Evaluation, Growth and Contemporary Trends in Open Distance Education

The Ibadan Experience

In Honour of Prof. Bayo Okunade

Edited by

Oyesoji Aremu

Ayo Kehinde

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Dedication

For Past Director of Distance Learning Centre,
University of Ibadan, Nigeria.

Acknowledgements

Generally, on book covers, there could be a name or two indicating the authors, but with such a book as this, a team of contributors would certainly be credited as authors. It is on this note, as editors, that we acknowledge heartily all contributors to this book without whose efforts (singly or collaboratively) the book would not have been a reality.

There are also some hidden hands that passionately encouraged and supported the book project. In this category are the former Deputy Vice Chancellor (Academic), Prof. Gbemisola Oke, and the entire members of the Finance Committee of the Distance Learning Centre, University of Ibadan, for identifying with our vision. Prof. Segun Ajiboye, the Registrar/Chief Executive, Teacher Registration Council of Nigeria, although a co-chapter contributor, freely offered suggestions that helped to shape our vision in the course of the project. Similarly, Dr Deji Omole's goodwill was tremendous.

Also, our gratitude goes to Dr Kunle Odedokun and Solomon Olaniyan for providing editorial assistance. Special thanks to Prof. Andrew Okwilagwe and the staff of Stirling-Horden Publishers for working under pressure and the ability to promptly complete the publication within a very short time.

Specially, our indebtedness is to Prof. Bayo Okunade, the Director, Distance Learning Centre, University of Ibadan, for the great trust reposed in us to execute the project. This he freely displayed without any interference. Furthermore and tremendously too, our gratitude is to the Vice Chancellor, University of Ibadan, Prof. Idowu Olayinka, who passionately agreed to write the Foreword to this book.

Finally, we are indebted to our families for enduring our absence from homes during the course of collating and editing the articles in this book. To them, we offer our grateful thanks.

Foreword

It is a great privilege and honour for me to write the Foreword to this book, ***Contemporary Trends in Open and Distance Learning in Nigeria: The Ibadan Experience***. The preferment of this is hinged on three factors. One, this is the first time in the history of the University of Ibadan and unarguably in any university in Nigeria that a collection of essays in a book form is written in honour of a sitting Director of Distance Learning Centre; two, it is also the first book ever in Nigeria on Open and Distance Education, and three, the honouree of the book is an internal member of the University of Ibadan Governing Council which also makes the opportunity to write this Foreword a rare honour as the Vice Chancellor.

Distance Education generally is perceived in contemporary period as the education without boarder in which access is unlimited and mediated through technology. More often, however, this perception is encumbered with challenges of attitude which also, invariably, makes this learning platform not to be wholly accepted as it is in other climes. All over the globe, Open and Distance Learning is the way to go and not an alternative platform of learning. For me, this attitudinal mindset should give way to a wholesome acceptance of the reality of the 21st century education which is largely driven by technology. In fact, that is what Distance Education provides - not necessarily to open access. From the late 20th century to present, Open and Distance Education has metamorphosed from its amorphous and traditional face-to-face teaching and learning to what is referred to in literature as blended form of learning. The University of Ibadan in her usual and unequalled effort has again taken a lead in this light with her Distance Learning Centre ranking as the best in Nigeria.

Our interest in distance education in the University of Ibadan is a sustainable one that is driven by passion and commitment which is leveraged on the principle of parity of esteem. It is in this context that this book is conceptualised from my assessment of the thirty-four chapters to provide literature base for Open and Distance Learning in Nigeria using the Ibadan experience. The galaxy of scholars, the depths of the papers and the spread (locally and internationally) make the book epochal and a masterpiece in Open and Distance Learning. The avalanche of topics cover such issues as collaboration and partnership in Open and Distance Learning; evaluation; application of tests and measurement; building effective students' support base; Open and Distance Learning policy and practice; strategies of Open and Distance Learning delivery, and the question of access and emerging issues of globalisation, among others.

