

# Teaching across the Curriculum



# Teaching across the Curriculum:

*Research-based Evidence and  
Principles for Professionals*

Edited by

Akpovire Oduaran, James Omonu,  
Walter Lumadi and Kola Kazeem

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and Kola Kazeem

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To all teachers in Africa and Developing Areas in the world  
who are working hard daily to make the contents of different  
subjects understood and applied by the learners.



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## EDITORS' PROFILES

**AKPOVIRE ODUARAN (PhD)**, an experienced educator with international exposure, is an expert in curriculum and programme development in both formal and non-formal education settings. A Professor of Adult and Lifelong Learning with practical experience in teaching learners from diverse cultures and work environments, he is currently leading and supervising graduate research in his capacity as Extraordinary Professor at the North-West University in South Africa. He is resident in the Community-Based Educational Research (COMBER) Focus Area in the Faculty of Education. He is the author of more than a hundred journal articles and book chapters, and has solely published five books. He sits on the editorial board of several internationally reputable academic journals.

An accomplished leader in university administration, Akpovire Oduaran was Head, Department of Adult Education, University of Benin, Nigeria, and then at the Department of Adult Education, University of Botswana. He was also Director, School for Continuing Education, and Teacher Education and Training, respectively, at the Faculty of Education, North-West University, Mafikeng Campus, South Africa. He later served as the Executive Dean, Faculty of Education and Training, North-West University, South Africa.

As a rated researcher at the National Research Foundation of the Republic of South Africa, Akpovire Oduaran sits on the education review panel of the National Research Foundation, South Africa. His services in developing academic leaders have been appreciated, and frequently used by many universities to assess his peers for promotion to the rank of professor. He is very passionate about continuing professional development, lifelong learning, intergenerational relationships, literacy, community development, and the impact of HIV and AIDS in Education.

Presently, he is Extraordinary Professor and Research Fellow at the Faculty of Education, North-West University (NWU) in South Africa. He is affiliated with the Community-Based Educational Research (COMBER) Focus Area in the Faculty of Education.

**JAMES BOYI OMONU (PhD)** is Professor of Health Education at the Department of Human Kinetics and Health Education, Faculty of Education, Ibrahim Badamasi Babangida University, Lapai, Nigeria. He teaches Health Education and health-related courses at both undergraduate and postgraduate levels at that institution with a special leaning towards health professional development planning.

He has to his credit a number of publications in referred journals both at local, national and international levels. He has been lecturing in different tertiary institutions since January 1986 and has served in various capacities, as Head of Department for two terms (2014-2018). He is currently the Director of Sports for his university. He is an Adjunct Professor at the Nigerian Maritime Administration and Safety Agency (NIMASA), IBBU, Lapai, Nigeria.

He is a National Consultant and a Health Development Consultant, and has been consulting for Treeshade Associates Nig Ltd (RC: 478254) from April 2012 to date. He has consulted for the MAPS (USAID)-funded initiative for the roll-out of the Programme Management Modules of the harmonised Training and Support Materials for Strengthening Capacity for Malaria Control in Nigeria and SuNMap Niger State Ministry of Health, and Hospital Services in collaboration with the Support to National Malaria Programme (SuNMap) technical support to Niger State for the development of the Integrated Supportive Supervision/On-the-Job Capacity Building (ISS/OJCB) System.

He has been the pioneer President of the International Centre for Science, Humanities and Education Research (ICSHER) since 2003 and a member of the Health Development Group, Nigeria. He has served as an editorial board member for several journals.

**MUTENDWAHOTHE WALTER ‘WALLY’ LUMADI (PhD)** is Professor of Curriculum and Instructional Studies in the College of Education at the University of South Africa (UNISA). He holds DD (UC, USA), PhD (Unisa), M.Ed. (UJ), Master's of Administration (NWU), M.A. (Stell), B.Ed. Hons (Wits), Hons, B.A. degrees (Unisa), FDE (RAU) and a Teacher's diploma from (Veco).

Professor Lumadi has served as the Director of the School for Postgraduate Studies, Faculty of Education at the North-West University and as Campus Rector of the Westminster College of Education.

