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*THE INFRANGIBLE NATURE OF KNOWLEDGE:  
THE NEED FOR RESEARCHERS TO BE  
MULTIPOTENTIALITES*

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## **THE INFRANGIBLE NATURE OF KNOWLEDGE: THE NEED FOR RESEARCHERS TO BE MULTIPOTENTIALITES**

### **SYNOPSIS**

*Placing my present engagements within the viewpoint of my understanding of my task as a researcher, I began and concluded with the assertion that knowledge exists as an infrangible whole. I also affirmed that every researcher must be a multipotentialite—a philosopher, a historian, a communication specialist, an ICT enthusiast, a salesperson, a mentor, among others. Although, as researchers, we frequently approach understanding the world through the lenses of our various areas of specialisation. I argued that while specialisation may be good, it no doubt has its inherent weaknesses, especially when researchers approach the world's challenges solely from the orientation of their specializations. The argument in this lecture is that research is a universal language and that we, as researchers, only speak various dialects of the same language; thus, for anyone to be a better researcher, he or she must be a multipotentialite, i.e., an individual that would have universal, broad-based expertise as their areas of specialisation. And that in every research project, the researcher must be able to make use of skills from other areas of knowledge in addressing world research problems. This lecture, then attempted to take us through my sojourn into the world of academics as I attempted to provide a digest of my research activities to emphasise that knowledge is infrangible.*

## **PROTOCOL**

The Vice-Chancellor

Deputy Vice-Chancellor, Administration

Deputy Vice-Chancellor, Academic

Principal Officers of the University

Provost, Deans, and Directors

Heads of Departments

Distinguished Professors,

Esteemed members of the academic and non-teaching staff of GSU,

Dear friends and guests,

Great Students of GSU

Members of the Press

Respectfully, Ladies and Gentlemen

## **INTRODUCTORY REMARKS**

Mr Vice-Chancellor, Sir, I am very grateful for this historic opportunity to speak to the university community and the public about my research life and concerns as a teacher and a researcher at the Gombe State University for the past 17 years. History indeed was made in this great institution on Thursday, January 27, 2022, when Prof. Ibrahim Waziri Abubakar- a historian- delivered the first inaugural lecture. History is also being made today, **Thursday 15th December 2022**, when the first professorial inaugural lecture of the Faculty of Education and the second in the University is being delivered by my humble self.

I have always considered myself very fortunate concerning history and historians. Mr Chairman Sir, let me mention that I had always been a foundation staff member in almost all the places I had worked before my appointment at Gombe State University. I do not know if it is a conspiracy of history that I am also one of the pioneer staff of this institution. What is more, I had to work very closely with historians, especially the first Vice-Chancellor, Prof. Abdullahi Mahadi. Although, this lecture is not about history, however, history

will play a role in its development. In the attempt to take us through what my research activities and concerns have been as well as my contributions to knowledge, history definitely must play a role.

Over the years, I have realised that researchers are expected to be guided by their areas of specialisation. However, I also realised that my research activities were frequently influenced not only by my area(s) of specialisation but also by the type of person I am - a multipotentialite. Who is a multipotentialite? According to Wapnick, (2015),

*“a multipotentialite is someone with many interests and creative pursuits. It stems from the word multipotentiality—a psychological and educational term used to describe people who display aptitudes across multiple disciplines”:*

this, I believe, is a good description of who I am, especially regarding my research interests. As an example, when asked what my area of specialisation is, I frequently prefer to be asked what my areas of interest are. This is because, as a multipotentialite, I have a couple of research interests and concerns, including teacher education, science education, environmental education, educational and counselling psychology, educational evaluation, ICT applications in education and research, history, languages, and religion.

These various areas of interest have influenced my research activities. I have often been guided (and equally restricted) by the expectations that research activities in academics must be based on one's areas of specialization, however, this requirement is often not compatible with the nature of multipotentialites.

Mr Chairman Sir, now that I have laid the groundwork for understanding my academic and research activities, allow me to take this audience through my academic research works and

contributions to knowledge, and, of course, in doing so, I must put on the hat of a researcher as a historian.

### **THE GENESIS OF MY SOJOURN IN THE ACADEMIC WORLD**

My academic life started when I gained admission into the prestigious University of Lagos in 1987 immediately after my secondary school education for my undergraduate programme in Chemistry Education. I need to mention that I never for once had it in mind to study education. But then I have no iota of regrets about the choice that Prof (then Dr) Duro Ajeyalemi made for me to study Chemistry Education.

Late Prof Ajeyalemi was a good friend of my father. When I was to gain admission to the university, I was taken to him for counselling and he asked what I would like to be in the future, my reply (based on the true nature of my being a multipotentialite) was that I would love to be a medical doctor (like every other science student), I also loved to be an accountant (like my father), I loved chemical engineering, and I would not mind being a pharmacist as well. After allowing me to say all that I thought I wanted to become, Prof Ajeyalemi simply looked into my eyes and responded “chemistry education would be good for you”. I did not ask him, then the reasons for his choice for me and now looking back, I fully agree that for a young, curious mind like mine that intended to go into many professions at the same time, chemistry education was indeed good for me.

When I was writing my final year research project, it was the same Prof Ajeyalemi that was my supervisor, on seeing him for the topic I wanted to work on, he requested to know what the problem that I was interested in addressing was. He then warned me not to take upon myself all the problems of this world (referring to my nature as one that was interested in many things). I remember simply



informing him that I (and my partner) was interested in finding out why undergraduates were not interested in teaching as a career.

