Full Length Research Paper

Primary teacher's perceptions of classroom assessment practices as means of providing quality primary/basic education by Botswana and Nigeria

H. J. Nenty[1], O. O. Adedoyin[2], John N. Odili[3] and T. E. Major[1]

[1]University of Botswana, Gaborone.
[2]Molepolelo College of Education, Botswana.
[3]Delta State University, Nigeria.

More than any other of its aspects, assessment plays a central role in determining the quality of education. Quality of primary/basic education (QoE) can be viewed as the extent to which the process of education at the primary education level maximizes desirable outcomes in terms of cognitive, affective and psychomotor behaviour of the learners. Given human resources demand for development in the society some cognitive skills are more desirable than others. Hence education, to meet the skill demand of the society must ensure the development of such desirable skills among learners. Since teachers are the key executors in the processes of ensuring the development of these skills, their perception as to the level to which each of such skills differ in enhancing quality of primary/basic education, and the level to which current assessment practices ensure the development of each of these skills are important in any attempt to contribute solution to the problem of quality in basic education in Africa. The purpose of this study was to determine the extent to which primary school teachers in Botswana and Nigeria perceive the six levels of Bloom's cognitive behaviour as being different in the extent to which they enhance quality in basic education and the level to which their current classroom assessment practices involve items that measure each of these levels of cognitive behaviour. Survey data from 191 primary school teachers from Gaborone district in Botswana, and 300 similar teachers from Delta State in Nigeria were analysed using repeated measure ANOVA to test related hypotheses. The main finding was that there is a significant discrepancy between the level to which, in the perception of the teachers, each of Bloom's level of cognitive behaviour enhances quality of education and the level to which their classroom assessment practices are able to provide for the development of such behaviour among learners. The results were discussed and recommendations made on how to enhance quality in primary/basic education through classroom assessment practices.

Key words: Primary/basic education, assessment, quality of education, Bloom taxonomy of human cognitive behaviour

INTRODUCTION

Education is said to change learners' behaviour desirably, and the quantity and quality of such changes are determined by assessment. The most important aspects of these changes are the amount, type and level of the cognitive, affective and psychomotor skills that are developed among learners. One of the millennium education goals involves a demand for the cultivation of critical thin-

king, problem solving and higher order thinking skills necessary for adaptation and contribution to the rapidly changing information age. Given human resources demands for development in the society some cognitive skills are more desirable than others, hence primary education; to meet the skill demand of the society must lay a foundation that will ensure the development of such desirable skills among learners.

For cognitive behaviour, the concept of higher order thinking is based on the Taxonomy of Educational Objectives popularly known as Bloom's Taxonomy (Bloom et al.

---
*Corresponding author. E-mail: hjnenty@yahoo.com

1956). This system involves a six-level hierarchical progression for the categorization of human cognitive behaviour from a most basic to a higher order level of cognitive processing. The first two levels of Bloom's Taxonomy involve accumulation and understanding of information only, while the other four levels which are often classified as higher order thinking involve application of such information for finding solution to real life problems, for creativity and for critical thinking and judgment. These four levels of cognitive thinking are the more desirable ones for development and educators have been increasingly charged to develop these among the learners in order to enhance their ability to contribute to the development of the society.

High level cognitive questions can be defined as questions that require pupils to use higher order thinking or reasoning skills. By using these skills, pupils do not only remember factual knowledge, instead, they use such knowledge to solve problems, analyze, create and evaluate. It is believed that this type of question reveals the most about whether or not a pupil has truly learned that which is necessary for him or her to contribute to the development in the society. But a number of research studies have indicated that student possess limited abilities to think at higher levels of cognition (Gardiner, 1998; Tsui, 1998).

A growing body of educational literature has challenged teacher educators to provide pre-service teachers with the knowledge and skills necessary to develop thinking skills and problem-solving abilities in their respective students (Buriak et al., 1996; Crunkilton, 1990; Newcomb and Trefz, 1987). "Teaching teachers to teach thinking must become one of the highest priorities of [teacher] education" (Underbakke et al., 1993). One method of modeling a classroom culture for thinking is suggested by the concept of alignment. Alignment refers to the "degree of correspondence" between instructors' educational objectives, methods of instruction, and forms of assessment (Anderson and Krathwohl, 2001).

