been selected considering properties of research and scientific norms and developed. The developed questionnaire has been primarily applied to a group of teachers and reliability coefficient has been determined by judging the results. It has become ready for application by considering suggestions.

After data collected from surveys applied to teachers at vocational high schools in Anatolian region of Istanbul was transferred to SPSS program (version 13) environment at computer. The data has been showed in tables by aid of SPSS environment. In data analysis, 'Mann-Whitney U' test [3], [4] has been used to test significance of frequency, percentage, average, standard deviation and difference between averages. 'Kruskal-Wallis' test has been done for multiple variables, for those that are found significant, 'Mann-Whitney U' test [3], [4] has been done for each variable. In dependent variables, more than one selection has been marked at some of the questions and their assessment has been done in themselves. And total percentages have been taken by collecting all the answers of answered questions. So it has been formed with percentage distribution according to total of marked selections.

Crosstabs, which give distribution of these dependent variables versus independent variables, have been provided. Tables have been formed in 'Findings' part in order to comment on obtained data easily and these findings have been interpreted in 'Conclusion' part.

VII. FINDINGS CONCERNING PERSONAL INFO

In this part, there are findings concerning independent variables such as gender, age, educational status, professional seniority and branches of experimental subjects participating in this survey (Table II, Table III).

TABLE II. DISTRIBUTION OF SAMPLE ACCORDING TO GENDER VARIABLE

Gender	Male	Female	Total
Frequency	220	78	298
Percent	73.8	26.2	100

TABLE III. DISTRIBUTION OF EXPERIMENTAL SUBJECTS ACCORDING TO AGE GROUPS.

Age	25 and below	26-30	31-35	36-40	41-45	46 and above	Loss	Total
Frequency	17	84	77	51	48	18	3	298
Percent	5.7	28.2	25.8	17.1	16.1	6	1	100

TABLE IV. DISTRIBUTION OF EXPERIMENTAL SUBJECTS ACCORDING TO EDUCATIONAL STATUS.

Age	Collage	Faculty	Mc.	Dr.	Other	Loss	Total
Frequency	14	250	27	1	5	1	298
Percent	4.7	8.9	9.06	0.33	1.68	0.33	100

When Table IV is examined, it is seen that experimental subjects within the research have got different education levels.

TABLE V. FREQUENCIES AND PERCENTAGES OF QUESTION 'IS THERE A TECHNOLOGY CLASS IN THE SCHOOL YOU WORK?'

	Yes	No	Loss	Total
Frequency	184	109	5	298
Percent	61,7	36,6	1,7	100

And in Table V, circumstance of schools they work in has been given.

TABLE VI. FREQUENCIES AND PERCENTAGES OF QUESTION 'HAVE YOU GOT A COMPUTER IN YOUR HOME?'

Have you got a computer at your home?'	Frequency	Percent
Yes	266	89,3
No	32	10,7
Total	298	100,0

TABLE VII. FREQUENCIES AND PERCENTAGES OF QUESTION 'HOW MUCH DO FOLLOWING EDUCATIONAL TECHNOLOGIES AFFECT TEACHING-LEARNING PROCESSES?

	Not important	Sometimes important	Important	Generally important	Generally important	Total
	(%)	(%)	(%)	(%)	(%)	(%)
Computer	1,6	5,1	28,7	19,3	45,3	100
Internet	1,7	16,3	27,9	19,7	34,4	100
Television	14	41,4	29,5	8,1	7	100
CD / DVD	3,2	17,2	43,5	17,9	18,2	100
Interactive Video	9,2	26,1	41,2	13,6	9,9	100
Over head projector	3,8	18,3	44,3	16,6	17	100
Projection	2	10,7	34,7	17,9	34,7	100
Other tools	3,7	17,2	46,6	16,8	15,7	100

As it will be seen when Table VII is examined, use of educational Technologies in teaching-learning processes includes variety. For example; according to research findings, it has been found out that 1.7 percent of teachers do not ever use computer while realizing teaching-learning processes and 5.1 percent seldom, 28.7 percent sometimes, 19.3 percent frequently and 45.3 percent usually use computer.

TABLE VIII. FREQUENCIES AND PERCENTAGES OF QUESTION: 'WHAT IS THE LEVEL OF RELATION BETWEEN STUDENT SUCCESS AND USE OF FOLLOWING EDUCATIONAL TECHNOLOGIES?'

	No relation	Low relation	Related	Quite related	Extremely related	Total
	(%)	(%)	(%)	(%)	(%)	(%)
Computer	1,4	7,1	42,9	28	20,6	100
Internet	0,7	19,2	34,7	28,9	16,5	100
Television	7,9	39,2	35,4	12,5	5	100
CD / DVD	1,8	22,9	42,3	23,6	9,4	100
Interactive Video	5,7	23,4	44,3	20,6	6	100
Over head projector	2,1	16,4	45,9	25,3	10,3	100
Projection	2,7	12,3	35,6	29,1	20,3	100
Other tools	3,4	20,9	42,9	21,6	11,2	100

When Table VIII is examined, according to research findings, it has been found that there is 1.4 percent no relation and 7.1 percent lower relation between student success and use of computer, and they are 42.9 percent related, 28 percent quite related, 20.6 percent extremely related. It is seen in Table VIII that, this circumstance is valid for other educational Technologies.