This led to my very first research project titled “An investigation into the factors inhibiting undergraduate students of three Nigerian Universities from choosing teaching as a profession” (Adepoju & Lawal, 1991). This research work was in the realm of guidance and counselling and one major finding of the study which still holds to date is that, among others, the condition of service of teachers was a great factor hindering capable, qualified and willing individuals from choosing teaching as a profession. What we observed back then was that if the conditions of service were right, almost every university graduate would want to go into teaching as a profession. Mr Vice Chancellor Sir, it is unfortunate that up till now, the conditions of service for teachers are very poor and thus, most university graduates would not want to go into teaching as a profession.

At the master's degree level, my interest had shifted to an attempt to have an insight into the types of errors committed by secondary school students in chemistry and why they do so. This research interest was driven by a couple of factors, not just the need to be a specialist. First, I was a secondary school teacher at the time that I enrolled for my M.Ed. Programme. By that time, I had fallen in love with teaching and had a strong passion for chemistry, secondly, two of my lecturers then - the Late Prof (then Dr) Bayelo who taught me a course in curriculum evaluation and another course in Test Development and Late Prof (then Dr) Temi Busari - that taught a course in test development in chemistry both of them made a lasting impression on my curious mind. Little did I know then that I had started my specialisation in the world of educational research and evaluation.

Thus, my M.Ed. dissertation was titled "a diagnostic evaluation of the operational and conceptual errors of secondary school students in energetics" (Adepoju, 1995). One major finding of the study was that the sources of errors in students' learning are wide and varied, among which are teachers, textbooks, and prior experiences of learners, among others. One interesting finding of the study, which had greatly influenced my teaching to date is that oftentimes, conceptual errors set in when the prior knowledge and experiences of the learners are faulty. As an example, in the study, SS 2 Chemistry students in Lagos State public secondary schools were asked questions such as what does it mean when the value of  $\Delta G$  is negative, in some other questions, students were provided with some details and asked to compute the  $\Delta G$  value.

Let me provide a little background to understand this. In Chemistry, we teach that the decisive factors for the spontaneity of a reaction are the enthalpy and entropy changes that occur in the system and that the free energy change of a reaction is a mathematical combination of the enthalpy change and the entropy change and that this is represented mathematically as

$$\Delta G = \Delta H - T\Delta S$$

We also teach that a reaction is spontaneous (that is, it occurs without the addition of external energy) when the value of  $\Delta G$  is negative.

What we observed in the study is that due to the general misconception of the value of negative as "bad", "poor", "impossible" etc., most students although perceived rightly that the spontaneity of a reaction is related to the value of  $\Delta G$ , but then wrongly conceived this based on their faulty perceptions of "negative" and thus many claimed that a reaction was spontaneous when the value of  $\Delta G$  is positive simply because of the wrong perception that positive value implies "good". Of course, this has

obvious implications for the teaching of chemistry and the need for teachers to be involved in "diagnostic evaluation" was emphasised.

Upon the completion of my master's degree programme at the University of Lagos, my supervisor, the Late Prof (Mrs.) Temi Busari recommended that due to my interest in evaluation, I should proceed to the Institute of Education of the Premier University of Ibadan for my PhD programme. The great Institute of Education at the University of Ibadan runs only postgraduate programmes in educational evaluation. The model of the PhD programme of the Institute of Education at the University of Ibadan was very compatible with my nature as a multipotentialite.

The approach was a piecemeal style of studying and understanding research and evaluation and involved a sort of understanding of what I prefer to call "research without borders". The exposures at the Institute of Education, I can say, awaken the realisation in me that I must tackle academic problems as a researcher that understands several dialects of the language of research, and not necessarily as a specialist that understands only a dialect of the language of research.

One area of study that I became very interested in at the Institute was programme evaluation. It is an aspect of evaluation that suits my nature as a multipotentialite. In programme evaluation, one applies knowledge of research and evaluation to evaluate a programme. To evaluate a programme, one must understand the programme and the programme must not necessarily have to be strictly an educational programme (and the truth, after all, is that every programme can be regarded as an educational programme!).

My PhD thesis was thus prompted by this interest in programme evaluation in addition to the fact that, before my enrollment at Ibadan, I had got myself involved with the activities of the Nigerian Conservation Foundation (NCF). This thus gave birth to the choice

of “Evaluation of the school conservation club programme of the Nigerian Conservation Foundation (NCF)” as my PhD thesis (Adepoju, 2003). Among others, the study revealed that the School Conservation Club Programme, which I evaluated had a significant influence on students’ environmental knowledge, environmental attitude and environmental habits. The study further indicated that teacher factors, student factors and school factors in various ways influence the extent to which the School Conservation Club Program had its impact. One major finding of the study was that school clubs and their activities have a significant effect in reinforcing learning and thus must be encouraged. The study further informs that the success of such clubs had much to do with the quality variables of the teachers.

## **RESEARCHERS AS MULTIPOTENTIALITES**

As could be observed from my initial research works, my research interests started from the field of counselling to science education and then programme evaluation. All these reflect the multipotentiality in me and no doubt also served as the foundation for building my research interests and capacity.

Mr Chairman Sir, one point I need to emphasise in this lecture is that research by its inherent nature demands that the researcher must be a multipotentialite. Being a specialist is good, but whatever the area of one's specialisation, as a good researcher, one must have to wear the caps of other disciplines. To illustrate this point, may I make use of the components of research reports in education: every research report in the field of education (and of course in the social sciences) usually has five chapters. This can be labelled as the five-chapter syndrome.

