Ethnobased learning and international standards in assessment

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Abstract

The local environment in which people are living is rapidly changing and at the same time, being increasingly affected by and integrated into the large global environment. Those affected include skills, values and competencies required to live a sustainable life. Education is now required to impart learning both local and transnational knowledge. Assessment should be reformed from that which assesses the traditional fact-based knowledge to assessing that which reflects 'real world' experiences and requires students to structure the task, apply information, construct responses and explain the processes by which they arrive at answers. Measuring instruments must consist of meaningful tasks that demand problem-solving, critical thinking, and good writing skills.

In this study the November 2005 Mathematics, Computer and Science subjects were analyzed in terms the context of the question and skills tested. Although localization of examinations in Zimbabwe changed the context of the content to focus on local knowledge, the teaching, learning and assessment strategies remained unchanged resulting in a misalignment within the education system. This could have been caused by trying to maintain internationally competitive standards. The misalignment can result in Zimbabwe lacking behind in current trends in educational reform and as such educational standards no longer being internationally competitive.

Introduction

It is the desire of every parent and stakeholder that the learner receives quality education of high academic standards. Academic standards are considered high if the knowledge and skills

acquired at schools are used in everyday life. Hence most countries are searching for ways on how to educate all their learners to high standards which are internationally competitive. Internationally competitive standards are being sought after, because nations can no longer stand apart from each other socially, politically and economically. There is increased interdependence of national economies and increased economic competitiveness. These come together as a global market where human capital and quality of education are matters of prime importance. Education is all about acquisition of knowledge. Current trends in educational theories emphasize that learning occurs best when knowledge is derived from the learners' experiences. The purpose of this paper was to link teaching of local knowledge with internationally competitive standards of education through ethno-based learning.

Background

Globalization

People are now living in a rapidly changing environment with vast and complex sources of information. The movement of information, together with that of people, goods, and ideas is always accelerating across the globe such that although human lives continue to be lived in local environments, these are continually being integrated into the larger global world. This has an impact on education systems worldwide, because education has to prepare learners for the costs, challenges and opportunities of both the local and international environment. The greatest challenge to the learner is how to manage change and difference. People in today's world interact with others of different racial, ethnic, national, linguistic and religious backgrounds. They are then required to understand human nature, history, different cultures, values, traditions and social organizations. This requires individuals who approach and solve problems from multiple perspectives, and are able to work collaboratively in groups made up of diverse individuals. Globalization requires a paradigm shift in education from a focus on mastery and regurgitation of rules, facts and principles to the development of both non-technical and technical abilities required in real life. As such current trends in educational reform reject the acquisition of pure knowledge without any application to real life situations. Life long learning, higher order cognitive skills, intra and interpersonal skills are required in this ever changing world. Higher order cognitive skills are required for multidisciplinary understanding of society, problems and solutions. Intrapersonal skills are needed for personal understanding and development and interpersonal skills for better human relationships. The goal of education should be that each and every child should be equipped with skills that are required of an individual to function after school. According to Cotton (2001) the fundamental skills possessed by an educated person include the ability to think carefully, reflectively, critically, creatively, make wise choices and right decisions. Some of the skills required of school graduates in terms of business, employment and life in general are:

1. higher order skills such as
    - application, analysis, synthesis, and evaluation of concepts in real life contexts
    - creative and innovative thinking
    - critical thinking
    - problem solving
    - logical, deductive and inductive thinking
    - decontextualisation

    - transfer of knowledge between disciplines, issues and subjects
2. metacognition
    - self-confidence
    - positive self-image
    - self-discipline
    - self-management
3. intrapersonal skills
    - independence
    - responsibility
    - honesty
    - enthusiasm and motivation
    - dependability
    - integrity
4. interpersonal skills
    - cooperation and team membership
5. basic skills and oral communication (speaking and listening), including
    - understanding and following instructions, mathematical computation
    - and simple writing.

A lack of the majority of these has been found to be some of the causes of improper work habits behavior, attitude and a general failure in life. Cotton's research (2001) showed that these capacities were not genetic but are deposited qualities that are possessed by the owner, but could be developed and through instruction and practice from school level. The content of what is taught comes from the curriculum and is assessed during and after instruction. An education system should have its curriculum, instructional strategy and assessment aligned to achieve desired goals.

