



*Sciences For Prosperity*

# UGANDA NATIONAL ACADEMY OF SCIENCES

## 2019 Annual Scientific Conference Proceedings

*Theme:*  
**Education Systems in Uganda**

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*Sciences For Prosperity*

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## **ACRONYMS AND ABBREVIATIONS**

<b>ASC</b>	Annual Scientific Conference
<b>BBA</b>	Bachelor of Business Administration
<b>BDS</b>	Bachelor of Development Studies
<b>BIT</b>	Bachelor of Information Technology
<b>ICC</b>	Intra-Class Coefficient
<b>JAB</b>	Joint Admissions Board
<b>MoES</b>	Ministry of Education and Sports
<b>NAPE</b>	National Assessment of Progress in Education
<b>NCDC</b>	National Curriculum Development Centre
<b>PLE</b>	Primary Leaving Examination
<b>SACMEQ</b>	Southern and Eastern Africa Consortium for Monitoring Educational Quality
<b>SDGs</b>	Sustainable Development Goals
<b>SES</b>	Socio-Economic Status
<b>SPSS</b>	Statistical Package for the Social Sciences
<b>UACE</b>	Uganda Advanced Certificate of Education
<b>UBOS</b>	Uganda Bureau of Statistics
<b>UBTE</b>	Uganda Business and Technical Examinations
<b>UNAS</b>	Uganda National Academy of Sciences
<b>UNEB</b>	Uganda National Examinations Board
<b>UPE</b>	Universal Primary Education
<b>USE</b>	Universal Secondary Education

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## UGANDA NATIONAL ACADEMY OF SCIENCES

The Uganda National Academy of Sciences (UNAS) is an autonomous and honorific service organization comprising a diverse group of scientists from the physical, biological, social, and behavioural sciences. These scientists work together in an interdisciplinary and transdisciplinary manner to achieve their main goal of promoting excellence in the sciences by offering independent, evidence-informed advice for the prosperity of Uganda. The success of the Academy lies in the strength and expertise of its membership and its ability to mobilize scientific experts to advise government policymakers and other stakeholders.

The organizational structure of UNAS consists of the General Assembly, Council, Standing Committees and the Secretariat.

The membership includes Founding members, Fellows of the Academy, Foreign Fellows and Honorary Fellows.

### Council Members

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12. Mr. Christian Acemah (Ex Officio)	Executive Secretary

## **ACKNOWLEDGEMENTS**

The Uganda National Academy of Sciences (UNAS) wishes to express her sincere appreciation to the individual presenters of the scientific papers and organizations who gave valuable time to provide information through their participation in the 2019 Annual Scientific Conference (ASC).

The Academy further wishes to appreciate the UNAS standing committee on Publications and Conferences for overseeing the ASC event and ensuring that the proceedings meet the minimum requirements of UNAS publication.

The Academy also wishes to acknowledge the UNAS staff for organizing the conference and ensuring production of this conference report.

Special thanks go to the individual report reviewers who volunteered their time to provide candid and critical comments to ensure that the report is accurate, effective and credible.

Gratefully acknowledged are the sponsors, the Fellows and Members of the Academy who partly provided financial support for this activity.

## **PAPER REVIEWERS**

All presenters at the conference have reviewed and approved their respective papers in this report for accuracy. In addition, the papers were reviewed in draft form by independent reviewers chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the Uganda National Academy of Sciences (UNAS) Council. The purpose of the independent review is to provide candid and critical comments that assist UNAS in making the published report as sound as possible and to ensure that the conference proceedings meet institutional standards, including those for objectivity and evidence. The review comments and draft manuscripts remain confidential to protect the integrity of the deliberative process.

The Uganda National Academy of Sciences thanks the following individuals for their participation in the paper review process.

1. Leah Namarome, PhD  
Senior Lecturer and Curriculum Specialist, Makerere University
2. Hasifa Nampala, PhD  
Senior Lecturer and Head of Mathematics Department, Kyambogo University
3. Doreen Mbabazi, PhD  
Lecturer, Mathematics Department, Kyambogo University

## PREFACE

Uganda National Academy of Sciences is committed to providing an autonomous forum through which scientists can exchange ideas, knowledge and experiences aimed at generating, promoting, sharing and using scientific knowledge and giving evidence-based advice to government and society. This is done annually through various mechanisms such as the Annual Scientific Conference. UNAS has held Annual Scientific Conferences since 2001. The themes for these conferences have ranged from Sciences for Sustainable Development, Science Education for Development, Biotechnology for Development, Impact of Climate Change on National Development, and Human Resources for National Development, among others.