In Education, Chapter 1 of the research report is always called the “background to the study”, and Chapter 2 is traditionally devoted to reviewing the relevant literature. In Chapter 3, the methodology is

discussed. Chapter 4 focuses attention on the results and discussion of results, while in Chapter 5, the research report provides a summary of the major findings and makes recommendations based on the findings of the study. We shall see that to successfully address the demands of each of these components in our research activities, the researcher must be an all-in-one specialist to meaningfully and successfully carry out the daunting tasks of designing, conducting and reporting his research findings. Let us take a look at some of these specialist roles that the researcher must take upon himself.

### **The Researcher as a Philosopher**

There is no doubt that philosophy is the mother of all disciplines (Trueblood, 1963) and that “philosophy serves other disciplines because it provides the base from which other disciplines emanated” (Nweke & Uyanwune, 2020). Little wonder then, that despite the various myriad of disciplines and areas of specialisations existing today, all fields of human endeavours end up converging back to the mother discipline - philosophy. It is thus not surprising that all over the world, the highest degree is the doctor of philosophy (PhD). This also simply reinforces the fact that knowledge is infrangible. Knowledge simply exists out there as knowledge and not as science, arts, humanities, and what have you.

Philosophy is one of the prime specialisation areas. As the mother of all disciplines, it only amounts to stating the obvious that every researcher is a philosopher. As a philosopher, the researcher would need to reason on the worthiness of the research he is about to conduct and about the procedure(s) to be followed. Philosophy would no doubt among others, help the researcher in developing the background of the study.

Let us take a look at chapter one of the research report in education which often has the title background to the study. You may wish to agree with me that the background of every study is an

argumentative essay that attempts to justify that a problem worth studying exists. For the researcher to adequately provide a convincing background to his study, then he must heavily rely on philosophy, especially using logic (which is a branch of philosophy) in coming up with a good logical argument that is convincing enough. In essence, to do this successfully, the researcher must be a philosopher.

### **Researcher as a Historian**

To effectively come up with a good background to the study and a good review of related literature in research, besides from relying on philosophy, the researcher must of necessity put on his cap as a historian. If we take history as the study and the documentation of the past (Munslow, 2001) then, there is no way you will be reviewing the literature - what others have done before and related to your present research problems - without relying on history. And of course, the historical research into historical documents of related literature is also very critical in coming up with very good backgrounds. As it were, we surely see the vital role that history plays in chapters one and two of the research reports in education.

That is not all, in Chapter 3, which is the methodology, the researcher needs competency in history to be able to discern from the literature search the approach(es) that previous researchers had used concerning instrumentation, data collection strategies, and of course, data analysis. History also plays a crucial role in the discussion section of Chapter 4. The researcher must of necessity compare the results of his present findings with previous studies (this calls for little aspects of history as well).

### **The Researcher as a Language and Communication Expert**

There is no doubt that skills in using the language of expression are very crucial to research communication. Although there are

language specialists who can provide help to researchers to better communicate their research findings, the truth is that the researcher himself would need to put on his cap as a communication specialist to communicate his thoughts clearly and this entails cautious and conscious use of words to enhance clarity. A good researcher must have to be a wordsmith, as according to the Cambridge Dictionary (2022), a wordsmith is a “person who has skill with using words, especially in writing”. Is this not who a researcher is expected to be and must be?

### **The Researcher as a Statistics Enthusiast**

The science of statistics cannot be ignored by any researcher, this is obvious since statistics plays a significant role in “designing research, analysing its data and drawing conclusions therefrom” (UCI Department of Statistics, 2019). What this implies is that right from the conception of the problem, the researcher would need to think like a statistician, he needs to start envisaging what type of data would be collected, how they would be collected and analysed and of course, he would need to start to envisage how the result would look like and how they would be presented, concerning the research report. The researcher must think like a statistics specialist concerning Chapters 3 and 4 of the research report. Without being able to speak (to a fair extent) the dialect of statistics, the researcher is fairly handicapped.

### **The Researcher as an ICT User**

The research process is a very rigorous one. However, to ease the series of tedious and rigorous steps, the use of ICT is imperative. All of the stages of research from conception to implementation and dissemination can be made easier, faster and better with the judicious use of ICT. The more a researcher can make use of ICT, the better the quality of the research output. There are several ICT tools that researchers can make use of, but from experience, I had come to realize that when it comes to the use of ICT in research, the only

limitation is one's imagination (Adepoju, 2020, 2021). My attempt in this lecture is not to teach how ICT can be used to ease the process of research, but to inform that to research better, every researcher must be an ICT user.

In my usage of ICT for research, I learned to leverage on a few technologies to aid my research activities. As an example, at the conception stage, I simply have to search the web for millions of published research articles from every corner of the world (and in the comfort of wherever I happen to find myself) by using a couple of search engines, databases and digital libraries such as Google Scholar, ResearchGate, and Microsoft Academic Search to explore the latest information in my area of interest. As I search the literature, I also use ICT tools for my literature tracking and reference compilation, the one I enjoy most is <https://www.mybib.com/>. With mybib.com, I do not need to be involved in committing to memory the unending rules of referencing styles involved in referencing, I simply hand over the task to mybib.com to compile my references.

As I do the writing component of my research, I want to be sure that I pay attention to basic errors in terms of spelling, punctuation and grammar, I need not be too bothered as I have tools such as Grammarly to simply be my language consultant and provide its proofreading check services. I also want to be sure that my work is free of plagiarism either knowingly or accidentally, I equally find a useful ally in Grammarly (the premium version) to do this for me.