His research and publications are in the fields of Curriculum and Instructional Studies, Teacher Education, Economic Sciences, Language Education, Human Resource Management and Instructional Technology. Furthermore, he has already promoted more than twenty-eight Masters of Education Degree students and twenty-five doctoral students in different universities in South Africa.

He has authored several publications in peer-reviewed journals and scholarly book chapters. He served as Guest Editor for *Education as Change (EAC)*, the *Journal of Educational Studies (JES)*, the *South African Journal of Education (SAJE)*, *Africa Education Review (AER)*, the *South African Journal of Higher Education*, and (*SAJHE*). He serves on the editorial boards of six peer-reviewed journals. He is a Vice-President of the Curriculum and Development Association (CDA).

**KOLA LABAYO KAZEEM (PhD)** is Professor of Adult and Non-Formal Education at both the University of Benin, Benin City and the University of Ibadan, Ibadan, Nigeria. Born on June 22<sup>nd</sup>, 1961, he holds a Bachelor of Arts Degree (Education) from the University of Ife (now Obafemi Awolowo University), Ile Ife, Nigeria, and Master's of Education and Doctor of Philosophy (PhD) degrees from the University of Ibadan.

Professor Kazeem has a passion for teaching and mentoring beginners in the teaching profession to embrace the noble profession of teaching, and to establish a very close rapport with learners at all times. He has a keen interest in the development of human resources in several professions.

As a teacher with experience of over twenty-nine (29) years and academic publications in over forty (40) books and learned journals, he has been involved at every level of education, making far-reaching contributions to the “moulding of the man, mind and might”.

As an administrator serving as Head of Department and a member of the senate of the University of Benin Senate, he has been able to contribute valuable ideas to the making of professional educators and trainers for the industry. He has served as Co-ordinator of the Faculty of Education, University of Benin teaching practice committee, and also of the part-time teacher education programme at the same university.

Professor Kazeem is currently the Provost of the College of Education, Ilesha, Nigeria, where he takes the leading role in the development of education programmes. In that capacity, first-entry teachers are prepared in

different subject areas. A student body of over 3000 is known to make good contributions to the development of their nation.

He is a trained facilitator of education, and a consultant at different times to the World Bank, UNICEF, NTI, NCCE, NMEC and UBEC.

He is the President of the Nigerian National Council for Adult Education (NNCAE) and the current Provost of Osun State College of Education, Ilesa, Nigeria.

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## FOREWORD

I am very much honoured to have been requested to write the foreword for a book that is set against the background of the dearth of Africa's relevant research-based thinking and information on the intriguing and interesting scholarship about teaching across the curriculum for professional development programmes. What has existed until now has placed an emphasis on professional development either in the formal, basic, secondary, and higher learning formats or non-formal teaching and learning alternative routes to professional development. Interestingly, the alternative route to preparing people for pre-entry and post-entry professional development scholarship does not appear to have received as much attention and patronage as the formal route has received over the years.

It is interesting that the history of professional development in Europe typically began with Sunday schools, such as the ones started by Robert Rikes, and schools for mechanics during the Victorian times in the United Kingdom. Accounts of such efforts in Anglophone Africa typically began with the journey of Vasco Da Gama in 1460 AD to the West Coast of Africa. That exploratory journey was largely followed by several missionary journeys that led to the establishment of formal education systems in Africa. The arrival of Europeans in Africa, first the explorers, followed by missionaries, traders, and then European Governments which had jostled to make inroads into the hinterlands of the continent, encouraged formal systems of professional development.

The arrival of Europeans and then Arab traders (from 1611 AD onwards) in the northern parts of Africa led to the jettisoning of indigenous professional development strategies and institutes. It was these cultural institutes that produced the traditional African blacksmiths and goldsmiths, as well as the skills development initiatives of cottage industries and remarkable guilds systems which largely served as the bulwark for socio-economic, cultural and political development. But all of that was done away with as soon as the European type of professional development was introduced.