The 19<sup>th</sup> ASC was held on 25<sup>th</sup> October, 2019 at Hotel Africana Kampala. The theme for the conference was, “*Education Systems in Uganda.*” Three subthemes were presented, including, *Education in the Digital Age, Assessment and Curriculum Development in Uganda, and Investigating the School Effect in Entry Scores at Universities in Uganda: A multilevel Analysis.* These subthemes were presented by individual scientific experts from selected fields. During the session, the papers were discussed by plenary, and after the conference the authors revised their respective papers considering comments from plenary and comments from independent reviewers.

The ASC was attended by over 100 participants including Government officials, academicians, researchers, young scientists, and various stakeholders as indicated in the participants list in Annex 2.

This report is made up of two sections. Section 1 addresses the content of the 2019 ASC. The views presented in this conference report are those of the individual authors, and not necessarily those of the Uganda National Academy of Sciences. Section 2 presents the profiles of distinguished *Fellows* who were inducted into the Academy at the 2019 ASC.

## SECTION 1:

# ASSESSMENT AND CURRICULUM DEVELOPMENT IN UGANDA

By

Gilbert Gift Siima & Grace K. Baguma

NCDC

### Abstract

*This paper sets out to explore assessment and curriculum development by analyzing the experience of Uganda. The objectives of the study were to find out the preconditions for successful curriculum development that is (not) met in Uganda and establish the extent to which that hinders or supports improvement of the quality of education, establish the barriers existing that obstruct the focus on curriculum outcomes, and examine the extent to which the nature of assessment represents the needs and the required expectations of the curriculum. Using a descriptive case study design, the paper draws on documentary evidence about educational assessment in Uganda. The paper reveals that the curriculum in Uganda falls short of realizing its intended outcomes such as creativity, critical thinking, cognitive flexibility, and emotional intelligence, as well as producing graduates with the required employable and entrepreneurial skills due to the numerous barriers existing that obstruct the focus on curriculum outcomes and instead insist on assessment. Assessment drives the curriculum. The system is unfair to learners because it judges them unfairly basing only on the cognitive domain, leaving the rest of their abilities unexamined.*

**Key words:** Affective, Assessment, Cognitive, Curriculum, Learning domain, Psychomotor

## 1.0 Background

A Curriculum is normally at the heart of the education process. It sets out what is to be learned, and how and when it is to be taught (Massimo, 2013). The Curriculum underpins all other parts of the system, guides the day-to-day experiences of the classroom, forms the basis for teacher training programmes, the content of textbooks and other materials used in the classroom, determines how learning is assessed, how standards are developed and how performance is monitored through school inspection and supervision systems (Massimo, 2013). Curriculum is an essentially signified foundation of an academic arena (Rajurkar, Chavan, Kachewar, & Giri, 2019). Curriculum refers to the specific blueprint for learning that is derived from desired results, that is, content and performance standards (Dündar & Merc, 2017). A curriculum is essentially a plan for learning (Taba, 1962). It refers to the totality of students' experiences that occur in the education process.

The word “assess” comes from the *latin* verb “*assidere*” meaning “to sit with”. In assessment, one is supposed to sit with the learner. This definition implies that assessment is more about what the teacher “*does with*” and “*for*” the learner not “*to*” the learner. Assessment refers to any procedure or activity that is designed to collect information about a learner’s knowledge, attitudes and skills (Allen, Elks, Outthred, & Varly, 2016). Assessment has three main forms. Assessment of learning (summative assessment) whose main purpose is to provide evidence of achievement to the student and other stakeholders, assessment as learning that helps learners to reflect on their work and learn about how they learn best, and assessment for learning that is aimed at improving students learning and teachers’ teaching experiences (Earl, 2006).

Uganda’s education is theoretically based on a philosophy of holistic assessment that takes into account the personal, social, academic and non-academic competencies that enable a person to meet current and future economic, social, and political demands and situations. The Uganda National Examinations Board (UNEB) is responsible for Uganda’s formal development of assessment and examinations. UNEB was established by the statute of 1983 as Uganda’s examination and assessment body mandated, among functions, to prepare and conduct primary, secondary and such other examinations within Uganda as may be considered desirable in the public interest (Toohig, 2014).

