

# Emerging technologies in educational assessment: The need for teachers' competence

U. S. A. Osuji

School of Education, National Open University of Nigeria, Victoria Island, Lagos State, Nigeria.

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## ABSTRACT

The practice of students' assessment in our educational system has been described as pervasive and takes on so many different forms. There has been a long history and a growing concern about the quality of our students' assessment and the use of the assessment results. The results from both formal and informal assessments typically have been weighted heavily in decisions about the students, programmes and policies. There are malpractices in students' assessment which can have detrimental and irreversible consequences which may affect human lives as well as the school programmes. Educational assessment affects not only the teaching and learning; it also affects the society as a whole. Because the impact of educational assessment can be complex and unpredictable, the teachers who are at the centre of its implementation must be adequately trained in all aspects of educational assessment and in the use of emerging technologies and tools in order to cope with the future of the educational system. This paper looks at the purpose and importance of educational assessment, emerging technologies in educational assessment, educational assessment, redefined issues to be considered for teachers' competence in assessment, towards a new assessment agenda for the future, and the teachers' competences in the future we want in our educational assessment.

**Keywords:** Teachers' competences, educational assessment, future education system, information and communication system.

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E-mail: osujiojiugwo2006@yahoo.com.

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## INTRODUCTION

Assessment has been described by Sanders and Voget (2012), as the process of obtaining information that is used to make educational decisions about students; to give feedback to students about their progress, strengths and weaknesses; to judge instructional effectiveness and curricular adequacy; and to make informed policy. Based on this description, it is very important that our teachers' training institutions should prepare and produce teachers who are well trained in students' assessment. Having the capacity to make use of information properly when making important decisions about the students, instructions or curriculum, is an integral part of the professional teaching practice. This is why Rudman et al. (1980) emphasized and highlighted the importance of assessment competences for teaching and teachers, and agreed that there is the need for teachers to use a variety of assessment methods in order to make informed and

appropriate decisions about students' grading, grouping, placement and instruction. Borg et al. (1986) also emphasized that training in students' assessment procedures has been shown to be very important to teachers. According to Stiggins (1988), research reports have documented that practicing teachers spend a substantial portion of their time in activities related to students' assessment. But according to Roeder (1972, 1973), Schafer and Lissitz (1987, 1988), research has also consistently revealed that the preparation of teachers in most universities in the area of assessment is either inadequate or absent.

Assessment is an integral part of any educational system. Therefore, a considerable amount of effort should be devoted to it. There are several reasons for the assessment of students. Educational assessment seeks to determine how well students are learning and is an

integral part of the quest for improved education. It is a very important component of the instructional process which provides feedback to the stakeholders in education about the effectiveness of the educational services. It helps to diagnose learning difficulties, gives students feedback about their progress towards achieving instructional objectives and also for promotion and certification. Following these number of important functions of assessment in the educational system, it becomes imperative that the teachers who are at the centre of it all must be competent enough to drive the assessment procedures. The teachers should be competent in the emerging school based assessment. According to Grifit (2005), school based assessment is the process whereby students undertake specified assignments during the course of the school year under the guidance of the teacher as part of a subject examinations. The school environment in its totality is therefore expected to provide a conducive situation to facilitate learning and subsequent assessment procedures. According to Njabili et al. (2005), the fundamental role of assessment is to provide authentic and meaningful feedback to improve students' learning, instructional process and educational options. This implies that assessment should not be seen as an end in itself but a means to a justifiable end of learning. It means that the teachers needed for these purposes must have the requisite knowledge of the assessment process.

Udeani and Adeoye (2010) reported that educational assessment is viewed from three major areas. These are students' assessment, programme assessment and system assessment. For the purpose of this paper, the school based assessment, otherwise called students based assessment is the focus. According to Pellegrino et al. (2001), student assessment is the mechanism whereby the final grading of a student in the cognitive, affective and psychomotor domains of behaviour takes account in a systematic way of all his performances during a given period of time in a school system. This involves the use of different methods and from different sources for the purpose of guiding and improving the learning and academic achievement of the student. Student-based assessment can be categorized into three. They are:

1. Pre-teaching student assessment, which is carried out prior to the commencement of teaching: It is described as both diagnostic and formative assessment whose purpose is to determine students' prior knowledge before teaching and to collect data for planning teaching. The data are on students' academic achievement, learning styles and entry behaviour.
2. During- teaching students' assessment, which is often carried out when teaching is going on: It is a type of formative assessment. The teacher uses the students' assessment at this stage to determine students' progress and to sustain their interest and attitudes.