The alignment between course objectives, methods of instruction, and assessment toward higher levels of cognition is essential to creating a culture of thinking in teacher preparation (Anderson and Krathwohl, 2001). The evidence suggests that teacher educators do not model this culture of thinking (Cruikshank, 1990; Howsam et al., 1976; Orata, 1999). In addition, little is known about the specific practices of teacher educators regar-ding objectives, instruction, and assessment, as well as the influence of those practices on preservice teachers' attitude toward teaching for higher levels of cognition. While research has been conducted regarding the dispa-rities between aspirations and classroom discourse at certain levels of cognition (Whittington, 1995), and bet-ween the cognitive levels to which instructors construct classroom objectives and challenge students via assessment practices (Adkins, 1983; Miller and Newcomb,

1990), no studies have been conducted to examine the relationships between the levels of cognition modeled via instructional objectives, instructional methods, and assessments in teacher preparation courses. Such findings could challenge teacher educators to provide curriculum and instruction that most effectively models a culture of classroom thinking, whereby pre-service teachers could further model in their own teaching practices. Thus, the primary teachers of the 21st Century could better prepare their students to succeed in a society that is increasingly less dependent upon the ability to memorize discreet facts and increasingly more dependent upon utilizing facts to think critically, to solve problems, and to create.

According to Wilen (1991), teachers spend most of their time asking low-level cognitive questions in asses-sing their pupils; these questions concentrate on factual information that can be memorized. These types of questions are widely believed to limit pupils by not help-ing them to acquire a deep, elaborate understanding of the subject matter. Ellis (1993) claims that many class-room teachers do rely on low- level cognitive questions in order to avoid a slow- paced lesson, keep the attention of the students and maintain control of the classroom. Arends (1994) also argues that many of the findings concerning the effects of using lower-level- cognitive versus higher-level-cognitive questions has been inconclusive. While some studies and popular belief favour asking high-level-cognitive questions, other studies reveal the positive eff-ects of asking low- level cognitive questions. Gall (1984), for example, cited that "emphasis on fact questions is more effective for promoting young disadvantage child-ren's achievement, which primarily involves mastery of basic skills; and emphasis on higher cognitive questions is more effective for students of average and high abili-ty…."

Nevertheless, other studies do not reveal any differ-ence in achievement between students whose teachers use mostly high level questions and those whose tea-chers ask mainly low level questions (Arends, 1994; Wi-len, 1991). Therefore, although teachers should ask a combination of low- level-cognitive and high-level-cogni-tive questions, they must determine the needs of their pupils in order to know which sort of balance between the six levels in the cognitive domain.

Problem of the study

Teachers are the key operators of the actual education process and assessment is the means through which learning that results from such process is enhanced, observed and defined. Given this scenario, the quality of education in any system whose teachers are not effective at utilizing assessment as a partner in ensuring and maxi-mizing learning in the classroom is bound to suffer. Tea-chers have always been accused of conducting both classroom and assessment practices that emphasize

only lower levels of cognition. Most classroom questioning and test items are geared to encourage the development of memory level cognitive skills. This is generally inadequate as a means of preparing the learners to fit in and contribute to the development of self and society. Even lesson objectives designed to call for higher order cognitive ability are not translated directly into appropriate activities during teaching and assessment in the classroom. Learners' classroom and assessment experiences do not sustain the development of higher-order cognitive skills. Class, school and even national tests and examinations for which the learners are prepared are made of items that predominantly call for lower order skills.

Secondly, teachers have little awareness of the place of higher-order cognitive skill in the development of the society. And more so, primary school teachers most especially generally tend to lack the awareness of the place of good assessment practices in their classroom on the achievement of quality of education at the national level. Assessment is an important tool in the hands of the teacher through which quality of education could be assured. But teachers are not aware of this and do not know how to use it effectively. The teacher's classroom assessment practices play a central role in determining the quality of education. Their perception as to the place of their classroom assessment practices in ensuring quality education is weak and fuzzy. But teachers have different perceptions as to the level each of the skills differ in enhancing quality of primary and basic education and to the level to which current assessment practices ensure the development of each skills. Primary school teachers rarely imagine that the way they carry out assessment in their classrooms contributes to the quality of education at the national level.

