

NEW TRENDS OF MEASUREMENT AND ASSESSMENT IN DISTANCE EDUCATION

Prof. Dr. Zeki KAYA
Gazi University, Faculty of Education
Ankara, TURKEY

Assoc. Prof. Dr. Seref TAN
Gazi University, Faculty of Education
Ankara, TURKEY

ABSTRACT

Distance education is a discipline that offers solutions to some important education problems. Distance education, contribute to the solution to the problems such as; inequality of opportunities, lifelong education, the implementation of a series of individual and social goals that can contribute to and benefit from educational technology and self-learning. In distance education, methods of measurement and assessment must be consistent with the objectives and contents of teaching. A major interest of formative assessment is determining the students' learning level of each behavior in the interested unit. In summative assessment, performances of students on some units are measured broader than formative assessment. A computerized adaptive testing, CAT, is the test managed by computer in which each item is introduced and the decision to stop are dynamically imposed based on the students answers and his/her estimated knowledge level.

In CAT applications, students do not take the same test. Despite item numbers and properties of items are different for the students; the precise of measures improves in positioning students on an ability or success continuum in CAT applications. In CAT applications, questions answered by a student depend on the student's ability or learning level. In item response theory, there are some models to estimate a student's ability level, such as three-parameter logistic model. Cheating in exams or other academic assignments can be defined as use resources not allowed to use or having someone else to take exams or assignments. Some precautions must be taken about cheating such as a live proctoring, using web cams, and using a plagiarism detection program.

Keywords: Distance education, computerized adaptive testing, online testing, item response theory, preventing cheating, measurement and assessment.

INTRODUCTION

Countries with a specific level of development prioritise education on innovation and developmental movements. These countries are attentive to shape and educate the individuals according to their interests and skills. Thus, they make an effort to provide an education that is consistent with the interests and skills of the individuals that form the society. However, both gaining terminal behaviors and an education consistent with the interests and skills of the individuals in these countries cannot be provided. Not being able to make the students gain terminal behaviors and also not providing them education can be mentioned as the problems that are encountered on educational applications.

In the century we live through, many similarities can be observed on the aspects of countries on education. The importance of education on individuals and society is adopted by almost all countries. Despite the inequality of the wealth resources and the contradictions in politics, all countries make a consensus on the basic topics related to education.

Adopted primary common consensus topics are these (Hızal, 1983:1):

- **Basic education for all individuals.**
- **Vocational education based on basic education.**
- **To be re-educated, lifelong education for the individuals who would like to have progress in their jobs.**
- **An education, considering the geographical, economical and facts of the society on each step of the education, that is adopted according to conditions and needs of the students.**
- **An education enables opportunities to societies to protect their political and cultural identities.**
- **An education that targets to achieve all educational objectives economically.**

These opinions democratise education systems, in other words, everyone, according to their interests and skills, no matter their economical opportunities, social statuses, ages and sexes are, needs to benefit from all educational opportunities (Hızal,1983:1).

In our day, a bottleneck on the educational systems of almost all underdeveloped and developing countries can be mentioned (Hızal, 1983:61). The main reasons for this bottleneck of these countries are:

- **Major amount of children population in overall population.**
- **Very less amount of children continuing school.**
- **Teachers few in number.**
- **Teachers little in quality.**
- **The large number of students for each teacher.**
- **The large number of children in closed area.**
- **Imbalance of schooling rate according to education stages.**
- **Imbalance distribution of schools according to settlements and regions.**
- **Graduating students few in number.**
- **Parents not realizing the importance of education.**

While these educational problems mentioned above are experienced in underdeveloped and developing countries, it is mentioned that in developed countries many economical, social and educational problems are experienced generating from scientific, social and individual facts (Kaya, 2002).

In our day, a change in social, economical, technological and educational conditions that form contemporary educational systems can be seen. In a contemporary society, the widespread notions of individual freedom, social justice and equality attract the attention. In the community of scholars there have been quantitative and qualitative changes which are impossible to satisfy with ordinary measures and implementations.

In the existing system, there are inequalities of opportunities and facilities on individual and social facts (Alkan, 1987: 8).

Both in underdeveloped and developing countries and in developed countries, there have been many initiatives to solve the educational problems within the bounds of possibility that are caused by the reasons and the likes of them mentioned above.