My concern for the application of ICT in research made me tilt the content of the course ICT in Education for my PhD students at Gombe State University and Modibbo Adama University, towards ICT applications in research. To ease the teaching of this course, I produced a couple of videos to teach applications of ICT in research as [YouTube](#) videos (see



[https://www.youtube.com/channel/UCbBrjz-0XVYztjm42rEA\\_gA](https://www.youtube.com/channel/UCbBrjz-0XVYztjm42rEA_gA))

In essence, to research better, what is being advocated here is that every researcher must be an avid user of ICT for every facet of the research process, and researchers must be able to creatively use the wide array of ICT tools that are available to enhance the quality of the research process and products.

## **RESEARCHING INTO TEST ITEM DEVELOPMENT**

Mr Chairman Sir, may I at this point focus our attention on one aspect of the several areas of my research interests and activities which I think is worthy of attention.

### **Why we must refrain from the use of optional questions in our examinations**

In a study I conducted in 2012, I came to revalidate a common view among test developers: *optional questions must as much as possible be avoided in examinations by classroom teachers*. Every time that I had to discuss this, especially with my students, I always get negative reactions, but the findings of this study are those that I strongly wish should be implemented via a policy directive from the Nigeria Universities Commission (NUC).

The need for the study was borne out of the observation that traditionally, students during the end-of-semester examinations are provided with optional questions and have the liberty to choose to answer from a pool of questions set by the examiner. (In fact, this is even a prescription of the NUC). A search of the literature, however, reveals that there is no justifiable rationale for this practice. The Literature abounds with several factors against the use of optional questions in examinations (Gronlund, 1976, Hill, 1976, Thorndike and Hagen, 1977, Okpala, Onocha and Oyedeji, 1993, Onocha and Okpala, 1995, Reiner, Bothell, & Sudweeks, 2002, Sidhu, 2005,

Adepoju 2012, Aleem & Gore, 2019). For example, Gronlund (1976) emphatically asserted that "there is little to recommend the use of optional questions" while Okpala, Onocha and Oyedeji (1993) insistently maintained that "students should be made to attempt all questions" in teacher-made achievement essay tests. Adepoju (2012) further argued that the "overall result of students in any test involving the use of optional questions may be more of a reflection of the nature of the question combinations the students have chosen rather than the true reflections of students' learning achievements"

From a series of observations, I realize that items (questions) at the end of semester examinations were of different difficulty levels and that some questions tend to be more attractive to the students than others. Based on this, I was able to come up with the classification of questions in examinations into four:

Type 1: Difficult But Attractive (DBA)

Type 2: Easy But Unattractive (EBU)

Type 3: Easy and Attractive (EAA)

Type 4: Difficult And Unattractive (DAU)

In Adepoju (2012), I hypothesized that

*Based on the problems associated with the practice of setting optional questions in essay tests, and the fairly common practice of the use of optional questions at the end of semester university examinations, it is very likely that sometimes those who may be regarded as the high achievers based on their performance at the end of semester examinations might most likely be those who are skilled in identifying and responding to easy items irrespective of the attractiveness of such items... this may imply that high achieving students may most likely respond to Type 2 and 3 questions. In the same vein, students that may be regarded as low achievers based on performance may be those who might have responded to questions based on their attractiveness. Such students most likely would respond*

*to Type 1 and 3 questions. Then, Type 4 questions are most likely to be such questions that are usually not answered at all or attempted by very few students who most often would be those classified as low achievers, those Hills (1976) describes as being unfortunate to answer the wrong questions.*

In ascertaining the truth or otherwise of this view, the study, then investigated the patterns of choice of questions between high and low-achieving students when presented with optional questions at an end-of-semester examination as well as the relationship between undergraduate performance and the question combinations that they chose. The results revealed as hypothesised that generally, students tend to opt for questions with low difficulty and that high achieving students tend to choose question combinations that have lower difficulty levels and that students' overall performances in the examination tend to be related to their choice of questions.

The study opined that the performances of the students might have been different if all questions had been made compulsory. The study then recommended that "the use of optional questions in the university end-of-semester examinations should as much as possible be minimized to enhance the validity of scores obtained in such examinations".

If I were to be asked what I would have loved to alter in the study, I would quickly reply that the conclusion ought to have been the use of optional questions in the university end-of-semester examinations "**should be abolished**" instead of the recommendation that the use of optional questions at the end of semester examination "should as much as possible be minimized" as the study recommended.

To buttress my strong view, let me provide a few details from the study: the questions for the research were designed as an end of semester examination items for EDUC 101 (a first-semester 2-unit

course of Gombe State University, Faculty of Education). The examination questions were selected from the pools of questions previously administered by me as previous semester examination questions (for five years) and analyses of responses to them were carried out. Attempts were made to select questions that could be grouped into each of the four question types as earlier mentioned.

The choice and combination of the study were in such a manner as to meet the demands of the study (which was to expose students to the choice of question combination based on attractiveness and difficulty) and that of the university requirements of setting 5 questions out of which students were to respond to only 3 for a 2-credit unit course and that each question was to carry 20 marks. The whole examination score constituted 60% of the total score for the course.

To meet these requirements, the examination paper comprised two sections. Section A was a compulsory 10-item multiple-choice objective test that attracted a total of 20 marks (this served as one question). Section B comprised two parts, and each part comprised two questions. Students were required to answer a question from each of the two parts. In the end, every student would have answered three questions one of which was compulsory. Thus, the university requirements for a two-credit unit course were satisfied.