Thus, one should not be surprised that most of the existing books on pedagogy and andragogy relied mostly on European and, to a certain extent, Arab knowledge and experiences. Up until recently, any book focusing on pedagogy or andragogy must have been based on external sources of information to a large extent. It would be difficult to find any single volume such as this one that attempts to bring together teaching and professional development in both formal and non-formal education.

Having searched for an equivalent book with a research evidence base silhouetted against the backdrop of theories, practices and experiences, and found none, to the best of my limited knowledge, I should like to submit in all honesty and humility that *Teaching Across the Curriculum: Research-Based Evidence and Principles for Professionals* stands in a special class of its own. The fact that most of the chapters are based on valid research and evidence-based experiences must be something that gives this volume a competitive advantage over any other such volume both in and outside of Africa. Indeed, the fact that this book has been written largely by scholars researching professional development in different specialities in Africa makes it unique.

This book has benefitted from the wealth of experiences of established and highly rated scholars made up of university and college of education administrators, teachers and researchers in Africa. The editors, editorial board members and contributors have not only served as teachers, but also as researchers and managers of learning systems. The intense blind peer review process driven by former deans of education from different African universities means that ideas contained in this book have been vetted for quality and solid scholarship that should lead to the production of pre-entry and post-entry professionals. The collaboration of such well-trained professionals should help in many ways to consolidate the different initiatives being made by African nations to achieve the Sustainable Development Goals which had hitherto looked illusive. This is the valuable hope that this book brings at this dire time as the world is combating the COVID-19 pandemic.

I recommend to all readers this valuable collection of research, theories and principles which elucidate how teaching might best be conducted to effect rewardingly efficient professional development policies, systems and programmes, not just in Africa, but in the entire developing world. Fittingly, of course, this book must create in the curious reader gaps that must be filled, and must fulfil a desire for further research that needs to be taken to



best serve the interests and development yearnings of all who live in Africa  
or wish our continent the very best in the comity of nations in the world.

Professor Washington Dudu (PhD Chemistry Education)  
***Deputy Dean (Research and Innovation)***  
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## ACKNOWLEDGEMENTS

Putting together a book of readings in different disciplines, especially when it comes to the professional development of different experts, is a daunting task. Equally challenging was getting so many scholars and academic leaders in the different specialities to agree to come on the editorial board, mainly because these are very established and busy people whose expertise and opinions are constantly in demand. It was even more challenging to ask them to read through several drafts written by scholars from different persuasions and learnings in research methodologies.

We should say that we have been particularly blessed as editors to have a rare group of editorial board members who were always humble enough and willing to help us achieve our goal. The patience and keen interest demonstrated by the authors, editors and the editorial board members as regards the successful completion of this book during one of the most trying times in history as the world woke up to the realities of the devastating effects of the COVID-19 pandemic in the early days of 2020 is, to all intents and purposes, very comforting. It is refreshing to know that scholars from different locations were able to sit down in the midst of the chaos created by the pandemic to complete the tasks assigned to them. We owe them our gratitude.

The language editors, graphic editors, index personnel, and especially our publishers, Cambridge Scholars Publishing, UK, certainly deserve a resounding commendation. The publisher has had to cope with our constant request to shift the deadline for submitting the draft manuscripts as some scholars failed to deliver on their promises. In addition, what more can we say about our distinguished scholars who sat on the editorial board and who willingly accommodated our plea for free and valuable professional services? Without their willingness to help us achieve our goal, the cost of putting this book in the hands of less financially privileged young and elderly Africans and general readers would clearly have been impossible.

To all of you, we say thank you very much. Whatever shortcomings that might arise from this kind of individualised scholarship will be borne by each author. As editors, we have done everything possible to ensure that

what we are putting in the hands of the reader has gone through very rigorous academic scrutiny as required by professional and ethical standards.

We recommend this piece of rich scholarship to every patriot of professional development not only in Africa but also in the developing world as a whole.