When the initiatives related to the solutions of educational problems are analysed, the intensity of these are mostly on teacher training, building new schools, extending the period of study, formal education and evening education (Hızal, 1983:2). The educational problems cannot be solved with these traditional efforts, and in contrast, existing problems are on the increase.

Realizing that these educational problems cannot be solved with the traditional resolution approaches, instructors and executives of the countries head towards new approaches. These reasons can be mentioned on the basis of these approaches:

- Not being able to provide educational services to large masses at the same time.
- Not considering the individuals' interests and skills enough.
- Not being able to specify the information and the amount of information that the individuals need.
- Not being able to provide the appropriate information with the appropriate methods and techniques.
- Not being able to make the individuals gain the necessary information in a short time effectively.

These reasons show that there is a need to provide everyone far better educational opportunities. Most of the efforts on making innovations on educational systems or the need on new options stem from two basic fact or belief. The first one of these is the equality of opportunity or to believe that everyone in the society has the right to benefit from educational experiences and opportunities.

The second one is to believe that education is one of the basic factors that can contribute to materialize a series of individual and communal objectives. Research with this aspect show that traditional education in the classes has proved that it has lost its qualification institutionally and universally, which is to be the best implementation providing the formal education opportunities. These problems that are experienced today show us why the education that takes place in the classrooms is not the best implementation:

- Not being able to extend the education.
- Continuing of inequality of opportunities and options.
- Not being able to use the resources effectively.
- In equilibrium of supply and demand.
- Education that is not operational enough.
- Lack of quality on education.
- Failing to provide standards on education.

To solve these problems, it can be said that advanced education technologies need to be set. In our day the developments on science and technology, and the facts contextualized economical, social and individual tend to improve the educational technology. As a result of the change on structural and functional factors that form education, the need for conceptual frame that is appropriate to change and innovation, the need to raise the productivity and efficiency altogether raise a question for a new dicipline on education (Alkan, 1996: 17).

This discipline that solves the problems on inequality of opportunities, provides everyone who are into lifelong learning, and besides contributes to materialize a series of individual and communal objectives, benefits from educational technologies and is based on self-learning is called "distance education".

ADVANTAGES AND RESTRICTIONS OF DISTANCE EDUCATION

From the definitions that are made for distance education it is understood that this kind of education provides many possibilities. Some of them can be summarized like that (Kaya, 1996:8):

- Providing different education options.
- Reducing the inequality of opportunities.
- Enabling mass education.
- Standardizing the education programs.
- Reducing the cost on education.
- Increasing the quality on education.
- Freeing the student.
- Providing the students a prosperous education environment.
- Not forcing the student to be taught in the classroom environment.
- Providing individual learning.
- Providing independent learning.
- Gaining the students responsibility for learning.
- Providing information from the first resource.
- Enabling many people benefit from the experts.
- Massifying the education and also individualising it.
- Overcoming the necessity to be in a definite closed area at a definite time.
- Enabling to determine the success under equal conditions.

It is obvious that distance education provides many advantages. Although distance education provides many opportunities on different aspects, it also has some restrictions.

These can be summarized like that (Kaya, 1996:9):

- Not being able to provide face to face educational relationships.
- Preventing students to socialize.
- Not being able to help the students who do not have self learning habits and cannot study without help.
- Taking the time of working students.
- Not benefiting from the application-oriented classes.
- Not being effective on performing behaviors aimed at skills and attitudes.
- To be addicted to communication technologies and transferring possibilities (Hakan et. Al. 1997:21).

ELEMENTS OF DISTANCE EDUCATION PROGRAMS

The elements of education programs are constituted of for basic elements likewise face to face education programs. These are as follows; objectives, content, teaching-learning process and measurement and evaluation.

Objectives

Objectives are terminal behavior features that are chosen to make students gain. Some of the primary features are; knowledge, abilities, skills, attitudes, interests and habits. In distance education objectives assert the process of directing education and learning and teaching process. Besides, objectives conduct the measurement and evaluation process.

Content

To reach the objectives of distance education content is necessary. In the element content, what to teach the students is represented. This means the lessons in the distance education program and the topics of the lessons. While choosing the content in distance education programs, as it is in face to face education programs, these criteria should be considered:

- To be beneficial for the community
- To be beneficial for the individual
- To be learnable and teachable
- A content that is important among all contents.