Purpose of the study

The purpose of this study is to determine the extent to which primary school teachers in Botswana and Nigeria perceive the level to which each of the six categories of Bloom's cognitive behaviour enhances quality in basic education and the level to which their current classroom practices involve items that measure each of these levels of cognitive behaviour.

Research hypothesis

To contribute solution to the problem of this study, the following research hypotheses will be tested.

H_1: In the perception of teachers in Botswana primary schools, the six levels of Bloom's cognitive behaviour differ significantly in the level to which they enhance quality of education.

H_2: In the perception of teachers in Nigeria primary schools, the six levels of Bloom's cognitive behaviour differ significantly in the level to which they enhance quality of education.

H_3: In the perception of teachers in Botswana primary schools, there is significant difference in the level to which current assessment practices in Botswana classrooms involve different types of cognitive items.

H_4: In the perception of teachers in Nigeria primary schools, there is significant difference in the level to which current assessment practices in Botswana classroom involve different types of cognitive items.

H_5: There is a significant difference in the level to which each type of item is perceived to enhance QoE and the level to which each is used in classroom questioning, tests and examinations in Botswana schools.

H_6: There is a significant difference in the level to which each type of question/item is perceived to enhance QoE and the level to which each is used in classroom questioning, tests and examinations in Nigerian schools.

METHODOLOGY

The survey inferential study is exploratory in nature. A face validated Likert type questionnaire having six options with a Cronbach alpha reliability of 0.699 for Botswana sample and 0.803 for the Nigeria sample was administered on 191 teachers who teach in twelve randomly selected primary schools in Gaborone district in Botswana, and 300 similarly selected teachers from twenty-five schools in Delta State of Nigeria. The questionnaire was designed to determine the extent to which primary school teachers perceive the six levels of Bloom's cognitive behaviour enhances quality in education and the level to which their current classroom assessment practices involve items that measure at each of these levels of cognitive behaviour. It consisted of three sections, A, B and C. Section A consisted of questions on personal data of primary school teachers including gender, teaching subject, age, teaching experience, qualification and number of assessment-related workshops attended. Section B consisted of items on how teachers perceive classroom assessment practices as a means of providing quality education. Section C consisted of items related to how they perceive the six levels of Bloom's cognitive behaviour as being different in the extent to which they enhance quality in basic education and the level to which their current classroom assessment practices involve items that measure each of these levels of cognitive behaviour. Sections B and C consisted of 20 items and were based on six-point Likert scale (1. Very strongly Disagree, 2. Strongly Disagree, 3. Disagree, 4. Agree, 5. Strongly Agree and 6. Very Strongly Agree). The instrument was face validated by three of the researchers and five graduate students, and then piloted during an earlier study (Nenty et al., 2005).

Data analysis and interpretation of results

In the null form the first hypothesis stated that in the perception of primary school teachers in Gaborone, the six levels of Bloom's cognitive behaviour do not differ significantly in the level to which they enhance quality of education in Botswana. Through a single-

Table 1. Single-Factor Repeated Measures ANOVA of Level to Which Type of Assessment Item is Perceived to Enhance Quality of Education in Botswana (n = 191)

Type of test Item		Mean Perception	Standard Deviation	Std. Error	
Memory		3.28	1.38	0.101	
Comprehension		4.34	1.11	0.080	
Application		4.70	1.14	0.082	
Analysis		4.53	1.12	0.081	
Synthesis		4.77	1.15	0.083	
Evaluation		4.68	1.31	0.095	
Source of Variation	**Sum of Squares**	**df**	**Means Square**	**F**	**p<**
Type of Item (A)	369.33	5	73.87	65.96	.000
Subject (B)	531.33	190	2.80		
A X B	1062.00	950	1.12		
Total	**1962.66**	**1145**			

