ISSN:1306-3111
e-Journal of New World Sciences Academy
2009, Volume: 4, Number: 3, Article Number: 1C0055

EDUCATION SCIENCES
Received: November 2008
Accepted: June 2009
Series : 1C
ISSN : 1308-7274

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AN OVERVIEW FOR COMPUTER ASSISTED ASSESMENT

ABSTRACT

In this study, evaluation, types of evaluation, and computer supported evaluation in general terms were considered through an instructional designer's perspective. First descriptions of these contexts were taken into consideration and then their advantages and disadvantages were examined. The key points in the design of the computer supported evaluation were examined. The importance of instructional implementations has increased that are learner-centered, that reflect the learner's enhancement throughout the process, that benefit from modern technologies, and that leverages also the instructor's enhancement. This change has caused the modification of the individuals' evaluation methods, as well. The fact that instruction takes place in the computer environment has given birth to the need for the evaluation process to take place in the same environment, too.

Keywords: Assessment, Computer Assisted Assessment, Computer Based Testing, Computerized Assessment, Computer Assisted instruction

BİLGİSAYAR YARDIMLI DEĞERLENDİRMEYE GENEL BİR BAKIŞ

ÖZET

Günümüzde öğrenen merkezli, süreç içerisinde öğrenenin gelişimini yansıtan, çağdaş teknolojilerden yararlanan ve öğreticinin gelişimini sağlayan öğretim uygulamalarının önemi artmıştır. Bu değişim bireylerin değerlendirme metodunun da değişmesine neden olmuştur. Öğrenmenin bilgisayar ortamında yapılması, değerlendirme sürecinin de aynı ortamda yapılması gereğini doğurmuştur. Bu çalışmada, bir öğretim tasarımcısının bakış açısından genel anlamda değerlendirme, değerlendirme türleri, bilgisayar yardımlı değerlendirme ele alınmıştır. Öncelikle bu ortamların tanımları ele alınmış ardından sahip oldukları avantaj ve dezavantajlar incelenmiştir. Bilgisayar destekli değerlendirme tasarımlarında dikkate alınması gereken noktalar incelenmiştir.

Anahtar Kelimeler: Değerlendirme, Bilgisayar Destekli Değerlendirme, Bilgisayar Temelli Test, Bilgisayarla Test, Bilgisayar Destekli Eğitim

1. INTRODUCTION (GİRİŞ)

The most powerful indicator of the rapidity of change in our society is the explosion of technology. This may be most obvious in the increasing presence of computers in the home, school, and workplace. Computers are providing individuals with a powerful means to transmit, access, and interpret an immense and growing body of information worldwide. In doing so, it is changing the way people live and work.

Inherent in this explosion of the capability to manipulate information is a corresponding need for education and experience in this new domain. The general acceptance of the use of information technology in industrialized societies, coupled with tremendous amount of information about technology and calls for technology standards, places greater responsibility on schools and families to help children become more efficient at accessing, transmitting, and using large pieces of information.

Internet-based information and communication technologies are changing how instruction and assessment are being conducted in innovative schools, colleges, and universities throughout the world. Training and testing are experiencing a noticeable transition ``from the traditional centralized, local, classroom-teacher focused approach, to a de-centralized, global, network based, student focused one. With the widespread use of personal computers in the classroom, on the job, and at home, and the connectivity to the internet increasing exponentially, many individuals have immediate access on their desktop to remote educational resources, and even instruction itself. Consequently, education and training do not have to be confined to classrooms and campuses, and students and teachers do not have to be present at the same place and time for instruction. Teaching and assessing can occur on local or global networks, and distributing educational materials can occur electronically, or on CD-ROMs, thus capitalizing on multimedia formats. These yield several advantages, specifically: (1) access to a potential worldwide student body; (2) access to better teaching materials prepared by experts; (3) rapid update of course materials; (4) enable instant access to these resources for students and teachers; and (5) tailoring instruction for self study ("Distance Education" 2002).

Computers are being used not only to construct test but also to administer them. The learner sits in front of a computer and answers items that appear on the screen. In this was the entire test becomes automated.