The content

Generally, the curriculum contains what learners should know and be able to do, (content), how it is taught (instruction) and how it is measured (assessment). Due to globalization and availability of vast sources of information the content should include:

- different ways of knowing and validating information
- approaches from multiple perspectives
- identifying and connecting ideas, concepts and applications
- communication
- metacognitive abilities
- awareness of contributions of different cultures to current knowledge
- context that is relevant to the real world environment.

The curriculum should be suitable for all learners irrespective of the background and give all learners the opportunity to learn. It should promote the acquisition of local, regional and international knowledge.

Instruction

Effective instruction cannot be prescribed for effective teachers because it involves continuous adjustment between the teacher and the learner. But generally instructional strategies should:

- be meaningful and motivating
- inspire learners to learn more and with enthusiasm
- be relevant to their lives, including in pursuit of work and leisure
- adequately prepare learners for the society in which they live and work
- be based on real world experiences
- should use prior knowledge as a base for new knowledge.

Ethno-based learning and local knowledge

Ethno-based learning, a concept derived from ethno-mathematics, is an instructional approach based on the premise that learning occurs best when it is derived from the real life experiences of the learner. Every learner has knowledge of one's local environment and this, together with one's experiences constitute local knowledge. According to Pandey (1990) learners construct new knowledge by integrating it with prior knowledge. This knowledge has meaning and value because it relates directly to real life experiences, All leamers believe that they can learn and are keen to learn new concepts. Ethno-based learning encompasses the fundamental theories of constructivism, contextual teaching, and problem-based learning. Constructivism, according Doolittle (1997) recommends that:

- learning take place in authentic and real world environments
- content and skills be made relevant to the learner
- content and skills be understood within the framework of the learner's prior knowledge
- learners be encouraged to be self-regulatory, and self-aware
- teachers provide for and encourage multiple perspectives of content.

Wilson (2001) describes "contextual teaching as a concept that involves connecting the content that the students are learning with the context in which that content could be used". Howey, (1998) in Wilson, (2001) notes that contextual teaching and learning emphasizes acquisition of higher-order thinking skills and knowledge transfer:

> Problem-based learning is an instructional approach that uses real world problems as context for students to learn critical thinking and problem solving skills and to acquire essential concepts of a course. (Wilson, 2001).

Authentic assessment

If educational context, content, and instructional practices are being reformed, then the assessment and evaluation strategies have to be changed and aligned with the new approaches. Ethno-based learning activities should be aligned with not only the instructional objectives but with the subsequent assessment. The use of the traditional pen and paper assessments only, where ethno-based learning has taken place, causes misalignment of what is expected of learners. The primary characteristic of ethno-based learning is that learning is anchored in the real world of the learner. Authentic assessment tasks together with

traditional standardized assessment tasks should therefore be used to assess learning achievement. An authentic task is an assignment s designed to assess the ability to apply knowledge and skills to real world challenges. Ethno-based learning can therefore be aligned with authentic assessment. This is because what is important is learners use knowledge acquired, in the face of real life challenges, rather than how much knowledge they would have acquired.

Ethno-based learning and authentic assessment produce learners who are:

- highly motivated and committed to learning
- equipped with a range of transferable skills
- are equipped with more meaningful and relevant knowledge that goes beyond the classroom
- collaborative and cooperative
- deep learners rather than surface learners
- life long learners
- reflective, analytical, inquisitive, critical, innovative and creative
- metacognitive
- fairly and reliably assessed.

(Adapted from Mowl, G. (1996) *Innovative Assessment*)

Assessment standards

These are determined by the needs of the society. They should be set such that they measure the acquisition of qualities required of individuals to live a sustainable life. Due to globalization, standards have to be tailored towards both the local and international communities. Quality assessment standards are based on principles of assessment namely, validity, reliability, and fairness. The assessment standards should promote acquisition of local and international knowledge and teaching practices that enhance learning by all children, irrespective of their background and abilities.