Concerning the demands of the research, the questions for the examination were selected from the pools of questions previously administered as previous semester examination questions and analyses of responses to them were carried out. Attempts were made to select questions that could be grouped into each of the following types: Section B comprised two parts, and each part comprised two questions. Students were required to answer a question from each of the two parts.

Following the Nigerian Universities Commission (NUC) and the university's baseline score of 40% as the pass mark (NUC, 1989), a question was classified as difficult if the mean score on the question was less than 40% while a question was judged as easy if the mean score on the question was at least 50% (questions whose mean scores were between 41% and 49% were not included for analyses, this was to ensure that a clear distinction existed between questions classified as easy and difficult). In addition, a question was classified as attractive, if at least 60% of the students responded to the question while a question was classified as unattractive if less than 50% of the students attempted the question. Table 1 gives the summary of the properties of each of the questions in the examination.

**Table 1: Summary of the property of each question in the EDUC 101 Examination**

Question No & Part	Mean Score	Proportion Of Respondents	Difficulty Level	Level of Attraction	Question Type	
PART 1	1A	36.2	86%	Difficult	Attractive	1
	1B	25.7	79%	Difficult	Attractive	
	2A	53.3	50.5%	Easy	Unattractive	2
	2B	55.7	52.1%	Easy	Unattractive	
	2C	57.2	56.9%	Easy	Unattractive	
PART 2	3A	51.2	89.1%	Easy	Attractive	3
	3B	52.0	77.3%	Easy	Attractive	
	4A	35.0	30.6%	Difficult	Unattractive	4
	4B	30.2	29.7%	Difficult	Unattractive	

These questions were selected to ensure that the possible question combinations would involve the decision to choose between an easy and a difficult question in each part. The possible question combinations are as thus: 1 & 3; 1 & 4; 2 & 3; and 2 & 4.

Now let us take a look at the pattern of the responses of students as presented in Table 2

**Table 2: Characteristics of the Questions in the Examination Based on Students' Grouping**

Question Characteristics	Students' Group	Question Combinations			
		1&3 DBA & EAA	1& 4 DBA & DAU	2 & 3 EBU &EAA	2 & 4 EBU & DAU
Difficulty	Low Achievers	18.5%	12.5%	20.2%	12.5%
	High Achievers	43.5%	0%	53.8%	42.5%
Attractiveness	Low Achievers	56.3%	1.4%	29.2%	10.4%
	High Achievers	46.8%	0.0%	46.8%	6.4%
Difficulty Ranking	Low Achievers	2	3	1	4
	High Achievers	2	4	1	3
Attractiveness Ranking	Low Achievers	1.5	0.0	1.5	3
	High Achievers	1	4	2	3

Table 2 reveals that question combination 1 & 3 was the most attractive to the students as 53.8% of the students chose this combination. This was followed by combinations 2 & 3 (37.9%), the combinations 2&4 (6.2%) and finally, combination 1&4 (2.1%). A very similar pattern is observed for the difficulty of the question combinations.

The Spearman-Brown Correlation between the attractiveness and difficulty ranking was computed; this yielded a value of 0.8. This thus implies that a strong positive correlation exists between the difficulty and attractiveness of the question combinations chosen by the students, that is, the least difficult questions are the most attractive ones. It could therefore be inferred that the students as a

whole are more likely to be attracted to question combinations that they are more likely to score higher in.

The attractiveness of the question combinations, however, appears to be significantly different between the high and low achievers. For example, those classified as high achievers found combinations 1 & 3 and 2 & 3 equally attractive while the combination 2 & 4 (a combination of two difficult questions) were completely unattractive to the upper group as 0.0% of them chose this combination.

The result further shows that the low-achieving students tend to have attempted more of the question combinations involving difficult questions when compared with the high-achieving students who often opt for the combinations of easy questions

What do all these imply? As we can observe from the results, generally the students did not find the questions in the examination to be of the same difficulty and attractiveness, we could also discern that the students were usually more attracted to the easier questions. There is no doubt then, that when presented with optional questions, students would often opt to answer the combinations of questions they perceive as easy.

We also observed that students who performed well in the examination often made choices of combinations of easy questions, while students who did not perform well had chosen a combination of difficult questions. Thus, to enhance the validity of the end-of-semester examinations of our universities, Mr Vice Chancellor Sir, I wish to strongly propose that based on the outcome of this study that students, should be made to answer all questions.

## **IMPROVING THE QUALITY OF ITEMS OF TEACHER-MADE TESTS**

I wish to also briefly outline my research activities in the area of the improvement of the quality of items of teacher-made tests. What caught my interest in this area has to do with the fact that teachers at all levels had failed to learn to set questions of high validity. This looks ridiculous for as someone once challenged me: what is the big deal in setting questions? But my research activities into the qualities of test items and qualities of questions set by teachers at all levels of the educational system in Nigeria made me realise that setting good questions is not as easy as it seems to be and that setting good questions requires knowledge, skills and expertise.

Mr Vice Chancellor Sir, may I present to this gathering, some of what we have come to discover concerning the way teachers set questions. First, let us please take a look at this English language question. "Write an essay on dog". The question seems so clear, and straightforward, but let us take a look at this picture!

### IS HE WRONG?



Then we ask, is this poor little boy wrong? Has he responded to the demands of the question as expected? I hope a point is made here.



Let us also take a look at these questions set by different teachers and taken from different subjects in different schools:

Who is the president of Nigeria? (Primary 6 Social Studies)

Where does the Vice-President of Nigeria come from? (JS1 Civic Education)

What do we do before we eat? (Primary 4 Home Economics)

What do we use to measure our body temperature? (JS 2 Basic Science)

At a glance, we may not see any problem with these test items, but let us consider sample answers to the questions and as we do, let us ask ourselves if the responses met up with the expectations of the questions as phrased.