Table 2. Mean[1] Difference[2] and t-Values[3] from Multiple Comparison Analysis of the Relative Level to Which Type of Assessment Item is Perceived to Enhance Quality of Education in Botswana (n = 191)

Type of Test Item	Memory	Comprehension	Application	Analysis	Synthesis	Evaluation
Memory	3.28[1]	-1.063[2]	-1.42	-8.91	-1.49	-1.398
Comprehension	-7.86**[3]	4.34	-0.356	-0.188	0.424	-0.335
Application	-10.11**	-3.60**	4.70	0.236	0.068	0.021
Analysis	-8.91**	-2.06*	2.63**	4.53	0.068	-0.147
Synthesis	-10.50**	4.60**	0.751	0.751	4.77	0.089
Evaluation	-9.3**1	-3.28**	0.27	-1.49	*0.904*	4.68

[1]Mean values are on the diagonal. [2]Differences among means are above the diagonal; [3]t-values are below the diagonal; *p< .05; **p< .01 df = 190

factor repeated measures ANOVA of relevant data that was done (Table 1) to test this hypothesis, it was found that, in the perception of primary school teachers in Gaborone, there is a significant (F = 65.96; df = 5, 950; p < .000) difference in the level to which the each of the six levels of Bloom taxonomy enhances quality of education in Botswana. An LSD multiple comparison analysis (Table 2) following this significance showed that memory level of cognitive ability was perceived to be significantly (p<.01) the least in enhancing quality of education in Botswana. This was followed by comprehension (p< .05). On the other hand, synthesis was perceived to be the most in enhancing quality of education in Botswana. It was found to be significantly (p< .01) more so than memory and comprehension.

For primary school teachers from Delta State of Nigeria, a similar analysis showed that there is a significant difference (F = 16.58; df = 5, 1495; p < .000) in the level to which the each of the six levels of Bloom taxonomy enhances quality of education in Nigeria (Table 3). Following this significance a multiple comparison analysis (LSD) was done (Table 4) and this showed that analysis level of cognitive ability was perceived to be significantly (p<.01) the least in enhancing quality of education in Nigeria. This was followed by memory, synthesis and evaluation. On the other hand, application, followed by comprehension were perceived to be the most in enhancing quality of education in Botswana.

The third null hypothesis speculated that in the perception of primary school teachers in Gaborone there is no significant difference in the level to which current assessment practices among Botswana primary school teachers involve different types of items. Again, a single factor repeated measures ANOVA was done to test this hypothesis (Table 5). The result gave an F-value of 6.40 which

indicated a significant (p<.005) difference in the level to which current assessment practices in Botswana classroom involve different types of items. A multiple comparison analysis (LSD) (Table 6) showed that with current classroom practices by Botswana primary school teachers significantly (p<.01, except for evaluation) the most emphasized cognitive level is memory, followed by evaluation (p< .01, except for memory and comprehension). The least emphasized being synthesis followed by analysis and application.

A similar statistical test done to test the same hypothesis for primary school teachers in Delta State of Nigeria gave an F-value of 125. 72 (Table 7). With 5 and 1495 degrees of freedom this value was found to be significant (p<.000) and hence the null hypo-thesis was rejected. This is saying that there is a significant difference in the level to which Nigerian primary school teachers involve different types of cognitive items or tasks in their assessment. Given this significance, the multiple comparison analysis done showed that the most involved type of cognitive items were evaluation items (p<.01) (Table 8), followed by application and memory items. The least involved items were analysis items followed by synthesis items.

A similar statistical test done to test the same hypothesis for primary school teachers in Delta State of Nigeria gave an F-value of 125. 72 (Table 7). With 5 and 1495 degrees of freedom this value was found to be significant (p<.000) and hence the null hypo- thesis was rejected. This is saying that there is a significant dif-ference in the level to which Nigerian primary school teachers involve different types of cognitive items or tasks in their assess-ment. Given this significance, the multiple comparison analysis done showed that the most involved type of cognitive items were evaluation items (p<.01) (Table 8), followed by application and and memory items.