Learning-Teaching Process

With this element of distance education, it is desired to emphasize how to provide learning and teaching. In our day, learning and teaching mostly take place via course books, lecture notes, radio and television programs, academic counseling services, communication and counseling services, video conferencing and e-learning services and m-learning. Recently audio books have become widespread on distance education implementations. These books that are generally in CD and MP3 player format and can be prepared not only for visually handicapped people but also for all students. Also, students can be taught in virtual classes. In these virtual classes an interactive education can be established between the instructor and the student. Lately, when the distance education implementations of developed countries are closely observed, as learning and teaching environment it is mostly via e-learning and education, in other words, it is concentrated on education through internet is seen.

Measurement and Evaluation

Measurement is to observe a point and state the observation results in numbers or symbols. Evaluation is to consider both measurement results and some criteria to reach a standard of judgment.

In the process of learning and teaching of distance education implementations, in accordance with the learning and teaching process of face to face education, more technology and materials are provided. Redundant technological materials that are provided on distance education implementations effect the measurement and evaluation element of distance education programs. There are some differences on measurement and evaluation of distance education in accordance with the measurement and evaluation on face to face education.

MEASUREMENT AND ASSESSMENT IN DISTANCE EDUCATION

In distance education, exams can be done online or in specific examination centers as formal education. Online exams can be done in either synchronous or asynchronous. Reflecting the success of the students some homework and projects can be used in distance education to assess students achievement. Monitoring and assessing of their learning progress of students is one of the important aspects of distance learning programs.

Methods of measurement and assessment must be consistent with the objectives and contents of teaching. For this purpose, tests should be carried out in accordance with the table of specifications. Which type of exam is done, you must ensure that the high content validity of the tests.

Two main approaches of measurement and assessment in distance education are formative and summative assessment. Both formative and summative assessment activities in a distance education program should be performed. Formative assessment, summative assessment, measurement of affective behaviors, computerized adaptive testing with item response theory applications as a future direction of measurement and assessment in distance education and preventing students' cheating in distance education issues are briefly described, below.

Formative Assessment in Distance Education

Formative assessment is made for small learning parts or units. Formative assessment included questions designed to measure the learning objectives of the entire unit. A major interest of formative assessment is determining the students' learning level of each behavior in the interested unit. Then students' learning deficiencies and difficulties are determined for revising distance education program during the process. As Moore, Lockee, & Burton (2002) stated out formative assessment is the best way to ensure quality in a unit or course.

A formative test of a learning unit could be administered via a web site and very immediate feedback could be provided for students in distance education. Using this approach also leads students to reorganize his/her further studies or completion of the shortcomings of the related learning unit. It is very helpful to design formative tests in multiple choice test formats to provide rapid feedback for a large group of students.

Summative Assessment in Distance Education

Summative assessment is used both at the end of the course and during the course. In summative assessment, performances of students on some units are measured broader than formative assessment. Summative tests usually used as midterm exam or final exam of a course. The main focus of summative assessment is determining students' learning level on critical behaviors, not on all the behaviors students have been taught.

Measurement of Affective Behaviors in Distance Education

Some of the emotional factors affecting the efficiency of student achievement or program, such as learning motivation and attitude towards learning or technologies used in distance education are also exists. According to Shachar, & Neumann (2003) such factors as attitudes, satisfaction, and evaluation of instructional factors can be performed by using questionnaires and likert type scales. When asking students to report their feelings and opinions about the program, their answers can be subjective. Therefore, in addition to questions about the program or instructor, questions reflect the students' emotional status should be asked too. Also some control questions need to be involved into questionnaire. In assessing students' feelings, achievement and course expectations of student should be considered for improving accuracy of decisions.

Computerized Adaptive Testing, CAT, with Item Response Theory, IRT

As Salcedo, Pinninghoff, & Contreras (2005) pointed out, a CAT is the test managed by computer in which each item is introduced and the decision to stop are dynamically imposed based on the students answers and his/her estimated knowledge level.