Q: Who is the president of Nigeria?

Sample Answer: The president of Nigeria is an old man, a husband of one wife and an ex-military Head of State.

Q: Where does the Vice-President of Nigeria come from?

Sample Answers: The Vice president of Nigeria comes from

-“God”,

“Ijebu-Ode”,

“His parents”

Q: What do we do before we eat?

Sample Answers: “We wash our hands”;

“We pray”,

“We cook the food”,

“We sit down”

Q: What do we use to measure our body temperature?

Sample Answer: “We use the back of our hands to measure our body temperature”

We ask, is any of the answers wrong? What then could be the problem?

The simple answer that we realized is that specificity and unambiguity are two vital criteria that would enhance the quality of any question. We have attempted at various fora to enlighten teachers as to how the qualities of questions that we set as teachers can be enhanced especially as regards these two identified problems. Such fora include workshops for the Staff of the College of Education, Billiri, General Studies Directorate of Gombe State University, Faculty of Pharmaceutical Sciences of Gombe State University, the 2021 Examiners' Workshop of the Nursing & Midwifery Council of Nigeria and a couple of primary and secondary schools across a couple of States in Nigeria. To ensure that more teachers benefit from these pieces of training, I have created a couple of YouTube videos on this issue.

### **MY ACTIVITIES AS A MENTOR ACROSS DISCIPLINES**

A good researcher must be a good mentor. Having a research team is very important, and having to be a personal mentor to others is equally very vital. In addition, the mentees are expected to span across disciplines. This is one of the qualities I expect of multipotentialite researchers who must be "restless" in reaching beyond their areas of specialisation.

I have been very privileged to have several individuals within and outside of the Gombe State University and beyond my area of specialisation as my mentees in the art and science of research.

Mr Chairman Sir, may I just outline a few of those that I had mentored and provide a brief of what we had done together:

#### **Dr Sani Ahmed and Financing University Education**

Dr Sani Ahmed Yauta can be described as one of my success stories. Today, he is an associate professor of educational administration and the first Deputy Vice-Chancellor (Academic) of this great institution. I must say without mincing words that it has been my greatest delight to have started working with him right from his appointment

as a graduate assistant (through his PhD programme - of which I was his co-supervisor) up until now.

Although my background is in the area of science education and educational evaluation, in an attempt to be a good mentor, and as expected of researchers as a multipotentialite, I had to learn from my mentee, the dialect of educational administration (especially the subdialect of financing university education in Nigeria). This was necessary for me to be able to communicate the language of research with him and see him through his PhD Programme. This mentor-mentee relationship resulted in a couple of research outputs including international conferences.

### **Dr Kinge Fanny Ruth and Female Participation in Politics**

Dr Kinge Ruth is an associate professor of Political Science. She is always passionate about gender issues, especially female participation in politics. During her PhD, I was privileged to be her unassigned co-supervisor. It was an exciting experience for me to learn the language of political science from her for me to be able to make meaningful contributions to her thesis, especially as regards the development of the research tools, data collection and data analysis. In addition, to be able to contribute to her work and communicate meaningfully with her, I had to learn about Cameroon; its geographic and political structure since data collection was done in the South West Region of Cameroon.

The mentor-mentee relationship resulted in a study titled “Women Education and Political Participation in the South West Region of Cameroon: An Empirical Analysis” published in the Canadian Center of Science and Education journal: Public Administration Research. In the study, we (Kinge & Adepoju, 2014) examined the relationship between the level of formal education and the level of political participation of women in the South West region of Cameroon. In the study, we examined the indices of political

participation to include membership of a political party, voting in elections, occupation of a political post, means of occupation of political post and level of occupation of a political post. The results of the study showed that there existed a significant relationship between the level of political participation and the level of formal education of women in the South West region of Cameroon. The study thus recommended that the panacea to poor participation of women in politics is increasing their access to formal education.

Mr Chairman Sir, although I am not a Political Scientist but, because a researcher must be ready to be a multipotentialite and must be a mentor across disciplines, I had been able to make a little contribution in the area of Political Science. I dare to say that because of the study by Kinge & Adepoju, (2014), the recent cries and concerns of women's advocacy groups that are bothered about the low participation of women in occupying political posts in Nigeria (and other parts of Africa) should rather be more on increasing the access of women to formal education as a tool.

### **Dr Kingsley O. Anozieo and Eye Defect at FTHG**

Dr Anozieo is an Optometrist with the Ophthalmology Department at the Federal Teaching Hospital, Gombe (FTHG) and a part-time lecturer at the Medical College, Gombe State University. This mentor-mentee relationship (especially concerning putting an eye on the approach to the type of data to be collected, and how the data were to be analysed to address the focus of his research) had seen him through his MSc. In optometry at the University of Jos and also his Fellowship at the Nigerian College of Optometry. We are still working together even now on his present project on the prevalence of ametropia among patients of the ophthalmology Clinic between 2012 and 2021 at the FTHG.

Working with Dr Anozieo in the past ten years had been quite an interesting experience, especially since as a researcher, I had to delve

into an area that is out of my “comfort zone (so I initially assumed). But as I had often emphasised, "research is a universal language". So, all I needed to do was to allow Dr Kingsley Anozio to teach me the dialects of optometry for me to be able to assist him with the types of data to be collected and how they will be analysed.