Table 3. Single- Factor Repeated Measures ANOVA of Level to Which Type of Assessment Item is Perceived to Enhance Quality of Education by Primary School Teachers in Delta State, Nigeria (n = 300)

Type of test Item		Mean Perception	Standard Deviation	Std. Error	
Memory		4.28	1.36	.078	
Comprehension		4.40	1.55	.089	
Application		4.61	1.24	.072	
Analysis		3.76	1.40	.081	
Synthesis		4.35	1.38	.080	
Evaluation		4.38	1.34	.077	
Source of Variation	**Sum of Squares**	**df**	**Means Square**	**F**	**p<**
Type of Item (A)	123.025	5	24.61	16.58	.000
Subject (B)	1202.295	299	4.02		
A X B	2219.475	1495	1.48		
Total	3564.795	1799			

Table 4. Mean[1] Difference[2] and t-Values[3] from Multiple Comparison Analysis of the Relative Level to Which Type of Assessment Item is Perceived to Enhance Quality of Education in Nigerian (n = 300)

Type of Test Item	Memory	Comprehension	Application	Analysis	Synthesis	Evaluation
Memory	4.28[1]	-0.12[2]	-0.33	0.52	-0.07	-0.10
Comprehension	-0.99[3]	4.40	-0.21	0.64	-0.09	0.02
Application	-2.73**	-1.74	4.61	0.85	0.26	0.23
Analysis	4.30**	5.30**	7.03**	3.76	-0.59	-0.62
Synthesis	-0.58	-0.55	4.22**	-4.88**	4.35	-0.03
Evaluation	-0.83	0.03	3.62**	-5.13**	-0.25	4.38

[1]Mean values are on the diagonal. [2]Differences among means are above the diagonal. [3]t-values are below the diagonal; *$p< .05$; **$p< .01$ df = 299

Table 5. Single-Factor Repeated Measures ANOVA of the Perceived Level to Which Current Assessment Practices in Botswana Classroom Involve Different Types of Items (n = 196)

Type of Test Item		Mean Perception	Standard Deviation	Std. Error	
Memory		4.15	1.42	0.101	
Comprehension		3.87	1.16	0.083	
Application		3.68	1.17	0.084	
Analysis		3.65	1.32	0.094	
Synthesis		3.61	1.43	0.102	
Evaluation		3.95	1.37	0.098	
Source of Variation	**Sum of Squares**	**df**	**Means Square**	**F**	**p<**
Type of Item (A)	43.72	5	8.74	6.40	.005
Subject (B)	665.92	195	3.41		
A X B	1362.78	975	1.39		
Total	1962.66	1175			

The least involved items were analysis items followed by synthesis items.

A similar statistical test of the sixth hypothesis which speculated that there is no significant difference in the level to which each type of question/item is perceived to enhance high QoE and the level to which each is used in classroom questioning, tests and examinations in Nigerian primary schools. A dependent t-test analysis was performed (able 10) to test this hypothesis. The analysis showed that except for analysis and evaluation cognitive levels, there is significant (p<.01) difference in level to which each type of test item is perceived to enhance high quality of education and the level to which it is used in classroom questioning, tests and exami-nations in Nigerian primary schools.

Table 6. Mean[1] Difference[2] and t-Values[3] from Multiple Comparison Analysis of the Relative Level to Which Current Assessment Practices in Botswana Classroom Involve Different Types of Items (n = 196).

Type of Test Item	Memory	Comprehension	Application	Analysis	Synthesis	Evaluation
Memory	4.15[1]	-0.281[2]	-0.475	-0.505	-0.541	-0.204
Comprehension	-2.42*[3]	3.87	-0.194	0.224	0.260	-0.077
Application	-3.51**	-1.89	3.68	0.031	0.066	-0.270
Analysis	-3.24**	2.02*	0.31	3.65	-0.036	-0.301
Synthesis	-3.38**	2.16*	0.67	-0.38	3.61	-0.337
Evaluation	1.25	-0.65	-2.71**	-3.77**	-3.42**	3.95

[1]Mean values are on the diagonal. [2]Differences among means are above the diagonal [3]t-values are below the diagonal; *p< .05; **p< .01 df = 195.