The uncommon feat as expounded in this book can only come from the University of Ibadan. I am sure, as a scientist, that this assertion is not only well-informed, but also evidence-based. This book, which is the first full-length material on Open and Distance Education in Nigeria, will, undoubtedly, provide conceptualisations and re-conceptualisations of the subject of Open and Distance Learning in Nigeria. The book has also sufficiently addressed the issue of quality assurance being one of the contending factors in open education globally. The value of the essays in the book is also well entrenched in the advocacy on the use of online collaborative tools in Open Distance Learning using web-surfing. It is, therefore, suffice to note that ODL as a platform of learning delivery cannot be effective without collaboration. This calls for evaluation of the platform and its policy. This will also require some deeper understanding of the entire concept than the unfounded assertions on the concept. The book provides this compelling viewpoint, not only as all-inclusive mode of learning delivery. I make bold, therefore, to advance that in Ibadan we are further challenged that our efforts are paying off

through this book. I am also convinced that through this book whatever remains of the ignorance of ODL in Nigeria should pale into oblivion. Furthermore, instead, community of scholars, policy makers and students should avail themselves of the education that this book provides. As noted by Prof. Dele Braimoh who unequivocally admonishes in his paper that we should conclude the struggle, I have come to the conclusion that from the papers assembled in this book, the struggle and thoughts on ODL, especially in Nigeria is still far to be concluded given what I have read in the essays in this book. This, notwithstanding, I do hope that the conjecture of knowledge on Open and Distance Learning which is thoughtful and professional as embedded in this book will benefit all.

In conclusion, I commend, heartily, the invaluable efforts of the editors of this book, Professors Oyesoji Aremu and Ayo Kehinde and Dr Femi Ayoola. When Prof. Oyesoji Aremu first contacted me on behalf of the Editorial Team on the need to write the Foreword, it was a total feeling of nostalgia given the person of Prof. Bayo Okunade, the personality on whom the Festschrift is dedicated. I sincerely commend the efforts of the editors for critical selection and editing of the essays in the book and for their invaluable decision to make the University celebrate Prof. Bayo Okunade in this special way.

In the same vein, I should, in a special way, commend all the contributors of the chapters in the book, many of whom are doyens of Open and Distance Education globally: Emeritus Prof. Olugbemiro Jegede, Profs. Dele Braimoh (from Pretoria, South Africa), J.B. Ayodele (Ekiti State University), Prof. Hassan Zoaka (Ahmadu Bello University, Zaria), Profs. M.O. Akintayo, J.O. Ajiboye, K. Ojokheta, Andrew Fadoju, Drs E.M. Ajala, Olayemi Abiodun-Oyebanji, Adebayo Oluwole, Adeleke Joshua, Afusat Busari, Kunle Odedokun, Olumide Olajide, J.O. Fehintola, M.O. Ogundokun, Dara Abimbade, Adetola Adeyemi, Yemisi Olaleye and Abiola Omokhabi (all of the University of Ibadan), and Motolani

Williams (Babcock University, Ilishan-Remo), Maruff Oladejo and Folashade Afolabi (both of the University of Lagos); Dr Kabir Fatima Sheu (Kaduna State University, Kaduna), Dr Babajide Oyadeyi, Ayodele Opateye and Muyiwa Akintola (National Open University, Abuja) and Dr Bidemi Oguntunde of Federal College of Education (Technical), Akoka, Lagos.

I am very sure that this book will constitute significant and important contributions to scholarship in the field and sub-fields of Open Distance Education. Therefore, it is recommended for use in colleges and universities in and outside Nigeria.

Prof. I. A. Idowu, FAS
Vice Chancellor
University of Ibadan, Ibadan.

Preface

Open and Distance Education is seen as a learning platform through which the challenge of access is not only curtailed, but the one that is basically in tandem with the global reality of Information Communications and Technology revolution. The 21st century global best practice in education is through technology which Open and Distance Education is substantially all about. This book is conceived and delivered to provide diverse but holistic education on Open and Distance Education in Nigeria. And with the rapid interest for the establishment of Distance Education centres in Nigeria which the National Universities Commission through its directorate on Distance Learning try to scientifically regulate, there is the need to provide a scientific and home-grown discourse on the subject. This book provides that opportunity.

True, the argument has always been how do we key into the best global practice on Open and Distance Learning (ODL) delivery given the divergent views and limitations in Africa. This argument raises some fundamental issues bordering on the format (whole ODL or blended ODL), quality and its appraisal, courseware development, parity of esteem, appropriate thereoretical framework, technology and its variability, and the big one, the attitude which is behavioural, among others.