## MY CONTRIBUTIONS IN THE AREA OF TEACHER EDUCATION

Although I might not be able to discuss my various contributions in all the areas that I had worked in, I will love to briefly outline some of my contributions in the area of teacher education. This area as we had seen, is my very first area of academic interest. I had made some contributions in this area. At every opportunity that I have had in academic fora, I had always lent my voice towards what I think teacher education should be. If I had presented this lecture some five years ago, the primary focus would have been on my ideals of what teacher education should be in Nigeria.

Because I have much to say in this aspect and because of the scope of this lecture, I guess the best way I can summarize my view is simply to provide a summary of my published works in the area of teacher education and then present a digest of all I had been trying to advocate for in restructuring teacher education programmes.

Table 3: summary of my published works in the area of teacher education

SN	TITLE	PUBLISHER/ JOURNAL	DATE	CATEGORY	CO-AUTHORS
1	Rethinking teacher education programmes in Nigeria in the 21st Century.	<i>Faculty of Education, University of Abuja</i>	2007	Conference Proceeding	Nil
2	Teaching practice in Teacher Education programmes of Nigerian Universities	<i>Faculty of Education, University of Maiduguri</i>	2007	Conference Proceeding	Mohammed A. S

3	A proposal for renewed teacher education programmes in Nigeria.	<i>Journal of Teacher Education, Adeyemi College of Education, Ondo</i>	2008	Journal	Nil
4	Towards the attainment of the Millennium Development Goal No 2: a proposal for a functioning teacher education programme in Nigeria	<i>International Research Review. Osun State University</i>	2009	Journal	Ahmed, S.
5	Perceived instructional needs of Early Childhood teachers and attainment of the millennium development goals	<i>African Journal of Allied Education Enugu State University of Science &amp; Tech.</i>	2009	Journal	Ahmed, S.
6	Development of Teacher Education In Nigeria: Projections Into The Future	<i>Spectrum Books Limited</i>	2014	Chapter in a Book	Ahmed, S.
7	Functioning Teacher Education and Graduate Teacher Employability in Nigeria: Lessons from Global Best Practices in Teaching and Teacher Education	<i>Department of Educational Management, University of Ibadan</i>	2014	Chapter in a Book	Nil
8	An overview of education in Sri Lanka and Nigeria	<i>Samanala Education Centre, Sri Lanka &amp; Gombe State University</i>	2014	Chapter in a Book	Ahmed, S.
9	Enhancing teacher education for improved national security and development in Nigeria.	<i>Journal of Topical Educational Issues</i>	2016	Journal	Danjuma S. I
10	The interplay between Tai Solarin's education for self-reliance and teacher education in Nigeria	<i>Nigerian Journal of Educational Philosophy</i>	2016	Journal	Luka E. P.
11	Correlates of Teachers' Absenteeism in Gombe State, Nigeria, Public Secondary Schools.	<i>Pakistan Journal of Educational Research and Evaluation</i>	2017	Journal	Adamu, J. R

12	Rethinking philosophy of education in Nigeria: questions worth asking. Nigerian	Journal of Educational Philosophy	2020	Journal	
13	Social media and teaching tool: the possibilities	The Nigerian Society for Educational Psychologists	2020	Chapter in a Book	
14	Emerging innovations for curtailing contemporary challenges and issues in educational practice: setting the agenda	Faculty of Education, Federal University, Kashere.	2021	Chapter in a Book	
15	Time for a paradigm shift in teacher education in Nigeria	School of Science Education Federal College of Education (Technical) Potiskum, Yobe State, Nigeria	2022	Conference Proceeding	

What had been our arguments and propositions in all of these? Primarily, we had been arguing that teacher education is the most critical component of the educational system (Adepoju 2019). In our extensive review of literature, we have come to realise that teacher education programmes in Nigeria are failing in their task of the production of quality teachers and that “teacher education in Nigeria today is far deficient in producing the desired teachers as envisaged by the National Policy on Education” (Adepoju, 2008, Adepoju & Ahmed, 2014, Adepoju, 2019, Adepoju, 2022). Looking at the quality of teachers in our schools today, one may wonder what goes on in the production of teachers in Nigeria?

In providing an answer, Adepoju (2008) reasoned that:

*“... no one would doubt the obvious worthlessness of a well-packaged course in medical surgery if the medical students were not exposed to the real world of hospitals, patients and diseases. It should thus be obvious the inadequacies of the current practices of running courses in curriculum studies, guidance and counselling,*

*educational evaluation, administration, psychology, etc in abstract without exposure to the real world where these would be applied..."*

In the same vein, the myriads of problems of teacher education programmes in Nigeria had been fittingly summarized by the outcry of Ademola-Olateju (2013) cited in Adepoju & Ahmed (2014):

*The university admission policy in Nigeria does no good for the teaching profession... Faculties of Education are populated by rejects that have no interest in the profession they are being trained in. ... These students graduate in frustration and take up teaching for lack of alternatives. What result can one get out of a teacher who took up teaching out of frustration, not by choice? What do we hope to get in performance terms without genuine interest from accidental teachers? In addition, graduates of political science, sociology, and the sciences routinely crash the teaching profession for lack of opportunities after years of wandering in the streets....*

Asides from the identification of the problems, we had also made quite a number of proposals for a complete restructuring of teacher education programmes in Nigeria. We had proposed that the restructuring should start right from the admission criteria, for instance, Adepoju, (2006), suggests that “maturity, academic ability and interest in teaching and ability to cope with the tasks of teaching” must be part of the admission criteria to teacher education programmes.