- 3). Post-teaching students assessment, which is carried out at the end of teaching and for the purpose of determining students' academic achievement and the effectiveness of teaching methods and techniques. It is a summative assessment. It is used for certification and future studies.

Educational assessment affects not only the teaching and learning process; it also affects the society as a whole. Therefore, every teacher must be trained in all aspects of educational assessment and in the use of emerging technologies and tools for the future of the educational system. This is because according to Namara (2000), the impact of educational assessment can be complex and unpredictable. The rest of this paper takes a look at the emerging technologies in educational assessment, towards a new assessment agenda for the future and the teachers' competences we want in our educational assessment.

## **PURPOSES AND IMPORTANCE OF EDUCATIONAL ASSESSMENT**

Osuji (2008) noted that educational assessment is a process by which characteristics of individuals or group of individuals, the setting, goals, objectives and materials or teaching strategies are identified and understood for the purpose of making judgment and decisions relevant to educational activities. In addition, assessment provides data used to accomplish several purposes such as identification and placement, programming and instructional planning, and analysis of ongoing skills, interests and behaviours. They are also used for the activities of diagnosis in order to make informed and sound decisions. Assessments yield data which can be used for monitoring teaching styles, check classroom management and select instructional materials. Assessment should be either narrow and specific or broad and comprehensive. A narrow assessment should focus on specific skills or behaviour. But a comprehensive assessment should consider the setting, instruction, the out of school conditions among others. An assessor should therefore select an area of focus to which he should identify the influence and limitations that can be created by choice. In the Open and Distance Learning (ODL) system, both the specific and comprehensive assessment techniques should be employed. The students' counselors at the study centres can be used for behavioural assessment, while the instructional facilitators, the course coordinators and programme leaders are used for semester examinations, for the comprehensive assessment.

School based assessment is one of the major aspects of education. For it to be effective, it needs to respond to the purpose and importance of assessment and what we should do with the information from assessment. It also

needs to respond to the use and implementation of emerging technologies in education. Assessment has become increasingly important for accreditation and for accountability in education. Students based assessment is carried out in the school system in order to find out the students' knowledge, skills and academic achievement and performance. It can help us to find out how to go about the tasks of doing their studies and how they feel about their studies. The assessment of students will tell us what they need to learn, that is, diagnostic; and how well they are doing as their studies progress, that is, formative. It will also tell us how well the students did at the end of a unit, task, term or year, that is, summative. Therefore, assessment is about students' work or studies at every stage of their development and also at the end. Students' assessment includes the day to day observations, tests, quizzes, rubrics, rating scales, project works and portfolios. The data collected from the students' assessment should be used for the purpose of improving teaching and learning. They should also be used to direct the attention of the students to focus on their strengths and weaknesses. This can be motivational. It can also be used to improve planning (or programme assessment) and to report students' academic achievement to parents or other stakeholders in education (Brookhart, 1999).

## **EMERGING TECHNOLOGIES IN EDUCATIONAL ASSESSMENT**

The traditional methods of educational assessment which include pen on paper tests, performance assessments, oral questions, projects and portfolios, have become inadequate. There is a need to reappraise educational assessment techniques within the context of Information and Communication Technologies (ICTs) advancement. This is the reason why Torrance (1995) pointed out that new approaches to educational assessment are certainly necessary, but not a sufficient mechanism for change within the educational system. Brookhart (1999) opined that implementation must proceed in accordance with the school based exploration of the problems and possibilities of new approaches to assessment if our ambitions for them are to be realized. The use of ICTs in assessment is not entirely new. Globalization and the popularity of Open and Distance Learning (ODL) worldwide have brought about an opportunity to rethink and repackage educational assessment in terms of what, how, where, and when. To Pellegrino et al. (2001), the science of measurement commenced when technologies for standardization were transforming industries. Test designers and measurement experts were among the early advocates and users of new technologies. Today, most of the common kinds of assessments in use can be said to be, in many ways, the products of technologies