Akpovire Oduaran  
James Omonu  
Walter Lumadi  
Kola Kazeem  
(Editors)

## PREFACE

Effective teaching and learning aimed at the professional development of different specialists has come of age to a large extent. Interestingly, it is rewarding to know that just at the time educators in different professions are settling down to perfect their systems of preparing people prior to entry into the profession, technological and unexpected changes in the socio-political and economic spheres have all come together to provoke new thinking that makes educators perform at a much higher level than they could have imagined. For example, the COVID-19 pandemic has compelled the adjustment and re-adjustment of education systems in the different professions.

The writing of this book was conceived long before global formal and non-formal education systems were “upset”, provoking the re-imagination of ways of ensuring that the passing on of knowledge and skills prior to and after employment must have stimulated in all educators an idea of how to cope with the challenges of making progress as professional educators in different fields.

While this book has not been able to bring on board every imaginable profession, the chapters provide great bases for further thoughts and actions that could expand the pool of knowledge in the curriculum in both formal and non-formal systems of education. It is great to think that it is the combination of both systems that has now emerged as the major strand upon which national development now stands.

The value of this book is that it brings together both theory and research findings that should enhance a proper understanding of what we need to do as educators in the professions. Contributors to this book have come from different backgrounds and it is important to quickly summarise some of the major ideas they have put across to target better and more effective performance as educators in the professions.

The opening thoughts in Chapter One advance the idea that we are now taught in our different places of work, when we sit at home, as we walk about wearing earphones, with podcasts dangling around our waists or smartphones on our wrists, as we lie down anywhere, whether it be in our homes or in hostels or in places of relaxation such as parks and campsites,

and as we rise up from whichever position we find ourselves. This continuous teaching and learning will be “imposed” on all of us by multifarious factors, some of which will be far beyond our control. The drastic need to teach in more effective and meaningful ways will be observed in all disciplines.

Chapter Two proffers the view that experience has shown that there can never be one specific philosophy regarding teaching styles that can really be accepted as the most suitable or effective. In fact, it might take quite some time to figure out what can be regarded as the most effective teaching style across the curriculum. The main reason why the pursuit of such a goal is seemingly impossible is because contexts and circumstances differ from place to place, and from one teacher to another. They also differ from one academic discipline to another. Moreover, effective teaching is partly affected by government policy on education, teaching and learning.

A couple of ensuing chapters cover teaching and learning in selected professions, beginning with engineering in Chapter Three. Engineering and its effective teaching surely require the acquisition of appropriate and modern knowledge and skills that draw from core concepts in physics, mathematics, chemistry and technology. Teachers of engineering presumably understand and value their specialisation or expertise, however, the question remains as to whether or not they require any equivalent amount of teacher preparation for them to be able to prepare engineers for a changing world. The agreement is that they surely do. This chapter, therefore, provides research on the teaching of engineering and the professional and pedagogical development of expertise in engineering.

Chapter Four discusses medicine. Earlier generations of medical doctors did not need to bother about specific skills since they were expected to acquire them along the way. This is no longer the case (Ralhan, 2012). Presently, the General Medical Council of the United Kingdom, for example, does expect medical doctors to know and put into practice effective teaching skills. Medical doctors in the United States are also expected to show formal training in teaching methods in current practice. Research-based evidence and applications of the most appropriate approaches to teaching medicine face the first major challenge posed by a plethora of specialities that have evolved over time and space. Medicine has evolved to encompass the careful acquisition of knowledge, skills, aptitudes, values and interests in all areas of the field.

Chapter Five focuses on teaching and learning in public health. Teaching in the public health profession entails the utilisation of a series of logical steps

aimed at a desired behavioural change in order to develop human resources for improved socio-economic well-being, as well as personal and public health. Public health attracts the attention of scholars in the field; hence, many attempts have been made to ensure that effective pre-entry and post-entry teaching and learning techniques are built into the professional development of public health workers.

Chapter Six explores issues pertaining to demography. Teachers of demography and population studies often confront students with charts, graphs, econometrics, statistics, and tables characterised by bulky and boring (according to the perception of students) calculations of life events, such as fertility, mortality and migration. These teachers create the impression that the subject is all about mathematical and statistical calculations. But this is not always the case. There is much to learn from research-based evidence on how best to teach demography and population studies as a profession.