We had also consistently advocated for what Afe (2002) had referred to as the “clinical laboratory approach” to the training of teachers. By this, we proposed that every Teacher Education institution must have a “Demonstration School” structured like the Teaching Hospitals of Colleges of Medicine and these Demonstration Schools must be with the intent of providing practical hands-on training in all facets of the multi-faceted tasks of teaching. This we assume will



ensure that teachers are better prepared for the daunting task of modern-day professional teaching (Adepoju, 2006, 2013, 2014, Adepoju & Mohammed, 2007, Adepoju & Ahmed, 2014).

A daring proposal was even made by Adepoju (2013, 2014, and 2022) to convert all Colleges of Education into degree awarding Colleges of Basic Education (CoBEs) the proposal being that unlike the present prescriptions of the NCE as the minimum entry requirements into the teaching profession, the master's degree should be the minimum entry qualification. In addition, Adepoju (2014) proposed that in line with global best practices such as in Finland and Singapore, only the best brains from secondary schools should be admitted to teacher education programmes.

## **CONCLUDING REMARKS**

Mr Vice-Chancellor, distinguished ladies and gentlemen, my simple submission in this lecture is that *research is a universal language* and that researchers must be multipotentialites. There is a need to rethink the manners in which we teach and learn how we carry out research activities. Our concerns should focus more on the universality of the research process and the interrelationship among all disciplines. This is to enable every researcher to be a “complete package” and to ensure that researchers are equipped with the multi-dimensional skills and knowledge needed in conducting meaningful research. Researchers must also be trained to be able to make meaningful contributions in several areas outside their areas of specialisation.

Are researchers to be specialists or generalists? My point is not a debate as to which is better, for it will end up being an endless debate judging from the view of PrimeGenesis (2010), that

*“a generalist knows less and less about more and more until eventually he or she knows nothing about everything. A specialist knows more and more about less and less until eventually he or*

*she knows everything about nothing. Being either a generalist or a specialist is useless, and anyone trying to be both at the same time inevitably self-destructs."*

My main argument is that knowledge by its inherent nature is not fragmented, knowledge exists in the world as an infrangible whole and thus, researchers must be conscious of the inherent danger of the two sides (being a generalist and being a specialist) and thus, researchers must strive to strike a balance between the two sides and the best way to attain this is for researchers to endeavour to be multipotentialites in outlook.

### **APPRECIATION**

I like to start by appreciating the entire academic and non-teaching staff of GSU especially every single member of the Faculty of Education, you all had been so wonderful to me, I cannot ask for any better academic family. I am grateful to the Vice-Chancellor, Professor Aliyu Usman El-Nafaty OFR, for giving this great university purposeful and visionary leadership, and for especially singling me out for the daunting task of heading the Research and Development Directorate, a task that had made me contribute my little quota to the university. No doubt being the Director of the Research and Development Directorate reinforced my conviction that research is a universal language and that all researchers must be multipotentialites. Words alone cannot adequately express my appreciation to the Vice-chancellor for this opportunity.

I also like to express my appreciation to Prof. M.G Dukku and the members of the Public Lecture Committee. I must say that I appreciate the "conspiracy" of Prof Dukku and his team in ensuring, I mean in "forcing" me to pay my academic "debt" today. In no small ways had Prof Dukku contributed to my career progress, especially concerning the paying of attention to the use of grammar. Although he is not a professor of grammar, I can assure you that if you are

privileged to work with Prof Dukku, your command of the English language will be better.

I shall not fail to appreciate the immense contributions to and impact of all my teachers. I can only mention just a few of them. First is Dr Charles V. Abe (My main PhD thesis supervisor), who proved to be a great mentor to me, he treated me more like a brother than a student, next is Prof E. A. Emeke (My second PhD thesis supervisor), she equally treated me not as a student, but as a son, she strived that I should inherit her great energy and hardworking quality of which I managed to inherit just a little portion of it. Prof Adenike Emeke will give you the correction to your work by 6 pm and call you by 11 pm to motivate you to work harder and by 5 am the following morning you will get her calls requesting to know the progress you had made (I often wonder then if PhD supervisors do sleep!). Another of my great teachers to be appreciated is Prof Promise Okpala (a former Registrar of the National Examination Council, NECO), who not only sharpened my research skills but made use of all arsenals in his possession to fight for me when my PhD proposal was heavily plagiarised by another PhD student (who was a staff of another department), I cannot thank you enough for this great contribution you had made in my life. Equally appreciated are Late Professors Duro Ajeyalemi, Dickson Bayelo, Temi Busari, S. Tunde Bajah, and Wole Falayajo. All my great teachers at the University of Lagos and the University of Ibadan, I appreciate you all.

I am very grateful to my parents who provided me with the best education possible, and to all my siblings, I want to say thank you all for your support at all times. To all friends and guests whose presence either physically or virtually had added colour to today's lecture, I say thank you.

On a final note, I extend my warmest appreciation and gratitude to my jewel of inestimable value, my beautiful wife, Mrs Dinah Alero

Adepoju and our children who had all provided a conducive environment at home for me to thrive academically and in all ways. Thank you, a billion times.

In conclusion, as the Bible book of Psalm 121 verse 1 says:

“Unless Jehovah builds the house,  
It is in vain that its builders work hard on it.  
Unless Jehovah guards the city,  
It is in vain that the guard stays awake.

The truth is, anything that I had done, unless Jehovah, my God grant his blessings, is merely in vain. Every accomplishment of mine can only be attributed to his undeserved kindness and blessings and for which I remain eternally grateful.

Thank you all for your attention.

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