2. RESEARCH SIGNIFICATION (ÇALIŞMANIN ÖNEMİ)

This strong relationship between the instructional process and learners amplifies the concerns of people who design and implement the instructional process in terms of whether they can carry out a process that is suited to learners' overall characteristics. However, the importance of the ability to have individuals gain today's ever-changing contemporary competences and the ability to use technology for instructional purposes has increased. These two conditions reveal the need for different approaches to be presented in a wide spectrum that span from instructional strategies to techniques and from planning to evaluation. In this regard, it can be said that in the education field, instructional processes of evaluation, which show itself through the influence of understandings that have changed within the recent years and through the contribution of technology, will facilitate the creation of desired instructional contexts.

Instructional designers analyze, design, development implementation and evaluation processes have been performed using

hyper-text in teaching design, hyper-media and multi-media as a learning-teaching environment, often have begun to prefer. This environment has many advantages but at the same time of course, many disadvantages are also brought. From the perspective of a instructional designer can be used in the design of this environment has many design elements and principles, but which of them will be on environment and to decide how to do the design process is quite laborious and difficult. This study is conducted in order to help instructional designers in the design process of the computer based instructions and computer assisted assessment.

3. WHAT IS ASSESSMENT? (DEĞERLENDİRME NEDİR?)

Assessment can be defined as the systematic and ongoing method of gathering, analyzing and using information from various sources about an administrative unit, using measured outcomes, in order to improve student support services and student learning (Krist, Albert, Snow, and Bhati, 2008). An assessment describes any processes that appraise an individual's knowledge, understanding, abilities or skills (Beeson, et al. 2006; İpek, 2001; Alessi and Trollip, 2001). There are different reasons and purposes for assessing learners. These include:

- Helping the student learning process.
- Determining what a person knows and does not know.
- Grading students' work.
- Being able to regularly evaluate student progress.
- Helping to monitor how effective current teaching and learning strategies may be.
- Find out misunderstandings of students.
- Rank ordering people interms of performance.

There are different forms of assessment as diagnostic, formative and summative assessment. Diagnostic assessment is used to show a learner's preparedness for a module or programme and identifies, for the learner and the teacher, any strengths and potential gaps in knowledge, understanding and skills expected at the start of the program, or other possible problems. Formative assessment has a developmental purpose and is designed to help learners learn more effectively by giving them feedback on their performance and on how it can be improved and/or maintained. Finally, summative assessment is used to indicate the extent of a learner's success in meeting the assessment criteria used to gauge the intended learning outcomes of a module or program. One of the differences between formative and summative assessment is that in formative assessment, the results are used by students and lecturers; on the other hand, they are used to inform students' abilities to others.

McAlpine (2002) categorized the assessment as formal and informal. In formal assessments, the students are aware they are taking exam for assessment purposes. In the informal assessment however, the judgments are integrated with other tasks. For summative assessment, formal is most frequent, while for formative and diagnostic assessment, informal is more common.

The assessment can also be categorized as convergent assessment and divergent assessment. If there is one correct answer like computerized objective test, this is called as Convergent assessments. They are easy to deliver and mark. But, they can be limited in scope. In divergent assessment, essay type questions are generally used, hence there is no one correct answer. Although it is easier to assess higher cognitive skills but divergent assessment, they can be time consuming to mark by trained markers. An assessment process can involve one or more than one of these assessment purposes.

4. WHAT IS COMPUTER ASSISTED ASSESSMENT? (BİLGİSAYAR YARDIMLI DEĞERLENDİRME NEDİR?)

Computer-assisted assessment (CAA) is a common term for the use of computers in the assessment of student learning. Various other terms are used, such as computer-aided assessment, computerized assessment, computer-based assessment (CBA) and computer-based testing. These terms are largely interchangeable (Bull, 1999).

CAA encompasses the use of computers to:

- Deliver, mark and analyze assignments or examinations
- Collate and analyze data gathered from paper forms, using an optical mark reader (OMR) with hard copy question paper and an OMR-readable answer form
- Record, analyze and report on achievement
- Collate, analyze and transfer assessment information through network (pp: 34).

While summative assessment has been one of the features most widely recognized among teachers as a benefit of CAA (Bull, 1999), formative CAA has much to recommend it for improving learning. Formative assessment practices can be used to enrich the experience and enable to develop their capacity for self-regulated learning (Nicol, 2007). Students value the opportunity to test their own knowledge prior to formal exams (Dalziel and Gazzard, 1999). A careful integration of formative and summative CAA has much to recommend it as a general strategy for many educational contexts.

The results of a survey conducted in 1991 by the CAA Centre into the use of CAA in the UK higher education sector show that the majority of the CAA tests are used for summative and formative assessment (McKenna and Bull, 1999).