which were once cutting edge. Some of these include automated scoring and item bank management (Udeani and Adeoye, 2010). Today, computers and ICTs are making it possible for students' learning to be assessed even from distant locations, with vivid simulations of the real world situations and in ways that are barely distinguishable from learning activities. This is why Pellegrino et al. (2001) pointed out that the most provocative applications of new technologies to assessment are not necessarily those with the greatest sophistication, speed or glitz. According to Udeani and Adeoye (2010), the greatest potential lies in the role technology could play in realizing that assessments should be based on modern knowledge of cognition and its measurement should be integrated with curriculum and instruction, and should inform as well as improve students' academic achievement. Up till now, the promise of the new kinds of assessments remains largely unfulfilled. The hope is that the use of modern technologies will change this situation substantially. Therefore, only teachers well trained in the use of these modern technologies in assessment will be able to cope with the future of educational assessment. The connection between technology and educational assessment lies in the fact that various technologies have been used to bring greater efficiency, timeliness and sophistication to multiple aspects of educational assessment design and implementation. These include technologies that generate items; immediate adoption of items on the basis of the testee's performance; analyze score and report assessment data; allow learners to be at different times and in distant locations; enliven assessment tasks with multimedia and add interactivity to assessment tasks. It should be noted here that most of the technologies have been used to implement the methods of assessment more effectively. Online assessment with the use of emerging technologies in education as very important tools is a very vital need in the students' based assessment. The teacher for the future we want in educational assessment must be vast in the use of these emerging technologies in education and assessment. They must be ICT compliant. The emerging technologies in education and assessment are numerous. They include the internet and/or intranet, computers, mobile phones, ipad, tablet, radio, television, digital camera, video and audio conferencing, webcam, ipod, learning management system, white board and different types of social media and networks. Most of these ICTs are touted as potentially powerful enabling tools for educational change which includes tools for assessment. If these ICTs are used appropriately, they are said to help in expanding access to education, strengthen the relevance of education to the increasingly digital workplace and raise the quality of education by helping to make teaching and learning engaging, interactive and active process connected to real life among others.

## EDUCATIONAL ASSESSMENT REDEFINED

In today's digital world, ICTs have redefined educational assessment and expanded the understanding of the concept of educational assessment. Besides having the basic assessment skills, today's students and teachers also need technology skills for communicating, investigating, accessing and using information, computing, thinking critically about messages inherent in new educational media and understanding and evaluating data (Jegede, 2010). From UNESCO (2010), we learnt that ICTs support educational assessment literacy by raising access to training in assessment, stimulating awareness-raising and learner motivation, facilitating learner-generated assessment materials, localizing content and creating assessment literate environments, training assessment facilitators, gathering feedback on learners educational experiences and monitoring programmes. To be a full assessment literate in today's and indeed future world, both teachers and students must become proficient in the new ICTs. We cannot define educational assessment in the modern times without linking it to ICTs. It means therefore that the teachers for the future we want have a responsibility to effectively integrate these ICTs into the educational curriculum and assessment in order to produce students for the future they deserve. Jegede (2010) believes that much can be done to support both the teachers and students to develop the new assessment skills that will be required in their future. He also believes that students have the right to:

1. Teachers who are skilled in the effective use of ICT for teaching, learning and assessment;
2. An educational curriculum that integrates the new ICTs into instructional and assessment programmes;
3. Instruction that develops the critical knowledge and literacy essential to effective information use;
4. Assessment practices in education that includes reading on the internet and writing using word-processing software;
5. Opportunities to learn safe and responsible use of ICTs; and
6. Equal access to ICTs.