"The ideal testing situation would be to give every examinee a test that is tailored or adapted to the examinee's ability level" Hambleton, Swaminathan, & Roger (1991: 145). In CAT applications, students do not take the same test. Despite item numbers and properties (such as item difficulties or item discriminations) of items are different for the students; the precise of measures improves in positioning students on an ability or success continuum in CAT applications. In IRT which is used in CAT applications, item information is calculated according to the level of each student's ability or knowledge, and then the information provided by a test for an ability level is the sum of the item information functions. When enough test information is obtained to reliably predict a student's ability the test is terminated by computer. Questions answered by a student depend on the student's ability or learning level. In item response theory, there are some models to estimate a student's ability level, such as one-parameter logistic model, two-parameter logistic model, and three-parameter logistic model. As Hambleton, Swaminathan, & Roger (1991) reported, (Green, Bock, Hunphreys, Linn & Reckase, 1984; Lord, 1980; Weiss, 1983) pointed out that the IRT most appropriate in computerized adaptive testing is the three parameter logistic model. According to Hambleton, Swaminathan, & Roger (1991) the main reason for choosing the three-parameter logistic model is that it generally fits multiple-choice item data better than the one or two parameter models. According to Lord (1980) to use CAT, computer should accomplish below items:

- Predict from the examinee's previous responses how the examinee would respond to various test items not yet administered.
- Make effective use of this knowledge to select the test item to be administered next.
- Assign at the end of testing a numerical score that represents the ability of the examinee tested" (Hambleton, Swaminathan, & Roger, 1991:147).

Computerized adaptive testing research has been focused in six areas:

- Choice of IRT model,
- Item bank,
- Starting point for testing,
- Selection of subsequent test items,
- Scoring/ability estimation and
- Choice of method for deciding when to terminate the test administration" (Hambleton, Swaminathan, & Roger, 1991: 148).

There are some models which consider both difficulties of course materials and learner ability to assess students' achievement; and propose a personalized e-learning system based on item response theory, which estimates the abilities of online learners and recommends appropriate course materials to learners, interested readers should read Chen, Lee, & Chen, (2005).

Preventing Students' Cheating in Distance Education

According to Tan (2002) cheating in exams or other academic assignments, can be defined as use resources not allowed to use or having someone else to take exams or assignments. In distance education practice, a major problem encountered in the measurement and assessment of students' success is cheating.

As Ravasco (2012) declared technology has made it easy for learners to cheat.

Technology has significantly increased students' cheating both in assignments and online exams. Other students may answer an online test instead of intended student.

Thus, online measurement in distance-learning programs must be performed with caution. In some cases, students have to take tests at different times or in different time re-test is used for a student.

In this case, some of the test items would be known by students before taking the exam and this may cause another cheating problem.

As Olt (2002) declared if all-at-once assessment with a single test is not possible, assessment questions can be drawn from a large pool and each student given a random selection, as possible in WebCT and Blackboard.

Computerized adaptive testing application provides a significant contribution to solving this cheating problem. Some suggestions are given to prevent cheating; two of them are briefly given below:

- Limit the time to take an online test. With limited time available, there is less opportunity for the student to look up information, call friends, or consult past tests.
- Require students to take proctored exams.
- Give periodic quizzes during online chat sessions.
- Require students to use a camera on their computer desktop for discussions and exams.
- Develop a database of test questions and give different questions to different students.
- Consider alternatives to tests or use multiple methods of measuring performance, mastery, and skill (http://tutorials.txvsn.org/pluginfile.php/4627/mod_resource/content/1/cheatingdistanceeducation).

Some of suggestions made by Cizek (1999) related to online assessment are as follows:

- Define cheating and encourage honesty.
- Know the assessment takers.
- Understand what students face.
- Maintain assessment security.
- Proctor the assessment.
- Control the assessment situation.
- Make the assessment a learning experience.
- Use constructed-response test formats.
- Avoid situations that encourage cheating such as avoiding take-home tests, unproctored tests, and student grading of tests in distance learning.

As it is clear from the suggestions given above about preventing online cheating, a live proctoring, using web cams and humans monitoring several screens must be used for online exams. A plagiarism detection programs must be used for assignments or projects.

As it is true for all educational concepts, human factors are so important to prevent cheating. Instructors and all related people must be very sensitive and serious about all concepts of online exams.