It is in view of the foregoing that this book is also designed to provide a strong and scientific literature-base through which those issues and others are presented within our local (Nigeria) perspectives by the major players in the field represented, among other erudites like Olugbemiro Jegede, Dele Braimoh, Olamide Adesina, Suleiman Ramon-Yussuf, Zoaka Hassan and many others. Our strong contention on the galaxy of the contributions is borne out of the fact that the players are desirous of the best for the practice of ODL in Nigeria in spite of the limitations. It is,

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Contents

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Introduction

This study aimed at investigating open and distance learning (ODL) students' perception of cognitive processes existence in pen-on-paper (POP) examination questions focusing on National Open University of Nigeria (NOUN). A descriptive survey was utilised as research design on NOUN 300 and 400 level undergraduates in south-west Nigeria that served as population. Multi-stage and simple random sampling techniques were used to select 600 students sampled for the study. Four research questions guided the study. Cognitive process questionnaire (CPQ) was used as the only instrument to gather data for the study. The reliability coefficient of the instrument was 0.83, using Cronbach Alpha. Frequency counts, percentages, mean and chart statistics were

used to analyse the data collected. Results showed that pen-on-paper questions set for NOUN students were of low cognitive process of knowledge and comprehension items more than higher cognitive process items. POP questions generated for 300 level undergraduates were more of higher level cognitive process in analysis, synthesis and evaluation. Schools of Arts and Social Sciences, Management Sciences and Science and Technology POP questions were more of low cognitive process than schools of Law and Education. Consequently, NOUN lecturers should be given more training in the form of workshops to expose them to various levels of cognitive processes on which their question items should be based. Since most of the 400 level NOUN students used in the study are in the final year, question items generated for them should be of higher cognitive processes in order to apply their knowledge to solving individual and societal problems after graduation.

Open and distance learning is an educational system in which teacher and learner operate at a distance. In other words, it is a method of indirect instruction through print or electronic communication media to learners who engage in a formal or organised learning in a separate place or time different from that of instructor. It is a systematically organised form of self-study which provides opportunities for those who could not attend conventional university due to one reason or the other. It creates a forum for them to achieve their heart desires of furthering their education, either for the purpose of certification or acquisition of knowledge for self-development. Either in conventional university or ODL, assessment of students is of paramount importance. This is not only for grading but also for monitoring students' progress academically and for finding out whether the set objectives have been achieved. Nitko (1996) defined assessment as "a process for obtaining information that is used for making decision about students, curricula and programmes, and educational policies. According to Aderinoye and Ojekheta

(2004), assessment is the process of gathering and collecting information from multiple and diverse sources in order to develop deep understanding of what students know, understand and can do with their knowledge as a result of educational experiences. Therefore, assessment process involves generating and analysing comprehensive information about teaching and learning process, and providing feedback based on which a value judgment could be made.

For effective teaching to take place in the classroom, teachers need to monitor their students' learning through assessment to ensure that there is correlation between what they are expected to learn and what they actually learnt, judging from set criteria. Such close monitoring of learning can only be done when valid and reliable feedback is given to the teacher through the use of good assessment tools. Quality assessment of learning outcomes helps teachers to take some decisions such as whether learning is taking place or not and to determine the effectiveness of the adopted teaching methods. Assessment of students in general comes in different forms which include writing tests, giving assignments, projects, observation, through anecdotal records, taking examinations and many more. Taking the end-of-term/ semester/season examinations is a form of assessment that is more common and accorded more importance in schools. Sim, Holifield and Brown (2004) identified more than 50 varied techniques used within higher education for assessment purposes. The most commonly used, according to the source, is examination. Most times, this takes place in a predetermined time and place which gives the examinees armple opportunity to prepare ahead of the examination. There are various examination methods used in higher education institutions to assess academic progress, such as paper-pencil-based examinations, computer-based tests, presentations and many more. Paper and pencil form of examination is a form of examination in which printed question

papers are given to students to answer in a designated centre at a particular time under a well-structured and monitored condition.