According to Leu (2001), Luke (2000) and Warschauer (1999), just as new educational assessments are rapidly developing so as to effectively exploit the potentials of ICTs, so also is the emergence of new and modern ICTs engendering new instructional and assessment practices through innovative delivery of instruction and assessment. It means therefore that the traditional definitions of educational assessment and the traditional definitions of effective practices in instruction as derived from a long tradition of books and other print media have become grossly insufficient. Hence, given the rapid development of ICTs and their use in education and

assessment, an assortment of definitions of assessment is emerging. Among them are the following examples adapted from Jegede (2010):

1. Information assessment: the ability to access, assess and use information, analyze content, work with ideas, synthesize thought and communicate results.
2. Digital assessment: the ability to attain deeper understanding of content by using data-analysis tools and accelerated learning and assessment processes enabled by technology.
3. New educational assessment: the ability to solve genuine problems amidst a deluge of educational information and its transfer in the digital age.
4. Computer assessment: ability to accurately and effectively use computer tools such as word processors, spreadsheets, databases, and presentation and graphic software in educational assessment.
5. Computer-technology assessment: the ability to manipulate the hardware that is understructure of technology system.
6. Critical assessment: ability to look at the meaning and purpose of educational assessment with a view to questioning the attitudes, values and beliefs behind it. The goal is development of critical thinking to discern meaning from the array of multimedia, visual imagery and virtual environment, as well as written tests.
7. Media assessment: ability to communicate competently in all media forms - print and electronics - as well as access, understand, analyze and evaluate the images, words and sounds that comprise the contemporary culture of assessment.

The whole basis of having to redefine educational assessment in relation to the realities of new development in ICTs is for the nations to provide unfettered access to education for all citizens and produce teachers who fit into the new and future education and assessment.

## ISSUES TO BE CONSIDERED FOR TEACHERS' COMPETENCE IN ASSESSMENT

Whereas all the innovative technologies are very useful for educational assessment and instructional delivery, they are not necessarily effective in all circumstances and environments. This means that among the competency areas for the teacher is the ability to choose the most appropriate technologies. The teachers choice can be based on such factors as:- availability, simplicity/sophistication, proficiency, cost, appropriateness and relevance. These are some of the determinants in deciding to use any particular technologies for educational assessment. The teacher should be able to consider another fundamental issue. Does the technology fit the purpose of the assessment? If the answer is yes,

then it must be kept simple and cost effective. Jegede (2010) listed five considerations for the use of ICT in educational assessment. These are:

1. Public policy in the use of ICT for educational assessment: the potential of new technologies for learning is likely to be found not in the technology themselves but in the way in which these technologies are used as tools for learning and assessment. There should be public policy on all aspects of educational assessment and ICTs, including access, training, classroom practices and examination. The policy must cater for the disadvantaged and physically challenged students as well.
2. Professional development in technology and assessment: countries must be willing and able to provide adequate continuing education and professional development to ensure that all teachers are prepared to effectively integrate ICTs into the curricular and assessment. Government must also provide adequate funding for staff development in the effective integration of ICT into the curriculum and assessment so as to provide students with the learning opportunities they require.
3. Equity of access to internet and other ICTs: in many developing countries classroom internet access has continued to be a dream for the students, while the resolve of governments to provide equity of access to internet and ICTs has also continued to be a mirage. Providing all students with equity of access will ensure educational opportunities for all children in the country. In egalitarian societies which countries try to profess, creating a widening gulf of haves and the have nots around access to information will threaten the system.
4. Teacher education programmes: in order to play a critical role in preparing teachers for using the new technologies in education and assessment, our teacher education programmes should begin to include the new technologies in education and assessment within their method courses. Where lecturers do not use new technologies in their research and teaching, there will be a reduced urge to incorporate technology into their teaching.
5. Awareness of the "moving target" problem: due to the rapid nature of development and innovation, technologies change so rapidly and in many cases even becoming obsolete. As newer and modern technologies of information and communication continually appear, they raise concern about the technology needing different contexts and resources for use. They also raise concern about adoption and adaptation by teachers and students alike. Replacing them ever so often as they quickly become obsolete must become a paramount issue in the minds of management and government alike.