When Table IX is examined, according to research findings, about use of television technology in educational processes, those proportions have been determined that other teachers' approach is 10 percent useless, 31.7 percent sometimes useful, 31.3 percent useful, 12.1 percent generally useful, 7.8 percent very useful, 7.1 percent of them

have not got any information. This circumstance is seen in table for other educational Technologies in detail.

TABLE IX. FREQUENCIES AND PERCENTAGES OF QUESTION: 'WHAT IS THE APPROACH OF OTHER TEACHERS IN YOUR SCHOOL ABOUT USE OF EDUCATIONAL TECHNOLOGIES?'

	Useless	Sometimes useful	Useful	Generally useful	Very useful	I've no information	Total
	%	%	%	%	%	%	%
Computer	1	9.7	36.3	18.3	31.5	3.2	100
Internet	1.4	13.2	38.7	18.8	24.4	3.5	100
Television	10	31.7	31.3	12.1	7.8	7.1	100
CD / DVD	4.3	18.8	34.8	20.2	17.7	4.2	100
Interactiv e Video	5.8	17.4	37.3	18.5	13.4	7.6	100
Over head projector	1.4	12.3	39.3	20.4	21.1	5.5	100
Projection	1.7	10.1	30.1	20.6	32.5	5	100
Other tools	1,9	16	39,8	16,7	14,1	11,5	100

When Table X is examined, according to research findings, about subject of 'How did you learn using educational technology and teaching methods?', teachers have given those answers; 34.9 percent 'In teacher curriculum', 8.4 percent 'During master program', 1.7 percent 'During doctoral program', 13.1 percent 'With in-service training', 15.1 percent 'By taking courses', 74.5 percent 'On my own' and 15.1 percent 'other'.

TABLE X. FREQUENCIES AND PERCENTAGES OF QUESTION: 'HOW DID YOU LEARN USING EDUCATIONAL TECHNOLOGY AND TEACHING METHODS?'

	In teacher curriculum	During master program	During doctoral program	With in-service training	By taking courses	On my own	Other
Frequency	104	25	5	39	45	222	45
Percent	34.9	8.4	1.7	13.1	15.1	74.5	15.1

TABLE XI. FREQUENCIES AND PERCENTAGES OF QUESTION: 'HOW DO EDUCATIONAL TECHNOLOGIES HELP WITH LEARNING?'

	Educational Technologies help students who have got different learng rates for learning.	Educational Technologies realize visual and audio interaction.	Educational Technologies can be personalized for each student.	Educational technology can be used for motivating students.	Other
Frequency	170	218	97	191	27
Percent	57	73,2	32.6	64.1	9.1

When Table XI is examined, according to results obtained from research, about subject of 'How do educational Technologies help for learning?', teachers have given those answers; 57 percent 'Educational Technologies help students who have got different learning rates for learning.', 73.2 percent 'Educational Technologies realize visual and audio interaction', 32.6 percent 'Educational Technologies can be personalized for each student', 64.1 percent 'Educational technology can be used for motivating students', and 9.1 percent 'other'.

TABLE XII. FREQUENCIES AND PERCENTAGES OF QUESTION: 'HOW DO EDUCATIONAL TECHNOLOGIES AFFECT STUDENTS' PERFORMANCE?'

	Frequency	Percent
High motivation	129	43,3
High learning rate	168	56,4
Immediate feedback	132	44,3
It gives students support with basic information and wide range of resources which are not possible in traditional classes.	147	49,3
It enables students to use their time more effectively.	113	37,9
It provides teaching more personally.	105	35,2
It provides more feedback.	100	33,6
It enables to practice better.	155	52
It gives more chance to learn.	168	56,4
Other.	18	6

When Table XII is examined, according to research findings; about subject of 'How do educational Technologies effect students' performance?', teachers have given those answers; 43.3 percent 'High motivation', 56.4 percent 'High learning rate', 44.3 percent 'Immediate feedback', 49.3 percent 'It gives students support with basic information and wide range of resources which are not possible in traditional classes.' 37.9 percent 'It enables students to use their time more effectively.', 35.2 percent 'It provides teaching more personally.', 33.6 percent 'It provides more feedback.', 52 percent 'It enables to practice better.', 56.4 percent 'It gives more chance to learn.' and 6 percent 'other'.

VIII. CONCLUSIONS

In this part, there are suggestions according to results obtained from the research. Female teachers should be supported for preparing teaching materials on their own.

- ✓ Female teachers should be informed about the use of computer and projection while realizing teaching-learning processes is an important and increasing factor in learning and they should be encouraged.
- ✓ Male teachers should be informed that student success and use of television and projection in teaching-learning processes are related to each other in supporting learning.
- ✓ Teachers should be informed about using educational Technologies appropriate to the teaching method.
- ✓ Courses should be taught on using computer in

teaching-learning processes for teachers who are in 36-40 and 41-45 age groups. In-service training courses should be arranged on using CD/DVD in teaching-learning processes for 26-30, 31-35, 36-40, 46 and above age groups.

- ✓ College graduates should be informed that use of internet and CD/DVD while realizing teaching-learning processes is important because it increases learning qualification and facilitates learning. College graduates should be informed about using educational Technologies appropriate to the teaching method.

Teachers who do not an e-mail address should be informed about use of computer and internet in teaching-learning processes having an increasing effect on learning, and taught how to get an e-mail address.

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