The rapid advancement of information and communications technologies (ICT) in teaching and learning has shifted the paradigm (Uysal & Kuzu, 2009) from paper-pencil-based to computer-based system of examinations. Computer-based examinations are the form of assessment in which the computer is an integral part of question papers' delivery, response storage, marking of responses or reporting of results from a test or exercise (Whittington, Bull & Danson, 2000). Computer-Based Assessment (CBA) also known as Computer-Based Testing (CBT), e-assessment or computerised testing is a method of administering tests and examinations in which responses are electronically recorded and assessed. As the name implies, it makes use of computers or equivalent electronic devices feature more prominently. It may be a stand-alone system or a part of a virtual learning environment, possibly accessed through the "World Wide Web". CBT is not just about taking an examination on a computer; it also involves changes in the way examinations are scheduled, designed, conducted, monitored and evaluated. The candidate downloads the test paper on a scheduled date at a particular time and answers it usually at a secure test centre.

Whichever form of examination adopted, there is always involvement of cognitive processes. This is the involvement of mental ability in attempting examination questions. Cognitive process can be said to be the mental process which a learner goes through for learning to take place. **The definition of cognitive process is the performance of a cognitive activity or a processing and movement that affects the mental contents of a person, such as the process of thinking or the cognitive operation of remembering something.** The first step in the cognitive learning process is attention. In order to begin learning, students must pay attention to what they are experiencing. Educational psychologists have come to the conclusion that the

average person can hold approximately two or three learned tasks in their attention at the same time.

By paying attention, one tends to acquire information and this will be stored in memory. According to psychologists, there are three levels of memory through which information must travel to be truly learnt. When first received, the information will be in sensory register. In sensory memory, information is gathered via the senses through a process called transduction. Through receptor cell activity, it is altered into a form of information that the brain could process. These memories, usually unconscious, last for a very short amount of time, ranging up to three seconds. Human senses are constantly bombarded with large amounts of information. Human sensory memory acts as a filter, by focusing on what is important and forgetting what is unnecessary. Sensory information catches people's attention and thus progresses into working memory, only if it is seen as relevant or familiar. If someone pays attention and rereads a sentence, however, that information will move from the sensory register into short-term memory which was redefined as working memory by Baddeley.

The original working memory model (Baddeley & Hitch, 1974) consists of three components: executive control system, phonological loop and visuopatial sketchpad. The central executive control system, which is considered as the most important component, oversees all activities of working memory. This includes selection of information, processing method, giving meaning and deciding whether to transfer it to the long-term memory or discard it. This is used to ensure that the working memory resources are directed and used appropriately to achieve the set goals. There are also two temporary storage systems: phonological loop which is used for holding speech-based information and visuospatial sketchpad for holding visual and spatial information. These two storage mechanisms are regarded as 'slave subsystems' because the only thing they do is to hold information in a relatively passive manner. Due to various

criticisms that led to the revision of the model, Baddeley came up with the fourth components known as 'episodic buffer' (Baddeley, 2000). This new component of working memory provides a number of important new features: first, a link to long-term memory; second, a way of integrating information from all of the other systems into a unified experience; and third, a small amount of extra storage capacity that does not depend on the perceptual nature of the input.

Sensory memories transferred into working memory will last for 15-20 seconds, with a capacity for 5-9 pieces or chunks of information. Information is maintained in working memory through repetition or elaborative rehearsal, that is, organisation of information. This area of human memory will hold information anywhere from 20 seconds up to a minute. If one rehearses the information, such as repeating it to oneself, taking notes or studying it, it has the chance to move to one's long-term memory. This area will hold information indefinitely and has an unlimited capacity. Long-term memory includes various types of information: declarative (semantic and episodic), procedural (how to do something) and imagery (mental images). As opposed to the previous memory constructs, long-term memory has unlimited space. The crucial factor of long-term memory is how well organised the information is. This is affected by proper encoding (elaboration processes in transferring to long-term memory) and retrieval processes (scanning memory for the information and transferring into working memory so that it could be used). After receiving the information, the next thing is to arrange it in a proper way that will ease recalling of the information, the process known as encoding. Last in the process is retrieval of the information which goes hand-in-hand with encoding by simply reversing the process of encoding.