The teaching of any discipline relies on the use of good language, for example, language that can be understood. That is why research can never ignore how best to teach the English language which is the language of education in Anglophone Africa. That is the subject of this chapter. Admittedly, teaching the English language in a linguistic environment such as ours is an uphill task. Among the challenges faced by teachers of English is the attitude of most students to the language.

In an interesting way, this book draws attention to the link between informal and non-formal learning as this can inform the development of critical thinking that is needed in every profession. Therefore, Chapter Seven pays attention to this very crucial matter. This chapter investigates the potential benefits of a 13-week Puzzle Video Game-Cognitive Enrichment Programme (PVG-CEP) that combines formal, informal, and non-formal learning for the development of critical thinking among pre-service teachers at the North-West University, South Africa, as this could just as well inform practices in other parts of Anglophone Africa. Different intervention techniques have been proposed in this particular discourse.

The next chapter makes the point that education in the 21<sup>st</sup> century requires the application of adult education principles by professionals in the field. Ideas tendered here were informed by a study based on the theories of andragogy and heutagogy as used by those who help adults to learn.

Adult learning benefits profoundly from the use of fieldwork as andragogical practice in any university, and this is enshrined in the adult education curriculum. This is the substance of Chapter Eight. The National Geographic Society (2020) avows, “Fieldwork is the process of observing and collecting data about people, cultures, and natural environments. Fieldwork is conducted in the wild of our everyday surroundings rather than in the semi-controlled environments of a lab or classroom. This allows researchers to collect data about the dynamic places, people, and species around them. Fieldwork enables students and researchers to examine the way scientific theories interact with real life”. It is any approved practical work, teaching, study or research activity, usually conducted outside the classroom and often outside the normal environment of a university. These are the research-based ideas tendered in this chapter.

Professionalism in all specialities is integrated with the teaching and learning processes but how well it can be ascertained objectively is another issue altogether. This is the subject of Chapter Nine. In some professions, the assessment of professionalism is delayed until the very end when it is far too late to make any meaningful amendments. Without seeking to be prescriptive, since the contexts and philosophies guiding practice differ significantly, it seems to me that the earlier the assessment of professionalism is done, the better. However, the caveat is that each profession is quite free to determine when its pre-entry members should be assessed in order to determine the level of proficiency that is needed. The final chapter presents “Multisource Feedback” as the best approach to assessing the effectiveness of teaching and learning. This technique aims to improve the quantity and quality of the competencies needed in most professions. Hopefully, the ideas advanced in this book should provide a reliable foundation for the effective development of knowledge and skills in selected disciplines and professions.





# CHAPTER ONE

## THE FUTURE OF EFFECTIVE TEACHING IN THE PROFESSIONS

AKPOVIRE ODUARAN

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*“And ye shall teach them your children, speaking of them when thou sittest  
in thine house, and when thou walkest by the way, when thou liest down,  
and when thou risest up”  
Deuteronomy 11:19 (KJV)*

### Introduction

The 21<sup>st</sup> century is yet to reveal all the intricate opportunities and challenges that the rapid advances in technology will throw at us. Improved well-being buoyed by presumably steady economic growth and stable and human governance mirroring the so-called post-truth era will motivate anyone who has a normally functioning sense of balance to want to learn things, in new ways, and at a terrific speed that may not yet have been anticipated. This is one of the things implied in the above text from the Scriptures that opened this chapter. We will now be taught in our different places of work, when we sit at home, as we walk about with earphones and iPods dangling around our waists or smartphones on our wrists, as we lie down, whether it be in our homes or in hostels or in places of relaxation, such as parks and campsites, and as we rise from whichever position we find ourselves.

This continuous education will be “imposed” on all of us by multifarious factors, some of which will be far beyond our control. The drastic need to teach in more effective and meaningful ways will be observed in all

disciplines, and as far as dictated by the focus of this book, in selected disciplines which have been chosen to illustrate our points. Other disciplines are of no less importance. Indeed, the coming together of all disciplines is what makes life more exciting for all.