Research studies have shown that CAA that is properly used can make a significant difference in students' academic performance. Gibbs (1992) provides several examples of how small changes in assessment strategy can dramatically transform the way students learn. He has applied some assessment techniques that led to an improvement in the average exam score from 45% to 75%. Thomas and Taylor (1999), with the study of Tutor Marked Assignments (TMAs) which are the major mechanism by which Open University (OU) students receive feedback on their academic progress, have found out that there has been significant improvement in the teaching and learning process.

The results of a study (Pollock, Whittinghton and Doughty, 1999) where Computer Assisted Assessment (CAA) was used for a Mathematics course that was already being delivered using Computer Aided Learning (CAL), displayed that most of the students preferred CAA to traditional exams. They found it more organized, felt less pressure, were able to work at their own pace, and found it simple, much easier and less stressful to use.

The results of another study done by Özden and Şengel (2008) where CAA was used for a science course that was delivered using web-based learning, displayed that most of the students liked to have online exams on computer. They preferred CAA to traditional exams and they would like to use CAA in other courses as well.

5. TESTING APPROACHES IN COMPUTER ASSISSTED ASSESSMENT (BİLGİSAYAR DESTEKLİ DEĞERLENDİRMEDE TEST YÖNTEMLERİ)

Computers have been used to help construct tests for many years. In this way, test items have been produced and can be stored in pools in terms of difficulty levels. Then, whenever needed, items can be accessed. This kind of applications can be used either in local computer or in the World Wide Web. Prepared test can be printed and

applied or can be administered in different ways on computer. In one way, test's items can be selected from the pool randomly for each user. So, the users get the test in different order to minimize cheating. In another way, items appear in the same order as they were written in the item pool.

As well as constructing tests by computers, they are also used to administer them. Instead of solving tests on paper, items appear on the screen. Multiple-choice items, yes/no, matching, true/false items are generally used to administering tests in multimedia. Because, these ways are easy to grade by computer and users can easily respond to items just by clicking the mouse or pressing a key on keyboard. But, there may be some cases in which it is almost impossible or expensive and dangerous to implement the assessment without using computers or the user are required to type in an extended response to open-ended items. For the first case, simulation tests can be given as an example. In the second case, the responses of the users are sent to the instructor who grade the items manually and send appropriate feedback.

Simulations can be used for the assessment phase of instruction. Nuclear power plant operators for example could perform safely, if they were certificated after successfully operating a realistic simulation instead of taking a traditional test on the topic on paper or on computer. But, designing or writing a simulation test is far more difficult than writing a simulation program itself. Because, the simulation type tests should assess the examinee's performance automatically. The original set of standards would have to be modified. After the set of standards has been established, the evaluation routines must be programmed on the computer. Hence, providing feedback on errors can be difficult to program. Because, the range of user actions is very various.

Another testing methodology is adaptive testing that selects next item with respect to the examinee's previous response. An item is presented to the examinee. If the response is correct, the second item that is going to be administered. However, if the response is incorrect, another question related to the first question on that topic is selected by computer. In this kind of tests, the computer administers a beginning estimate of the examinee's knowledge. Then the computer searches through all the items from database to provide the greatest amount of information at the currently estimated knowledge level. According to respond of the examinee's, the program adjusts its estimate upwards or downward (Alessi and Trollip, 2001).

One of the advantages of the adaptive tests is that the estimate of ability is usually more accurate than traditional testing procedures. Moreover, the average number of items you must administer to reach the estimate is substantially fewer. Because, an adaptive test administers only necessary items, easy items are not shown to good learners and difficult items are not shown to weak learners.

An adaptive testing can measure only one type of knowledge. So, in an adaptive test, only one type of knowledge domain can be tested. In addition to that, many items are not administered because of quick termination without specific content being tested at all.

6. WHAT ARE THE ADVANTAGES OF THE COMPUTER ASSISTED ASSESSMENT? (BİLGİSAYAR YARDIMLI DEĞERLENDİRMENİN AVANTAJLARI NELERDİR?)