Table 7. Single-Factor Repeated Measures ANOVA of the Perceived Level to Which Current Assessment Practices in Nigeria Classroom Involve Different Types of Items (n = 300)

Type of Test Item		Mean Perception	Standard Deviation	Std. Error	
Memory		3.99	1.49	0.086	
Comprehension		3.96	1.33	0.076	
Application		4.03	1.47	0.085	
Analysis		3.64	1.39	0.080	
Synthesis		3.77	1.36	0.078	
Evaluation		4.36	1.34	0.077	
Source of Variation	**Sum of Squares**	**df**	**Means Square**	**F**	**P<**
Type of Item (A)	1035.28	5	207.06	125.72	.000
Subject (B)	89.23	299	0.298		
A X B	2464.77	1495	1.647		
Total	3589.28	1799			

Table 8. Mean[1] Difference[2] and t-Values[3] from Multiple Comparison Analysis of the Relative Level to Which Current Assessment Practices in Nigerian Classroom Involve Different Types of Items (n = 300)

Type of Test Item	Memory	Comprehension	Application	Analysis	Synthesis	Evaluation
Memory	3.99[1]	0.03[3]	-0.04	0.35	0.22	-0.37
Comprehension	0.22[2]	3.96	-0.07	0.32	0.19	0.40
Application	-0.30	-0.52	4.03	0.39	0.26	-0.33
Analysis	2.60**	2.38*	2.90**	3.64	-0.13	0.72
Synthesis	1.63	1.41	1.93	-0.97	3.77	0.59
Evaluation	-2.75**	2.97**	-2.45**	5.35**	4.39**	4.36

[1]Mean values are on the diagonal. [2]Differences among means are above the diagonal [3]t-values are in italics below the diagonal; *p< .05; **p< .01 df = 195

Summary of findings

Through testing six null hypotheses, it was found that based on the perceptions of primary school teachers in Gaborone, Botswana and in Delta State of Nigeria respectively, the six categories of Bloom taxonomy of human cognitive behaviour differ significantly in the level to which they enhance quality of education; and in the level to which they are involved in current assessment practices in the classrooms in both countries. It was also found that there is a significant difference in the level to which each type of cognitive item is perceived to enhance QoE and the level to which each is used in classroom questioning, tests and examinations in Botswana

and Nigerian primary schools. In other words, there is a significant discrepancy between the level to which primary school teachers in Botswana and Nigeria view each of Bloom's cognitive skill level as enhancing QoE and the level to which they provide, through their assessment practices, for the development among their pupil of these cognitive skills.

DISCUSSIONS AND RECOMMENDATIONS

To teachers in Botswana and Nigerian primary schools, there is a significant discrepancy between the level to

Table 9. Dependent t-Test Analysis of the Difference in the Level to Which Each Type of Test Item is Perceived to Enhance High QoE and the Level to Which it is Used in Classroom Questioning, Tests and Examinations in Botswana Schools (n = 180)

Type of Test Item	Perceived Level of Enhancement of QoE			Perceived Level of Usage in Classroom Questioning, Tests and Examinations			Paired Differences				
	Mean	Std. Dev.	SE of Mean	Mean	Std. Dev.	SE of Mean	Mean	Std. Dev.	Std. Error	t	p<
Memory	3.28	1.39	0.104	4.15	1.44	0.108	-0.87	1.93	0.14	-5.96	.000
Comprehension	4.33	1.10	0.082	3.87	.16	0.087	0.46	1.52	0.11	3.92	.000
Application	4.69	1.14	0.085	3.68	1.18	0.088	1.01	1.2	0.11	8.82	.000
Analysis	4.54	1.11	0.082	3.65	1.35	0.101	0.88	1.80	0.13	6.46	.000
Synthesis	4.76	1.13	0.084	3.61	1.47	0.109	1.15	1.94	0.15	7.88	.000
Evaluation	4.68	1.28	0.095	3.95	1.40	0.104	0.73	1.83	.14	5.18	.000