Cognitive processes in students' learning are based on theoretical framework of social cognitive theory that considered three variables: behavioural, environmental (extrinsic) and personal (intrinsic) factors and propounded by Pajares (2000).

criticisms that led to the revision of the model, Baddeley came up with the fourth components known as 'episodic buffer' (Baddeley, 2000). This new component of working memory provides a number of important new features: first, a link to long-term memory; second, a way of integrating information from all of the other systems into a unified experience; and third, a small amount of extra storage capacity that does not depend on the perceptual nature of the input.

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These three variables in social cognitive theory are said to be interrelated with one another, causing learning to occur. An individual's personal experience can converge on the behavioural determinants and the environmental factors. Pajares (2000) showed the interrelationships among these three variables thus:

Behaviour

PERSONAL FACTORS
(Cognitive, affective,
biological) $\Longleftrightarrow$ ENVIRONMENTAL
FACTORS
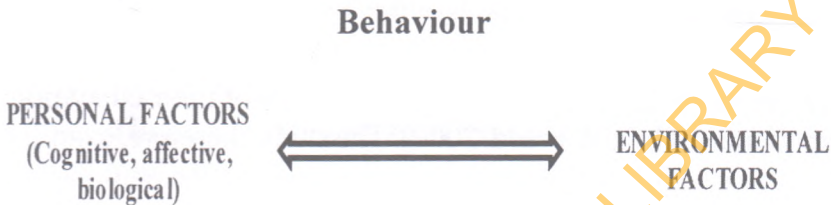
In the person-environment interaction, human beliefs, ideas and cognitive competencies are modified by external factors such as a supportive parent, stressful environment or a hot climate. In the person-behaviour interaction, the cognitive processes of a person affect his or her behaviour. In the same way, performance of such behaviour can modify the way he or she thinks. Lastly, the environment-behaviour interaction, external factors, can alter the way a person displays the behaviour. Also, one's behaviour can affect and modify one's environment. This model clearly implies that for effective and positive learning to occur, an individual should have positive personal characteristics, exhibit appropriate behaviour and stay in a supportive environment. In addition, social cognitive theory states that new experiences are to be evaluated by the learner by means of analysing his or her past experiences with the same determinants. Learning, therefore, is a result of a thorough evaluation of the present experience versus the past.

Cognitive process achievement is measured using Bloom's cognitive taxonomy of six objective levels which are knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, Engelhart, Furst, Hill & Krathwohl, 1956). The first two levels are termed as low, while the remaining four are considered

to be high. The test items generated for students assessment, especially in essay (pen-on-paper), are to reflect these levels in order to really ascertain the achievement of the learners whether at low educational level (nursery and primary), medium (secondary) or tertiary (polytechnic, colleges of education and universities). Assessment is the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand and can do with their knowledge as a result of their educational experiences (Huba & Freed, 2000). The study, therefore, examined how these cognitive processes were measured in the pen-on-paper test items given during semester examinations as perceived by NOUN undergraduate students.

Research Questions

(1) What is the perception of Open and Distance Learning students on pen-on-paper examination question cognitive processes adopted to assess learning achievement?

(2) To what extent do cognitive processes exist in pen-on-paper examination questions as perceived by ODL students?

(3) How do ODL students perceive cognitive processes in questions generated for pen-on-paper examination considering programme of studies?

(4) How do ODL students' educational levels influence their perceived cognitive processes existence in pen-on-paper examination questions?

Methodology

The study hinged on descriptive survey research design. The population for the study comprised all 300 and 400 levels of National Open University of Nigeria (NOUN) students in South West Nigeria. In order to select the sample, multi-stage and simple random sampling techniques were employed. There are six states in South West Geopolitical Zone out of which four states: Lagos,

Ekiti, Osun and Oyo were randomly selected. From each of the selected states, one study centre was selected to form the four centres used for the study. 300 and 400 levels NOUN undergraduates were selected through simple random sampling technique from each of the centres. Therefore, 600 NOUN 300 and 400 students were used as sample for the study.