There are several advantages in the use of CAA compared with paper tests. CAA can reduce marking time and improve the accuracy of the assessment. It will also remove any bias (good or otherwise) towards particular students. The results are stored in a format, which

is amenable to rapid production of statistical information. The advantages of CAA are as follows:

- **Cheaper and Faster:** The computer does the marking, saving large amounts of trainer or teacher time. The research studies (Kleeman 1998; Danson 1999) related to CAA showed that marking by computer was resource efficient and efficiency gains increase with the increasing class size. As there is little or no time spent in marking, students can be given their results either immediately upon completion or after a very short period (Kleeman, 1998; Bull, 1999).
- **Fairer:** Computers are objective. They do not make mistakes. In addition, they do not suffer from personal bias. It's very important to get the questions right, and to set up the marking criteria, but once you've done this; the computer will do the marking with precise accuracy (Kleeman, 1998; Bull, 1999).
- **Helps learning–Immediate Feedback:** One of the strengths of CAA is that students can receive feedback quickly as they progress through the assessment. Most of the survey results (McKenna and Bull, 1999) show that this is among the main advantages of CAA. There is considerable research evidence to show that effective feedback leads to learning gains. A meta-analysis of these studies revealed that feedback produced significant benefits in learning and achievement across all content areas, knowledge and skill types, and levels of education. Teachers have a central role in developing their students' own capacity for self-regulation; they are also a crucial source of external feedback. Feedback from teachers is a source against which students can evaluate progress, and check out their own internal constructions of goals, criteria and standards.

  Feedback is the information given to students about the correctness of their answers. Providing feedback to students is vital if they are to benefit from self assessment activities. It serves the purpose of "assisting learners in monitoring their understanding, leading students to re-study or seek help on points where feedback has identified errors. Feedback may also provide helpful explanations" (Jonassen, 1998).

  It is easy to get the computer to give helpful feedback to people taking tests. As well as simply working out a score, you can give diagnostic information to people about which topics they are strong or weak on, or why their answer to a question was wrong and perhaps direct them to relevant course materials (Kleeman, 1998; Winship, 2000). Technology allows complex analysis of student responses, and the tailoring of feedback according to that response (Jonassen, 1998). Thus testing can help learning, as well as measure its effectiveness (Kleeman, 1998).

  Nicol and Macfarlane-Dick (2006) reinterpreted the literature on formative assessment and feedback in relation to learner self-regulation. Seven principles of good feedback practice were identified as:

- Facilitates the development of self-assessment and reflection in learning
- Helps clarify what good performance is (goals, criteria, standards)
- Delivers high-quality information to students about their learning
- Encourages positive motivational beliefs and self-esteem
- Encourages teacher and peer dialogue around learning

- Provides opportunities to close gap between current and desired performance
- Provides information to teacher that can be used to help shape teaching

  Nicol (2007) worked on two case studies to find out how information and communication technology might support formative assessment processes and the development of self-regulation in large 1st-year classes. In these studies, students were moved from being dependent on teacher feedback to being able to generate their own feedback on learning by using different techniques like WebCT to to work collaboratively, and Intelligent Homework System.

- **Easy analysis:** The primary purpose of CAA is the information and results it provides. Also, more meaningful from the results can be obtained to be used to improve teaching and learning. Answer given by users, frequency of seeking help, time spent can be stored to improve tests and the testing process (Kleeman, 1998, Alessi and Trollip, 2001).

  CAA facilitates a detailed analysis of the test results with minimal effort. Once the data are the computer, it is easy to analyze the results on a computer. This can be used to identify areas within the course where the students have difficulty, thus alerting staff to the possible need to adapt their teaching. Or perhaps it could be used to identify trends and patterns within the student group. Questions which are not successful at discriminating between students can readily be identified and improved for future years (Kleeman, 1998).

  When a test is delivered on paper, the only analysis that you are likely to do is that which can be done easily without further calculation or data entry. However, when CAA is used, the full results from the assessment are on computer automatically, without any extra work needed. This gives us the ability to think of new kinds of analyses that would never have been considered when most tests were on paper, but which is worth considering now they are on computer (Kleeman, 1998). Merrell and Tymms (2007) describes the development of an adaptive assessment called Interactive Assesment System that is aimed at children of a wide age and ability range to identify specific reading problem. This system has advantages over traditional pencil-and-paper group assessment in terms of the ease and time for administration and a reduction in administration, marking and analysis for teachers.

  Also when conducting CAA, information that is simply impossible to know when conducting paper tests can often be gathered.