Table 10. Dependent t-Test Analysis of the Difference in the Level to Which Each Type of Test Item is Perceived by Primary School Teachers to Enhance High QoE and the Level to Which it is Used in Classroom Questioning, Tests and Examinations in Schools (n = 300)

Type of Test Item	Perceived Level of Enhancement of QoE			Perceived Level of Usage in Classroom Questioning, Tests and Examinations			Paired Differences				
	Mean	Std. Dev.	SE of Mean	Mean	Std. Dev.	SE of Mean	Mean	Std. Dev.	Std. Error	t	p<
Memory	4.28	1.36	0.079	3.99	1.49	0.086	0.287	1.81	0.104	2.75	.005
Comprehension	4.41	1.55	0.089	3.96	1.33	0.076	0.452	1.97	0.114	3.98	.000
Application	4.65	1.40	0.081	4.03	1.47	0.085	0.618	1.92	0.111	5.59	.000
Analysis	3.78	1.45	0.083	3.64	1.39	0.080	0.133	2.04	0.118	1.13	.258*
Synthesis	4.35	1.38	0.080	3.77	1.36	0.078	0.581	1.94	0.112	5.20	.000
Evaluation	4.36	1.61	0.093	4.36	1.34	0.077	0.076	2.09	0.121	0.63	.526*

*Not significant at .05 alpha level; df = 299; Critical t-value = 1.98.

which each of Bloom's level of cognitive behaviour enhances quality education and the level to which their classroom assessment practices are able to develop such behaviour among learners. The six categories of Bloom taxonomy of human cognitive behaviour differ significantly in the level to which they enhance quality of education. Teachers in Botswana indicated that teaching learners to develop these cognitive skills enhances quality of education in the following order: synthesis, application, evaluation, analysis, comprehension, and memory; while for those in Nigeria this order is: application, comprehension, evaluation, synthesis, memory and analysis. The ordering of the cognitive levels within each group and the conflicting ordering between the two groups might stem from the lack of clear knowledge of the taxo-nomy by primary school teachers. Though "There is no question about the value of what Bloom and his asso-ciates accomplished by creating this taxonomy . . ." (Fink, 2005, p.2), according to Houghton (1996), Benjamin Bloom lamented that so many years after the publication of his taxonomy it is still not well known and worse still the quality of learners' thinking in classrooms is no differ-ent than it was 40 years ago. While quality of education is enhanced by developing higher-order cognitive skills (application, analysis, synthesis and evaluation) among

learners, at the primary level of education it is more desirable to expand the learners' capacity to take in and store information or "brain file" by developing memory followed by understanding skills. This is likely the reason why for Botswana primary school teachers, memory in the cognitive level most involved in their current class-room assessment practices. For Nigerians, on the other hand, emphasis is placed more on evaluation and appli-cation before memory. This ordering again portrayed the lack of grasp of the essence of Bloom taxonomy that primary school teachers have.

Except for memory level, Botswana primary school tea-chers' perception of the level to which each of the cogni-tive behaviour is important in enhancing quality of educa-tion fail significantly to inform their classroom assessment practices. In each case they under performed in their involvement of the relevant type of questions, items and exercises during classroom assessment practices. Almo-st exactly the same trend was observed for primary sch-ool teachers in Nigeria. The level to which they develop each of these cognitive skills among their learners is sig-nificantly lower than the level to which they deem them as pertinent for the enhancement of quality education in the country. This deficit might be as a result of lack of training of teachers in assessment techniques especially in the

development of skill at different levels of cognition among pupil.

According to UNESCO (2005), assessment is the bed-rock of an effective teaching and learning environment, and regular, reliable and timely assessment is key to improving learning and enhancing quality of education. Assessment allows those working in the education system to diagnose, monitor and assure the quality of education. This situation in which teachers do not practice assessment to the extent that they themselves deem necessary for the enhancement of quality of education is partly attributable to their lack of training on and understanding of the use of the formative nature of classroom assessment as an effective means of achieving everyday lesson objectives. To UNESCO (2005), it also reflects the pressure of external summative assessment on teaching and learning. Moreover, effective assessment requires adequate resources, teachers grounded in assessment techniques and relatively small class sizes – requirements which do not fit the realities in many African countries. For governments seeking to improve education quality, a sound assessment policy is crucial. For school-level assessment to be influential, it should be consistent, regular and reliable, part of an overall school development policy and reconcile both formative and summative assessments with a strong focus on providing feedback to the learner and teacher (UNESCO, 2005).