The instrument used to gather data was Cognitive Processes Questionnaire (CPQ) that was constructed by the researchers. The items of the instrument were scrutinised by experts from the Institute of Education, University of Ibadan whose comments were used to modify and improve the quality of the items. The instrument was subjected to pilot testing on NOUN undergraduates from McCarthy Study Centre after which the internal consistency of 0.83 was obtained using Cronbach Alpha. There are two sections in the instrument: Section A elicited background information: gender, marital status, employment status, study centre, school and educational level, while Section B had 18 items measuring different six cognitive processes of Bloom's taxonomy. Three each of these items measured one cognitive process. Students were to respond to each item on four modified Likert scale of 'To a great extent (4), To a certain extent (3), To rarely extent (2) and Not at all (1). The distribution of the items and the cognitive process each of the items measured were as shown in Table 1.

Table 1: Distribution of items and cognitive process measured

Items	Cognitive Process Measured
1, 2, 16	Knowledge
3, 5, 9	Comprehension
6, 8, 10	Application
7, 11, 14	Analysis
4, 12, 17	Synthesis
13, 15, 18	Evaluation

The questionnaire was administered on the students during 2015/ 2016 First Semester Examination. The researchers visited each of the four centres and with the assistance of the Study Centre Directors to administer questionnaire on the selected 300 and 400 level students after the completion of their papers for that day. The data collection took two weeks. After the collection of completed copies of the questionnaire, the items of the instruments were scored and subjected to data analysis. Frequency counts, percentages, mean and chart were used as statistical tools for the analysis.

Results and Discussions

What is the perception of Open and Distance Learning students on pen-on-paper examination question cognitive processes adopted to assess learning achievement?

Table 2: Perception of pen-on-paper examination cognitive processes

Cognitive Processes Items	TGE(%)	TME(%)	TRE(%)	NAA(%)	Mean	StdD. evn.	Std. Error
1. Knowledge question related given assignments	195(32.5)	180(30.0)	90(15.0)	135(22.5)	2.73	1.141	.047
2. Questions that make appeal to the reproduction of facts	195(32.5)	210(35.0)	165(27.5)	30(5.0)	2.95*	.894	.036
3. Questions to explain events related to material taught	165(27.5)	270(45.0)	135(22.5)	30(5.0)	2.95*	.836	.034
4. Questions require the drawing of conclusion	30(5.0)	105(17.5)	255(42.5)	210(35.0)	1.92**	.849	.035
5. Questions that require the provision of examples	105(17.5)	180(30.0)	240(40.0)	75(12.5)	2.52	.922	.038
6. Questions that compare different concepts	75(12.5)	75(12.5)	255(42.5)	195(32.5)	2.05	.974	.040
7. Questions that require problem solving	60(10.0)	135(22.5)	255(42.5)	150(25.0)	2.17	.920	.038
8. Questions requiring the application of study materials learnt during the course	135(22.5)	210(35.0)	120(20.0)	135(22.5)	2.58	1.071	.044
9. Questions that focus on illustrating a procedure	90(15.0)	180(30.0)	225(37.5)	105(17.5)	2.43	.947	.039

10. Questions that require critical thinking	135(22.5)	285(47.5)	165(27.5)	15(2.50)	2.90*	.769	.031
11. Questions that require analysis	45(7.5)	120(20.0)	255(42.5)	180(30.0)	2.05	.894	.036
12. Questions that involve an overall view of the relationships between topics learnt	30(5.0)	105(17.5)	300(50.0)	165(27.5)	2.00	.807	.033
13. Questions that	-	75(12.5)	240(40.0)	285(47.5)	1.65**	.692	.028

Weighted Mean   **2.302**

* = Highly perceived items   ** = Least perceived items

From Table 1, highly perceived cognitive process items were: item 1 measuring knowledge ($\bar{X}$ =2.73), item 3 (=2.95) measuring comprehension, item 10 (=2.90) measuring analysis and item 16 (=2.88) measuring knowledge. The least perceived cognitive process items were: item 4 (=1.92) measuring synthesis, item 13 (=1.65) measuring evaluation, item 15 (=1.85) measuring evaluation and item 18 (=1.65) measuring evaluation. This implies that NOUN undergraduate students had high perception that questions set for pen-on-paper examination were of low cognitive processes of knowledge and comprehension items, while higher level cognitive processes of synthesis and evaluation were least perceived. The high perception of students recorded for low cognitive processes implies that most questions reflect list, mention, discuss and explain forms of questions but more tasking items like analyse, create, illustrate, assess and justify which measured higher levels cognitive process were not reflected in the questions.