## **TOWARDS A NEW ASSESSMENT FOR THE FUTURE**

The emergence of ICTs has now redefined what learning,

training, education and assessment mean for the student. The society and the stakeholders in education demand that assessment of learning be looked at differently. What is required now is to have a new link between assessment and the ICTs. This takes cognizance of the evolving nature of assessment and the implications for the future of the teacher and the students. Therefore developing new agenda that will take into consideration the needs of the students, the following are proposed by Jegede (2010), for consideration, especially in assessment practices which relate to certification, instrument for gaining entry into further education or career, or even community events:

1. Avoid assessment examination: learning cannot in all cases end up in testing, or the use of assessment of learning as obtains in the traditional teaching and learning situation. Other means should be found to carry out assessment of learning without recourse to examination.
2. Allow the students to participate in their assessment: students need to plan their own learning and be in a position to affirm when learning of any task is complete. They should be partners in the testing or assessment procedures. They should be part of the learning assessment.
3. Provide adequate feedback on performance: current assessment practice, especially public examinations only provide scores or at best give skeletal information on results of examinations. These in most cases, do not help the learner to either effectively judge his own learning or assist in the preparation for the next examination.
4. Assist students to establish their own standards: at every stage of learning and even before it is embarked upon, learners must be guided to establish their own standards and how to judge whether they are meeting them. If they are always not provided with these standards, they will never learn how to determine appropriate standards for themselves.
5. Discourage the closed-book approach to assessment: the experiences people face in their day to day world do not fit in with the closed book type of examinations we give to students. Some students use their daily experiences as basis for taking decisions for the future, they must be encouraged to use the whole world as resource for their learning. Assessment procedures should also mirror this.
6. Assessment on demand: the current practice of restricting all learners to take examinations at the same does not fit in with the flexibility of the future assessment. Students should be able to demand examinations at their own free will either as soon as they complete learning of certain tasks or delay assessment till they feel comfortable with what they have learned as sensible enough to subject themselves to examinations. Therefore, the assessment for the future must be supported by new media and new technologies which allow examination banks and delivery of examinations in

as many formats as possible to as many students at the same time or different times without causing any inconveniences or confusion as the paper and pencil technologies often do at examinations.

7). Encourage collaborative learning and group assessment: assessment for the future will thrive a lot on communication and sharing of values, attitudes and information. Presentation of evidence of learning should be possible in groups or in communities. Communal learning may help to decentralize knowledge or learning. Collaborative assessment provides values to society in terms of the social behaviours the students pick and exhibit.

### TEACHERS' COMPETENCES FOR THE FUTURE WE WANT IN OUR EDUCATIONAL ASSESSMENT

Having highlighted the emerging technologies and the new agenda for the future of our educational assessment, it means that the future we want in our educational assessment must have teachers who are competent in directing the students to fit into them. For the teacher to give direction to the students, it means he is proficient in the use of these technologies. It is a well known and acceptable fact that the effective use of ICTs can make a significant contribution to solving the challenges experienced in our educational assessment. Integrating ICTs into educational assessment calls for defined policies and legislations on teacher training. The policies must be articulate on what the teachers' competence in educational assessment and other issues are, the visions and outcomes to be realized through the use of ICTs. They must be futuristic, comprehensive and specify who does what and when. Teachers training curriculum should have integrated media and ICT components. In other words, our teachers should be multi-media and or ICT compliant. For educational purposes technology is not about hardware and software, but also, and importantly about procedures, purposes, structures, systems and patterns of use. It is about means towards certain ends. It has largely to do with thought processes, information flows and human communication. To the extent that technology can bring about improvements and advantages in the area of educational assessment, it can enhance the process of education. It is therefore very important to analyze changes in technology in terms of their impact on education and assessment as well as human thought processes and development. The teacher must be adequately equipped with the requisite competence to do this. There is no doubt that the use of ICTs in educational assessment is exciting, and offers particular economies of scale and opportunities hitherto unimagined. But we have to keep in mind the students who would like it to be useful and easy to use in their day to day lives and the teachers that would make it work.

### CONCLUSION

Changes in education and assessment are inevitable in the face of the inexorable advances of knowledge and information age that are being fuelled by rapid developments in ICTs. Decision makers and education planners are under pressure to make major changes which in most cases amount to a quantum leap in investments in technology for education and assessment. In this era of technological developments, it is easy to see developments in education and assessment as a linear progression in which each new technology represents an improvement on the previous ones. The inevitable implication is that the latest the best and those who do not keep up with the trends will lose out in the development process. This implies that the teacher we want for the educational assessment of students learning outcomes must keep abreast of the developments and use of the emerging technologies. Stakeholders and policy makers in education must redefine educational assessment in relation to the current and future realities of technological developments.

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