REFERENCES

Adkins AG (1983). A study of the congruence among the cognitive levels of unit objectives, teachers' questioning, and students' expectations of the basis for their performance evaluation in nursing education using Bloom's taxonomy of the cognitive domain (Doctoral Dissertation, University of Missouri-Columbia, 1983). Dissertation Abstracts International. 44-12, Section A, 3605.

Anderson LW, Krathwohl DR (2001). A taxonomy for learning teaching and assessing. New York: Longman.

Arends R (1994). Learning to teach. New York, NY: McGraw-Hill, Inc.

Bloom BS, Englehart MD, Furst EJ, Hill WH, Krathwohl DR (1956). Taxonomy of educational objectives-handbook 1: Cognitive domain. New York: David McKay Company, Inc.

Buriak P, McNurlen B, Harper J (1996). Toward a scientific basis for the craft of teaching. J. Agric. Educ. *37*(4), 23-35.

Crunkilton JR (1990). Thinking aloud about this process we call teaching. Journal of the American Association of Teacher Educators in Agriculture, *29*(1), 2-10.

Ellis K (1993). Teacher questioning behaviour and student learning: What research says to teachers. (Paper presented at the 1993 Convention of the Western States Communication Association, Albuquerque, New Mexico). (ERIC Document Reproduction No.359572).

Fink LD (2005). What is 'significant learning'?. Retrieved September 25, 2006, from http://www.ou.edu/idp/significant/WHAT%20IS.pdf#search=%22Bloom%20Taxonomy%20quality%20of%20education%22

Gall M (1984). Synthesis of Research on teachers' questioning. Educational Leadership, 42: 40-17.

Gardiner LF (1998). Why we must change: The research evidence. Thought and Action, 14(1), 71-88.

Houghton R S (1996). A critique of thinking categories. Retrieved September 25, 2006, from http://www.ceap.wcu.edu/houghton/Learner/think/critthink.html

Howsam RB, Corrigan DC, Denemark GW, and Nash RJ (1976). Educating a profession. *Report* of the Bicentennial Commission on Education for the Profession of Teaching of the American Association of Colleges for Teacher Education: Washington, D.C.

Miller C, Newcomb LH (1990). Cognitive levels of instruction and student performance in selected college of agriculture courses. Proceedings from the 44th Annual Central Region Research Meeting and Seminar in Agricultural Education, MO: St. Louis, 34-44.

Newcomb LH, Trefz MK (1987). Toward teaching at higher levels of cognition. NACTA Journal, 26-30.

Nenty H J, Adedoyin O O, and Major T E (2005). Analysis of the perceptions of classroom assessment practices as means of providing quality education by teachers and teachers trainees in Botswana schools. A paper presented at the 11th Biennial BOLESWANA International Symposium at University of Namibia, Windhoek

Orata PT (1999). The problem professor of education. J. Higher Educ, 70(5), 589-598.

Tsui L (1998, November). A review of research on critical thinking. Paper presented at the 23rd Annual Meeting of the Association for the Study of Higher Education, Miami, FL.

Underbakke M, Borg JM, Peterson D (1993) Researching and developing the knowledge base for teaching higher order thinking. Theory Into Practice, *32*(3), 138-146.

UNESCO (2005). EFA global monitoring report. Retrieved September 23, 2006, form http://portal.unesco.org/education/en/ev.php-URL_ID=34742&URL_DO=DO_TOPIC&URL_SECTION=201.html

Whittington MS (1995). Higher order thinking opportunities provided by professors in college of agriculture classrooms. J. Agric Educ., 36(4): 32-38.

Wilen W (1991).Questioning skills for teachers. What research says to the teacher. Third edition Washington, DC: National Education Association. (ERIC Document Reproduction No332983).