- **Looks different every time it runs:** By using computers, tests can be randomized to make each test different. You can choose questions at random from different topics, and with some question types (e.g. multiple choice), you can also shuffle the order of the options. You can also make adaptive tests, where the computer jumps to different places depending on the answers. This means that each time someone takes a test, it is different. So you can have a single test that people are allowed to re-take, because if they do, there is not much chance of seeing the same questions again (Kleeman, 1998). The content of the test can be tailored to suit individuals (Alessi and Trollip, 2001).
- **Testing on demand:** It is easy to arrange for people to take tests at the place and time that is convenient for them. Testing can be individualized, allowing examinees to take a test when

they are ready rather than at a fixed time. In the business environment, people can be assessed at their desks or from their portables over a mobile phone line. It is not necessary to drag people into the training office just to assess them, which means less wasted time, and less travel costs. Especially for medium or low stakes testing, where invigilation or proctoring is not required, the assessment can be available at all times (Kleeman, 1998, Alessi and Trollip, 2001).

- **Use graphics or multimedia – Powerful Learning Environment:** It is easy to include color graphics, a screenshot from a computer application or a color photograph on a computer, whereas this is expensive on paper. Furthermore you can include sound, video or other multimedia, which is impossible on paper. In some fields graphics or multimedia may open new opportunities altogether. Consider for example, a medical assessment on irregular heartbeats – how much better to play a recording of a heartbeat in a question than to describe it (Kleeman, 1998).
- **Easy to update:** Whereas re-printing paper tests is time consuming and can be costly, changing a computer test is just a matter of simple editing. Therefore, it is easy and cheap to change questions and keep a test up to date. Furthermore if you are testing at a distance, you can update the questions centrally, and the updates can happen remotely at once (Kleeman, 1998).

7. WHAT ARE THE DISADVANTAGES OF THE COMPUTER ASSISTED ASSESSMENT? (BİLGİSAYAR YARDIMLI DEĞERLENDİRMENİN DEZAVANTAJLARI NELERDİR?)

Besides many advantages of CAA there are also some limitations which must be taken into consideration and tried to overcome carefully.

- **Limited Question Types:** If scoring is to be automated, ultimately CAA is suited to those question types which require a limited response from the user. Typical examples of traditional CAA questions include multiple choice questions, multiple response questions, gap filling, matching pairs, list ordering, and those questions requiring numerical input, e.g. complex math problems. So it is not well suited to subjects such as the humanities (Oliver, 2000; Alessi and Trollip, 2001). It is difficult to program computers to judge extended or open-ended responses. However, the result of a survey made in 1991 by the CAA Centre in UK, suggest that there is evidence of some use of CAA in social and humanity courses (McKenna and Bull 1999). Recent research has produced an improvement in CAA's ability to test higher order skills such as comprehension, application and reasoning, and allowed for its implementation of the tools on the web. Areas for development include graphical hotspot questions, which involve selecting an area of the screen by moving a marker to the required position. Text assessment is also being developed (O'Keefe, 2000).
- **Security:** There are also security aspects to consider. It is very difficult to stop one student from glancing at the display of their adjacent companion, (either voluntary or involuntary!). But this can also occur in paper-based examinations. One proposed solution in CAA is to vary the sequence in which the questions are presented. Another solution suggests having each alternative machine presenting a different bank of questions, which measure the same educational objectives. So the percentage

of items common to any two administrations of a test is small (Alessi and Trollip, 2001). Also, use of random factors within the question itself can be a solution. For example angles, heights or widths can be varied. This would also solve the problem of the lecturer having to rewrite the questions every year. However this requires a considerable degree of programming expertise and time investment that CAA is trying to avoid!

There is also the issue of passwords. If CAA is to be used for coursework assessment, what is to stop one student from using another's password? There are recorded instances of students logging on under a different name, completing the assessment and then re-logging on under their own name to "successfully" complete the task (Oliver, 2000). But by the rapid improvement of biometrics technology new identification and authentication methods can be used such as smart cards, identifying from finger print, eye retinas etc. Many research studies are being done about this subject (Fröhlich, 2000).

Test security is controlled by 'Quiz Settings' where test access is prescribed in terms of release date/time, availability to specific students, availability on specific computers and test password. Test setting provides the ability to specify the style of question delivery, test duration, the form results are displayed in and the timing of the release of marks. It is necessary to specify the number of times the student can take the test (Pain and Le Herron, 2003).