Continuous teaching will be required, especially since new scientific knowledge has proved that it is impossible for humans to stop learning (Ali & Obaitan, 2005; Steyn, Steyn, de Waal & Wolhuter, 2011). Access to higher education in Africa's unequal societies and communities will be one of the critical issues (Walton, Bowman & Osman, 2015). Neuroscientists have continued to sketch and re-examine the brain's basic anatomy in a revolutionary way called neuroplasticity. In the words of the American psychiatrist and psychoanalyst, Norman Doidge (2007: 196-244), neuroplasticity is proving that the centuries-old notion that the adult brain is fixed and unchanging cannot be true. If that is true for adult persons, professionals in whatever professions they find themselves and youth and children from all backgrounds must be taught in such ways that they can make impressive gains in learning and the application of associated knowledge, skills, attitudes, values and interests. Neuroplasticity now gives hope not just to those who are thought to have mental limitations, or what was thought to be incurable brain damage, but to anybody who is in a position to learn (Doidge, 2007: 196). So then, neuroplasticity gives us hope for those who had been practically written off as "uneducable" and it has enlarged our understanding of the normal human brain, and, in particular, the resilience we are apt to find in almost every human on earth.

Our imagination and thought processes are increasingly being challenged on a daily basis, and with that, innovations and creativity are now driving the world like never before. Devices and systems for magnetic brain stimulation in approved scientific research centres all over the world are even fanning the embers of thinking in such ways that things that had never before been imagined are gradually emerging in different academic disciplines and spaces. Scientists are now able to use Transcranial Magnetic Stimulation (TMS) to influence behaviours and map the motor cortex of people's brains, and are working extremely hard to strengthen existing neuronal connections and to unmask buried pathways (Doidge, 2007: 199). From the works of neuroscientists, we now know that brand new structures can be created as new neuronal connections and synapses begin to sprout in the human learner.

New knowledge is rapidly being created with the increase in Artificial Intelligence Systems (AIS), and every day we are ushered into seeing or

hearing scientific feats and amazing ideas and thoughts in different professions that are compelling us to think and work smarter and more productively. For that reason, do not be surprised when scientists at ExxonMobil reveal to us that they are now working on *algae* as one of the newest renewable sources of energy since they have the potential to produce lower carbon dioxide emissions. Algae are now being proposed as one of the plausible biofuels of the future, especially as they can grow well in salt water and on land that is not suitable for crop farming. When that time comes, the challenges being posed to global food and fresh water supplies by the present means of energy production will be less intense. Yet, many more outstanding innovations are emerging in the fields of technology and science.

Time Magazine of November 26/December 3, 2018, attempted a description of the fifty most wonderful innovations in the world that are likely to change the way we live and do things. Let's take a look at some of them. Franka Emika's CEO and co-founder Simon Haddadin was reported to have come up with a revolutionary robotic arm called Panda. The Panda is an easy-to-program robotic arm that can move in seven axes and has been designed with a smart sense of "touch" capable of helping scientists to conduct experiments, build circuit boards, or pretest equipment at highly reduced costs. What about the compass known as *LynQ* that can now point to family and friends who have walked away from you up to almost three miles, and you do not need to rely on any cell signal or monthly subscription? What about Samsung's newest line-up of 4K QLED models of television sets that blend into the wall to mimic the background on which they are set and can display works of art, weather reports, or personal photos, and with them, you no longer need to worry about clusters of wires hanging loosely to uglify an otherwise elegant piece of technology? What about Reebok's PureMove, the newest sports bra that uses motion-sensing technology to adapt to a woman's movements in real time? PureMove is said to easily adjust when vigorous motions strain the bra's knit fabric due to a gel-like thickening fluid that activates and causes the garment to constrict and offer extra support. What about the nanobebe breast milk bottle that has more surface area and allows the milk to heat and cool twice as fast as a traditional bottle, without losing critical nutrients? What about *Keen* which is a smart bracelet that users programme to pick up repetitive motions like hair pulling, skin picking, or nail biting? *Keen* is capable of vibrating when it catches its user engaging in "unwholesome" habits such as those listed above. And, what about the Minnesota-based manufacturer 3M whose *3Mtm Smog-Reducing Granules* which, when exposed to the sun's UV rays, break down smog particles, washing them

away very easily during rainfall, thereby reducing pollution? You probably know that smog is a silent killer across the world because it comes in large quantities from automobiles and industrial facilities, causing the premature deaths of thousands of people.