Localization of examinations in Zimbabwe

Secondary school examinations in Zimbabwe, were, before independence, set and marked by the University of Cambridge Local Examinations Syndicate (UCLES). Soon after independence, Zimbabwe embarked on a process of localizing the whole education system, examinations included. This meant that the curriculum was developed and examinations marked and processed locally. The content of the curriculum and the context of the examinations were to be locally based. The teaching strategies, examination techniques, grading systems and certification remained unchanged. The standards therefore remained unchanged and international as the graduates were and are still being accepted in many countries across the world. The history of education in most countries, Zimbabwe included, shows that initially secondary education was a preserve for a minority and the curriculum was dominated by concepts which prepared learners for university education. Mass secondary education, which is now prevalent in most countries like Zimbabwe, requires that learners be prepared not only for university education, but for work, citizenship and membership of both the local and international community. The challenge was how to educate all learners, irrespective of background to international standards. This research was

important in that it highlighted the need to align instructional and assessment strategies of Zimbabwe's education system, in line with educational current trends, if its products are to remain internationally competitive.

Aim

The aim of this paper was to link, using the experience of the Zimbabwe School Examinations Council (ZIMSEC), teaching of local knowledge, through ethno-based learning and authentic assessment, to the achievement of international standards of education. The objectives of the research were to determine the extent to which questions set in Ordinary level (O'Level) mathematics and science subjects

1. were in context of out-of-school experiences
2. tested abstract concepts, higher order skills and non-cognitive skills.

Methodology

Seven most popular mathematics and science subjects at O' level were selected because more than seventy five percent of secondary school children leave school after this level, having sat for at least, two of the subjects. A total of twenty three papers were analyzed from the November 2005 examinations. Each question in each component of the subject was analyzed terms of its context and skills tested. Marks allocated to the question or parts thereof were summed up per paper so as to determine the proportion of different contexts and skills involved in the question. Assuming that the papers were sat according to the marking scheme, the percentages of the higher and lower order skills were obtained, together with the paper weighting, from the assessment schemes in the syllabuses. All the science syllabuses had three categories of assessment objectives, namely:

1. knowledge and understanding
2. handling information and problem solving
3. experimental practical skills.

The first two objectives were tested in theory papers and the third in the practical or alternative to practical papers. The first objective was interpreted to test lower order, whilst the other two tested higher order skills.

Results

Table 1.1 Skills and Concepts tested

Subject	Paper	Paper weighting	Higher order skills	Lower order skills	Abstract concepts	Out of school experience	School experience	Total
		%	%	%	%	%	%	Marks
Integrated Science	1	30	30	70	0	38	62	40
Integrated Science	2	50	30	70	0	12	88	100
Integrated Science	3	20	100	0	0	42	58	40
Biology	1	30	45	55	0	58	42	40

Biology	2	50	45	55	0	44	56	100
Biology	3	20	100	0	0	100	0	40
Biology	4	20	100	0	0	75	25	40
Physical Science	1	30	45	55	22	10	68	40
Physical Science	2	50	45	55	10	48	42	100
Physical Science	3	20	100	0	0	50	50	40
Physical Science	4	20	100	0	0	0	100	40
Chemistry	1	30	45	55	40	0	60	40
Chemistry	2	50	45	55	18	7	75	100
Chemistry	3	20	100	0	0	0	100	40
Chemistry	4	20	100	0	0	0	100	40
Physics	1	30	45	55	20	45	35	40
Physics	2	50	45	55	5	40	55	100
Physics	3	20	100	0	0	0	100	40
Physics	4	20	100	0	0	0	100	40
H. Social Biology	1	70	45	55	7	18	75	100
H. Social Biology	2	30	45	55	10	40	50	40
Mathematics	1	50	-	-	34	16	40	100
Mathematics	2	50	-	-	27	30	43	100

All papers ones, except for Mathematics but including Human and Social Biology paper two and not paper one, were composed of forty multiple choice questions. These papers had a weighting of thirty percent and the ratio of marks for higher to lower order skills was forty-five to fifty-five percent, except for Integrated Science which had thirty to seventy percent. The range of marks for out-of-school experiences was zero to fifty-eight percent with Biology only, having more than fifty percent.