CONCLUSION

Most of the efforts to make improvements in the educational system or the need for new options, stems from two major concepts or beliefs. The first of these is the concept of equality of opportunity. In other words, equality of opportunity is to believe that all of the individuals in society have the right to take advantage of educational experiences and opportunities. Secondly, to believe that education is one of the main factors contributing to the achievement of a series of individual and social goals. These concepts are more meaningful to the realization of distance education applications.

It can be said that distance education is equivalent to face-to-face education and situated along with it. As a result, distance education has some important features such as; settle for employees and adults, independence of facet o face meeting, independence of classes and specific place and time, from a combination of mass communication and individualization, potential of students' independence, and its unique methods.

Thus, distance education can not be viewed just as substitute of traditional face to face education, much rather it is a different kind of education.

There are four main components of distance education programs as it is in face to face education. These components are objectives, content, teaching-learning process and measurement and evaluation. Objectives and content components of distance education programs usually show a great similarity with face to face education. Having much more and different technology and materials used in the teaching and learning process, affect the measurement and evaluation.

There are some new trends related to measurement and evaluation components of today's distance education programs. Probably the one of the important measurement theory should be used in distance education is item response theory and one of its application is computerized adaptive testing.

Designing and using a computerized adaptive testing, CAT, the test managed by computer in which each item is introduced and the decision to stop are dynamically imposed based on the students' answers and his/her estimated knowledge level. In CAT applications, questions answered by a student depend on the student's ability or learning level.

A major problem in measurement is cheating. Some precautions must be taken about cheating such as a live proctoring, using web cams, and using a plagiarism detection program. Taking into account of these new trends related to measurement and evaluation and apply the most appropriate measurement and evaluation methods will improve the quality of distance education programs.

BIODATA and CONTACT ADDRESSES of AUTHORS



Zeki KAYA was born in Afsin, Kahramanmaras, Turkey. He graduated from Gazi Teacher Training School in 1982 and began to work as a German Language Teacher. He also continued his postgraduate education. In 1990 he graduated from Hacettepe University, Institute of Social Sciences as an Education Science Specialist. In 1994, he received his doctoral degree in the Institute of Social Sciences, Educational Programmes and Training Department. In 1997, he became an Associate Professor in education field.

Having worked at public schools as a teacher, Kaya also worked as a specialist and advisor in the General Directorate of Educational Technologies of Ministry of National Education. He also worked as a lecturer at Anadolu University. In 1995, he began to work in Anadolu University as a full-time instructor leaving his work at MOE. After two years' work in Anadolu University, he began to work in Industrial Arts Training Faculty of Gazi University. He became a professor in 2003. He is also a member of the editorial board of Turkish Online Distance Education Journal (TOJDE), and of National Education and Industrial Training Journals. He is the editor of International Journal on New Trends in Education and Their Implications (IJONTE). He published 13 books, 56 articles, 27 presentations, 1 translation text on the curriculum development and evaluation, educational technology, distance education, language education, teacher training.

Prof. Dr. Zeki KAYA
Gazi University, Faculty of Education
Education Sciences Department
06500 Teknikokullar, Ankara, TURKEY
Phone: +90 312 202 82 30
Fax : +90 312 222 84 83
Email : zkaya@gazi.edu.tr



Seref TAN was born in Rize, Turkey. He completed his primary and secondary education in Hopa, Artvin, Turkey. He graduated from Hacettepe University, Faculty of Education, Measurement and Evaluation Department in 1988. In 1990 he graduated from Hacettepe University, Institute of Social Sciences as a Measurement and Evaluation Specialist. Tan has earned Higher Education Council (HEC) scholarship to study for a PhD in the USA, in 1993. He has been studied in the fields of "Assessment and Evaluation", "Multivariate Statistical Methods" and "Research Methods" for doctoral education. He has received his doctoral degree on Research Methodology, Measurement and Testing program from Graduate School of Loyola University Chicago, USA, in 1997. He is currently working as a lecturer in the Gazi University, Gazi Faculty of Education, Department of Educational Sciences, Measurement and Evaluation Department, in Ankara, Turkey.

Assoc. Prof. Dr. Seref TAN
Gazi University, Faculty of Education
Education Sciences Department
06500 Teknikokullar, Ankara, TURKEY
Phone: +90 312 202 82 30
Fax : +90 312 222 84 83
Email : sereftan4@yahoo.com

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