To what extent do cognitive processes exist in pen-on-paper examination questions as perceived by ODL students?

Table 3: Extent of cognitive processes existence in pen-on-paper examination questions

Cognitive Processes	Mean	Std. Dev'n	Std. Error	Rank
Knowledge (K)	8.55	2.158	.088	1
Comprehension (C)	7.90	1.464	.060	2
Application (A)	7.52	2.111	.086	3
Analysis (A)	6.40	2.012	.082	4
Synthesis (S)	5.90	1.429	.058	5
Evaluation (E)	5.15	1.390	.057	6

The mean values in Table 3 represent the average of the scores for the three items that measured each of the cognitive processes. It is shown in the table that perceived mean of Knowledge was 8.55; Comprehension (7.90), Application (7.52), Analysis (6.40), Synthesis (5.90) and Evaluation (5.15). The knowledge questions were the most represented among the pen-on-paper items set for examination followed by comprehension, application, analysis and synthesis. Evaluation question items were least perceived by the students.

How do ODL students perceive cognitive processes in questions generated for pen-on-paper examination considering programme of studies?

Table 4: Students' perceived cognitive processes in pen-on-paper examination by school of studies

Cognitive Processes	SASS		SOE		SOL		SMS		SST	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
K	8.00	1.810	8.62	2.925	7.00	2.185	8.87	1.622	8.25	2.692
C	8.38	.699	7.37	1.735	5.87	.784	7.63	1.501	8.63	1.501
A	6.13	.931	8.63	1.501	9.37	1.004	7.63	2.405	7.87	2.325
A	6.37	2.004	7.37	1.941	7.50	1.230	5.50	1.506	6.88	2.724
S	6.37	1.501	5.63	1.116	6.00	1.230	5.38	1.735	6.12	1.274
E	5.25	1.485	5.38	.861	4.75	.972	4.63	1.806	5.75	1.304

Table 4 reveals how cognitive processes were reflected in pen-on-paper examinations according to the schools as perceived by the students. Students perceived that questions from School of Arts and Social Sciences were more of Comprehension (=8.38) and Knowledge (=8.00), while that of Education were more of Application (8.63) and Knowledge (=8.62). For school of Law, questions reflected more of Application (=9.37) and Analysis (=7.50) but for School of Management Sciences, examination questions contained more of Knowledge (=8.87) and Comprehension/Application (=7.63). School of Science and Technology examination questions were more of Comprehension(=8-63) and Knowledge (=8.25). Therefore, pen-on-paper question items from Schools of Arts and Social Sciences, Management Sciences and Science and Technology were more of low level cognitive processes of knowledge and

comprehension, while that of Schools of Law and Education were moderately of high cognitive processes. Lecturers that generate POP examination questions in the Schools of Arts, Management and Science and Technology were non-professional in teaching where measurement and evaluation are taught. They lack requisite knowledge and skills that could have assisted them in item generation that would span through all levels of cognitive processes. Conversely, although lecturers in School of Law also lack educational skills for examination item generation due to the argumentative nature, application of facts to present situation and its interpretation prompted the lecturers to ask for higher order thinking questions in pen-on-paper questions.

How do ODL students' educational levels influence their perceived cognitive processes existence in pen-on-paper examination questions?

Table 5: ODL educational levels and perceived cognitive processes in examination questions

Cognitive Processes	300 Level			400 Level		
	Mean	Std. Devn	Std Error	Mean	Std. Devn	Std Error
K	8.35	2.224	.128	8.75	2.074	.120
C	8.30	1.384	.080	7.50	1.434	.083
A	7.20	2.092	.121	7.85	2.084	.120
A	6.70	2.303	.133	6.10	1.612	.093
S	6.25	1.301	.075	5.55	1.463	.085
E	5.40	1.395	.081	4.90	1.340	.077