The paper twos, for the same category of subjects, were composed of sections of short-structured and free response questions. They had a weighting of fifty percent and a mark total of one hundred. Performance in paper twos alone, in all science subjects and paper one in Human and Social Biology had a much greater effect on the final grades than any of the other papers in the same subject. These papers had fifty-five percent of the marks in lower order category of skills, except for Integrated Science which had seventy. The range of marks for those questions which in context of-out- of school experiences was from seven to forty-eight percent.

The practical papers which had out-of-school experiences ranging between zero and one hundred percent were all, by their nature, of higher order skills.

Mathematics had a range of assessment objectives which could not be classified the same way as the science subjects. These were, at least, from the level of application. Mathematics

together with, physics and chemistry had marks ranging from five to forty percent for questions testing abstract concepts.

Theory papers alone accounted for at least eighty percent of the marks, and in almost all cases the subject had an alternative to practical paper. This meant that all papers could be assessed through pen and paper alone. None of the papers had a school-based or continuous assessment component, that is one based on assessment over a prolonged period.

Except for Biology papers, questions based on abstract concepts plus in-school experiences were in the majority in all subjects especially in Mathematics. All subjects had theory papers whose total weighting was at least eighty percent, and these were dominated by questions testing lower order skills, as per assessment scheme.

None of the questions tested non-cognitive and metacognitive skills.

These were standardized tests from a syllabus whose content was local but taught using the traditional fact-based teacher dominated approach. They sought to discriminate among different learners and only a minority achieved proficiency in the different disciplines. The graduate is unlikely to be of the calibre currently required by the global society.

Discussion

It can be concluded from the background of the study, that the content, context, teaching, learning and assessment standards are all driven by the needs of the society. These needs although locally based are influenced by the effects of globalization. This can be summarized in the form of a model, (see Appendix), linking educational components of content, resources, instruction and assessment. The required quality, hence standard, of these, are determined by the characteristics required of a school graduate. These in turn are determined by the needs of the society, which today are largely influenced by globalization. The characteristics required of an individual today are at the center, as they should be taken into account at each and every stage of the education system. All the components of the education system should be aligned to produce the desired products.

The Zimbabwe education system was misaligned by localization. Although the content was locally based, all the other components remained unchanged. As such the qualities of the resultant graduate were largely unchanged. This is now causing misalignment with the needs of the society, which requires its members to fit into the global society.

Conclusion

Alignment of the education system components removes tension between teaching of local knowledge and internationally competitive standards of education. Local knowledge can be used both as a resource and a strategy whilst standards are used to indicate certain qualities required in the product of a process.

Recommendations

The Zimbabwe school education system should have its components aligned and reformed along with current global trends of teaching, learning and assessment. Ethno-based learning and authentic assessment should complement localization of the content and context of education in Zimbabwe.

Items set for authentic assessment should:

1. be derived from real life situations experienced by the learner(s),
2. be based on experiences within and outside the school,
3. focus on issues that people care about or are important in their daily lives. The information must be credible and applicable to real–life situations such that they promote life-long learning. Any evaluations, conclusions and suggestions to be made must be for continuous improvement of life or must be towards sustainable living,
4. link local knowledge, culture, values and beliefs with other cultures including Western culture, technology and the contemporary world,
5. show equity by enabling all learners to demonstrate their academic achievements,
6. not be biased towards or against any group of learners,
7. avoid stereotyping, unreality, fragmentation, isolation and language bias,
8. although focusing on a subject, reflect content integration e.g. across topics, subjects etc. as experienced in real life,
9. not test recall, but ability to make sense of information provided and apply it,
10. assess ability to apply knowledge to real world situations,
11. enable the learner to demonstrate analytical, evaluative, critical thinking and problem solving skills,
12. measure abilities such as conceptual understanding, procedural knowledge, problem solving, linking, discerning and visualizing relationships, manipulating data to come up with new knowledge or materials to create new objects and application of computational skills to relevant situations.

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Appendix: International standards of education model