Currently, educational assessment is done nationally through the Primary Leaving Examination (PLE) at the end of Primary Seven, the Uganda Certificate of Education (UCE) at the end of “O” level, and the Uganda Advanced Certificate of Education (UACE) at the end of “A” level. The rest of the years are assessed internally by individual schools. At primary level, assessment is done only in the five core subjects of English Language, Mathematics, Science, Health Education and Social Studies. At all levels the questions in the examination papers mainly cover the cognitive aspects of each subject, and only a sample of them per year (Allen, Elks, Outthred, & Varly, 2016). Other aspects concerning practical skills, attitudes, behaviours and values are never covered.

In Uganda, curriculum development is the responsibility of the National Curriculum Development Centre (NCDC), which was established in 1973 by an Act of Parliament and revised in 2002, as a corporate autonomous body of the Ministry of Education and Sports (MoES) with the responsibility of developing and renewing curricula. NCDC is mandated to play a pivotal role in improving the quality of education and re-designing the courses at various levels (other than the universities) to meet the objectives of technical and vocational education (Toohig, 2014).

The main focus of curriculum development is on deciding which knowledge, skills and values to teach, how to reach the intended outcomes, and the learning and teaching processes (Dündar & Merc, 2017). On the other hand, assessment serves the three purposes to support learning; assessment for accountability; assessment for certification, progress, and transfer (Archer, 2017). Assessment and curriculum development remain a hot topic in education since they form the main gist of learning. Assessment is a key component of all education systems, and plays a critical role in a student’s learning journey (Allen, et al, 2016; Toohig, 2014; Altinyelken, 2010). According to several authors, sufficient analytical attention has not been given to assessment and curriculum development processes in developing countries such as Uganda; hence, many aspects of such processes are not yet well understood (Altinyelken, H., 2010). Consequently, there is a limited information base that policy makers can draw on (Altinyelken, H., 2010).

## 2.0 Objectives

This paper aims to respond to Altinyelken (2010)'s call for more research on assessment and curriculum development, by looking at the experience of Uganda. The paper will generate recommendations for improving assessments and curriculum development in the country.

This study has three specific objectives as presented below:

- a) To identify the existing linkage between curriculum development, assessment, and the world of work in Uganda;
- b) To analyse barriers existing in Uganda that obstruct proper curriculum implementation and assessment;
- c) To examine the extent to which the nature of assessment represents the needs and expectations of the curriculum.

## 3.0 Problem Statement

Uganda's education system follows a national curriculum that is designed to meet national labour market demands. The curriculum is assessed by national examination bodies at different levels of learning to ensure educational quality, and toeing the line already paved by the national curriculum.

Despite marked progress, Uganda has not fully met its commitments under the Education for All Goals (World Bank, 2018). With the introduction of Universal Primary Education (UPE) and Universal Secondary Education (USE), the quality of graduates has continually deteriorated. Ugandan graduates are now increasingly out of touch with the job market (Tumushabe & Makaanu, 2013; Uwezo, 2016). Furthermore, as observed by Kanyeimba (2015), there are many students scoring AAA's at entry into University, but these high grades are not seen getting out of the universities into the economy to cause the much-desired transformation.

This paper seeks to identify the missing link between the written curriculum and the assessed curriculum. This missing link will guide us in identifying the possible preconditions that have led to the education sector's failure to meet labour market demands.



## 4.0 Literature Review

This section explored the theoretical field to form a framework wherein this paper can be situated. Therefore, the issues addressed in the previous section will be explored in more detail. We will discuss the broad debate on curriculum development, followed by a deeper exploration of the nature of assessment. We will conclude by determining additional barriers that obstruct meaningful curriculum reforms.

### 4.1 Linkages between Curriculum development, Assessment and World of work

Curriculum development has six main steps: needs analysis, goal setting, syllabus design, methodology, testing, and evaluation (Dündar & Merc, 2017). Philosophical, theoretical and practical constructions give shape to the curriculum development; in other words, *science, society, moral doctrine, knowledge, and the learner* are the sources of the curriculum (Ornstein & Hunkins, 2009 cited in Dündar & Merc, 2017).