Figure 1: *Students' perceived cognitive processes pen-on-paper examination by level of studies*
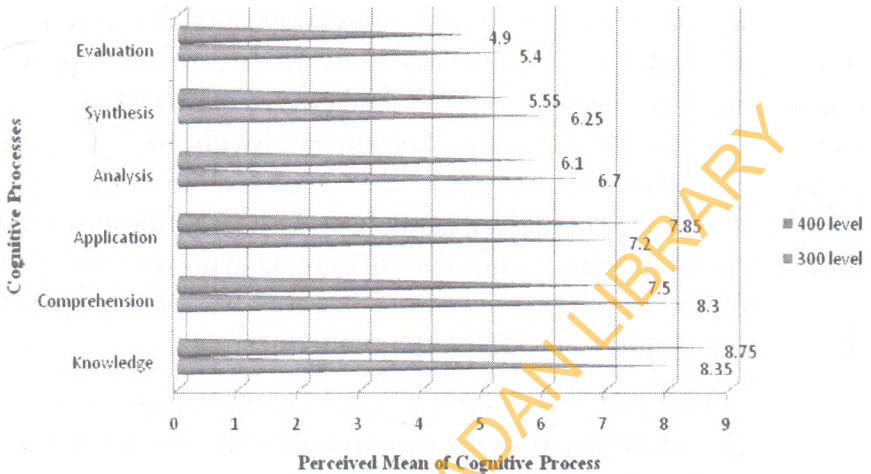
In Table 5 and Figure 1, questions set for 300 level undergraduates reflected perceived mean cognitive processes as Knowledge (= 8.35), Comprehension (= 8.30), Application(= 7.20), Analysis (= 6.70), Synthesis (= 6.25) and Evaluation (= 5.40). Also, perceived mean cognitive processes for questions generated for 400 level students were knowledge (= 8.75), comprehension (= 7.50), application(= 7.85), analysis (= 6.10), synthesis (= 5.55) and evaluation (= 4.90). It could be inferred that both 300 and 400 level NOUN undergraduates perceived that pen-on-paper questions generated during the POP examinations were more of knowledge, comprehension and application, although 400 level undergraduates considered their questions as more of low level than their 300 level counterparts. This is due to the fact that 300 level students perceived idea.

Conclusion

Measurement of cognitive processes, using learning objectives of Bloom's taxonomy, is vital to quality assessment given to learners at university level. Open and distance learning students

in National Open University are often exposed to both e-examination for those in 100-200 level students and pen-on-paper examination questions for those in 300 level and above. The aim of administering pen-on-paper examination questions is to develop higher critical thinking, application and appreciation of knowledge gained to solve personal and societal challenges. The study examined the perception of NOUN students on how cognitive processes were reflected in their pen-on-paper examination questions. Students perceived that pen-on-paper questions given during semester examinations were of low cognitive process and that 300 level perception of higher cognitive processes in their examination questions were more of low cognitive process. Schools of Management, Arts and Social Sciences and Science and Technology questions were more of low cognitive process. Consideration of cognitive process when generating pen-on-paper question items for undergraduates would make the students to develop comprehensively not in regurgitating the facts learnt but concretely applying them for the benefits of the society at large. Using a variety of assessment methods to test, flexible module and programme learning outcomes (cognitive processes) are ways to ensure that we put the focus on what students can do after their degrees.

Recommendations

Following the findings of this study, the recommendations are made thus:

(a) NOUN lecturers should be given more training in the form of workshops to expose them to various levels of cognitive processes on which their question items should be based.

(b) Since most of the 400 level NOUN students used in the study are in the final year, question items generated for them should be of higher cognitive processes in order to apply their knowledge to solve individual and societal problems after graduation.

(c) Question items given to Law and Science and Technology students should be more of application, analysis and synthesis cognitive processes for them to be able to practise effectively their chosen professions after graduation.

(d) Each Head of Department in NOUN should put in place mechanisms to moderate pen-on-paper questions to be administered to students to ensure that the items are of high cognitive standard before administering such questions to the students.

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This book is conceived and delivered to provide diverse but holistic education on Open and Distance Education in Nigeria. This book provides a scientific and home-grown discourse on Open and Distance Education in Nigeria. This book, loaded with vital information, provides a strong and scientific literature base, emphasising the observance of best global practice on Open and Distance Learning (ODL). It is, therefore, anticipated that the book would not only serve as a scientific reference for scholars, policy makers, ODL learners and the general reading public, but also the first ODL-compendium in Nigeria written in honour of a former Director of a Distance Learning Centre in Nigeria.

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