### **Bibliography**

- Ali, A. & Obaitan, K. (2005). 'The sociology and psychology of organisations: Some notes on difference and convergence,' *Journal of Adult Education and Community Services*, 1 (1); 81-87.
- Doidge, N. (2019). *The Brain that changes itself: Stories of Personal Triumph from the frontiers of Brain Science*. Eugene L. Goldberg. M.D. New York: Routledge.
- Steyn, H. J., Steyn, S. C. & De Waal, G. C. (2011). *The South African Education System: Core Characteristics*. Noordbrug, South Africa: Keurkopie, 101-154.
- Walton, E., Bowman, B. & Osman, R. (2015). 'Promoting access to higher education in an unequal society.' *South African Journal of Higher Education*, 29 (1), 262-269.

## CHAPTER TWO

# THE URGENCY AND RELEVANCE OF EFFECTIVE TEACHING IN THE PROFESSIONS

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NIGERIA

### **Introduction**

Beginning with Socrates, educationalists have attempted to find answers to the query about what makes teaching effective in the different academic disciplines down the ages, and for all levels of learning. In 2017, Ulrich Boser concluded that most people still do not have a robust sense of what effective teaching looks like (Boser, 2017: 1). It is in pursuit of the answer to the query that more active and engaging approaches and different philosophies of teaching have emerged over the years. The quest for what counts as effective teaching has been profound, attracting great contributions of brilliant scholarly ideas and sometimes involving debates that will continue among all stakeholders for a very long time to come (Darling-Hammond & Bransford, 2005; Teitel, 2004; Schneps & Sadler, 2000; Darling-Hammond, 2006; Goldhaber, 2006; Cochran-Smith & Zeichner, 2005). In that case, the acceptable global positions on what constitutes effective teaching in the different professions would not be as sacrosanct as many would have wished.

Such has been the desire to identify the factors that govern effective teaching that teachers have been tasked with the responsibility of

identifying, nurturing and evaluating from time to time what could be described as their teaching philosophies. In response to that demand, a plethora of such philosophies has emerged at every level of teaching.

Be that as it may, experience has shown that there can never be one specific philosophy regarding teaching or teaching styles that can be accepted as the most suitable or effective. It might take quite some time to identify what can be regarded as the most effective teaching style across the curriculum. The main reason why the pursuit of such a goal is seemingly impossible is because contexts and circumstances differ from place to place and from one teacher to another. They also differ from one academic discipline to another. More precisely, there could be factors regarding effective teaching that are entirely beyond the control of the teacher. For example, no matter how well prepared a teacher is, if the resources required for teaching in any academic discipline are not provided, there is very little the teacher can do, even if he/she has to improvise.

Within the same context, teacher and learner characteristics differ as well. For example, the level of self-motivation on the part of the teacher and the learner can make a whole lot of difference. A demotivated teacher attempting to get a set of highly motivated learners to learn can create a scenario that might be quite difficult to manage.

Moreover, effective teaching is partly affected by government policy on education, teaching and learning. For example, if a positive and well-structured education policy is absent, there will be no attractive provision and management of the entire enterprise of teaching. The point could be made, therefore, that the wrong mix of internal and extraneous factors can seriously affect the desire to bring about effective teaching across the curriculum.

Let us then return to the question once again. What are the most significant factors as regards teacher effectiveness across the curriculum? Research seems to suggest that depending on the context, the most significant factors could include a mix of internal and external factors. The National Council for Accreditation of Teacher Education (2006) and Darling-Hammond (2006) reported that the most significant factors include:

- Teacher preparation
- Knowledge of teaching and learning in any given academic discipline
- Subject matter (or content) knowledge