Security issues can be a problem in Web based CAA, but with adequate computer support, institutions have found that it is possible for exams and tests to be password protected, encrypted and loaded onto the server just prior to the test being taken. Questions and options can be randomized to reduce cheating and variety of mechanisms can ensure that students only have access to permitted online material during an exam (Warren, 2000, Pain and Le Heron, 2003). This problem can be solved by using testing centers that have an infrastructure in place for administering CAA (Alessi and Trollip, 2001).

- **Attitudes towards CAA:** Although some studies suggest that students are positive towards the use of CAA one must bear in mind that it takes the user longer to read a piece of text from the computer screen in comparison to that of its paper-based equivalent. Students can be tired after computer based exercises. Thus, the use of CAA may increase the actual time period of the examination (Oliver, 2000).

  As mentioned above, fear of technology and the lack of recognition for innovative teaching practice are among the potential obstacles for successful implementation of CAA (McKenna and Bull, 1999; Alessi and Trollip, 2001).

  Research to date suggests that if students are given adequate training in the use of assessment software prior to the actual test, no groups are disadvantaged by CAA (Winship, 2000).
- **Question Selection order during an exam:** One of the main obstacles CAA must overcome in the exam environment is that of duplicating of the advantages of the paper based equivalent. For instance students using the traditional method can flick from question to question and can answer in a random order if they so choose. Thus the CAA system must also offer a similar degree of freedom. In addition many students throughout the exam may change their answer – this is easily achievable with paper based

situations but not so with CAA. Many systems simply record the user's last entry (Oliver, 2000).

- **Time Consuming:** Creating a question and feedback databases for computer adaptive assessment is time consuming (Dalziel, 2000; Pain and Le Heron, 2003). Familiarity with the codes and layout required may lessen the time to create questions in the database but it also makes it more difficult to detect errors.
- **Reliability of Hardware and Software:** Reliability of hardware and software was found among the main disadvantages of CAA in the survey conducted by CAA Center in UK in 1999 (McKenna and Bull, 1999). The administration of tests to large numbers may cause logistical problems, such as sufficient computers or power failure. Moreover, when people take tests at their convenience, items whose answers are difficult to obtain by cheating must be prepared. This problem can be overcome by using commercial testing centers that could ensure that only authorized users take the tests.

  There are many delivery mechanisms for CAA. There are closed computer networks, web based systems, OMR-delivered systems and stand –alone machines. Among these, by the improvement in Internet technology, web based testing became an important assessment method. In the survey conducted by CAA Center in UK in 1991, it was found that the predominantly used delivery mechanisms were closed computer networks and web-based systems. However, a little delivery on stand-alone machines also exists (McKenna and Bull, 1999).

  Web-based assessment allows great flexibility in the presentation of computer assisted assessment (CAA), particularly in terms of time, place and pace. For this reason, existing Web-based assessment systems can be expected to be of growing importance in education. The Web-based assessment program runs entirely within the Web browser, as is currently exemplified by Web-based email. These systems allow for the creation, delivery and monitoring of all aspects of educational assessment over the Web, and bring with them a range of advantages in terms of ease of use, ease of editing and efficiency (Dalziel and Gazzard, 1999).

  The Web will change many aspects of education (in any society), but Web-based assessment is one of the most promising innovations in education and training. The flexibility in time, place and pace that Web-based assessment can afford for practice questions and other formative assessment methods is a major advance over previous CAA methods. In addition, the intuitive nature of the Web and its platform independence give it special advantages over "stand alone" CAA. Further, it is possible to design Web-based assessment systems which require no software installation or downloading, nor the use of any special plug-in, allowing the web-based assessment to become as simple as using a Web browser (Dalziel and Gazzard, 1999). Due to the server id, software need only be hosted on a single computer (rather than separately on each test computer), and questions can be hosted centrally, meaning that changes need only be made to a single computer, and these can then be distributed to all users. Monitoring exams and collecting response data are also greatly improved by using the standardized network of the Internet (Dalziel, 2000).

8. CONCLUSION (SONUÇ)

In this study, design elements were examined (or dealt with) for the points, which instructional designers have to consider when they choose and design hyper texts, hyper contexts, and multimedia contexts as an evaluation environment. The reason for instructional designers to utilize different environments by benefiting from the advantages of developing technologies can be explained by slogans like "instruction that is independent of time and context."

Computers can provide the opportunity to administer new types of tests. These tests can be more valid, efficient and reliable than the traditional tests. Computer assisted assessment is still in its opening and it has possibilities that continue to be worth exploring.

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