Curriculum development focuses primarily on content and areas related to it. It encompasses the macro or broadly-based activities that impact on a wide range of programmes, courses, and student experiences (Rajurkar, Chavan, Kachewar, & Giri, 2019). Whereas the above highlights curriculum development, assessment refers to any procedure or activity that is designed to collect information about a learner's knowledge, attitudes and skills (Allen, Elks, Outthred, & Varly, 2016).

The existing legal framework allows both the curriculum development body and the assessment bodies to have representation in curriculum development and assessment (NCDC Act, 1973); (UNEB Act 1983). The National Curriculum Development Centre Act of 1973 CAP 135, states that "NCDC will implement her roles through subject panels". These panels take into account representation of stakeholders from the world of work and assessment bodies. This representation was intended to harmonise the expectations of all stakeholders at the time of curriculum formulation and development. In addition, one of the functions of NCDC is to devise, test and evaluate examination questions and methods of examining students with other appropriate teaching and examining

bodies (Cap 135). In simple terms, NCDC has a stake in the assessment of the curriculum. However, it remains to be established whether the existing gap between the written curriculum and assessed curriculum is a result of the gaps within the laws governing these institutions or poor interpretation and implementation of the law.

Assessment in the education sector has many purposes. An over-emphasis of any one of the purposes of assessment will affect the other sides by diverting resources from one or both of the other essential assessment functions, thereby adversely influencing the quality of education (Archer, 2017). For the case of Uganda, stake holders tend to place great value on public examination certificates. As a result, school systems and teachers have tended to concentrate on subjects that promote academic excellence and little else (Rudhumbu, 2015). This emphasis on assessment by teachers impacts the achievement of the broad goals and objectives of the curriculum.

## **4.2 Preconditions for successful curriculum development**

The curriculum development process includes several stages such as planning, preparing, designing, developing, implementing, evaluating, revising, and improving. Curriculum development is a systematic and dynamic process sensitive to time and place in which preparation, development, implementation and evaluation steps are involved (Jadhav & Patankar, 2013). It seems necessary to discover the nature of factors and forces which influence the process of curriculum development process in Uganda. Factors which influence curriculum development in Uganda include: skill of experts, societal needs, political forces, culture and resources.

Cultural and ideological differences within a society or a country can influence curriculum development processes. Some communities may resist a domineering culture or government ideology and hence affect the curriculum development of the centrally planned curriculum (Akhtar, 2004). There is no doubt that the cultural patterns and value system of the society are influential in the shaping of the curriculum. In Uganda, some communities have resisted domineering cultures and government

ideologies, and hence affected the implementation of the centrally planned curriculum. For example, some communities use mother-tongue as a medium of instruction in lower primary, whereas this has not been practically possible in urban schools.

The nature of school organization and type of administrative structure in which the programme is carried out markedly influence the curriculum development as a whole (Rudhumbu, 2015). The decentralized administrative structure in Uganda has had a strong effect on curriculum development due to diversities in culture, language, and so on.

Political factors influence curriculum development (Mafora & Phorabatho, 2013) through their ability to determine which courses will be taught, which teachers will be hired, which books will be used, and which speakers will be allowed to address the student body. With these methods they control the ideas to which students are exposed, and this applies to all levels of education (Rudhumbu, 2015). In the case of Uganda, it is the political wing that appropriates and approves curriculum review or reform activities.

Finally, the availability of the necessary teaching and learning materials has a great influence on the nature of the curriculum to be developed. Consideration of the nature of the teaching materials that can easily be accessed in the community guides the nature of the curriculum that is feasible for the given society in order to make learning more effective for all learners (NCDC, 2013).

With these linkages between curriculum, assessment and world of work in place, it is key to note that curriculum directs assessment. The mismatch between the skills possessed by graduates and the expectations from the world of work can be traced back to the way that the curriculum is implemented by the teachers and assessed by the assessment bodies.

### **4.3 Barriers that obstruct proper curriculum implementation in Uganda**

The history of curriculum development has been characterized by a series of crises with the pendulum shifting between traditionalists calling for “getting back to the basics”, and progressives focusing on the learner (Rajurkar, Chavan, Kachewar, & Giri, 2019). Similar to other African countries, Uganda has engaged in various curriculum reforms in the post-independence period after 1962. The thematic curriculum that was introduced in February 2007 aims at increasing the achievement levels of students in literacy, numeracy and life skills (Altinyelken, H., 2010). The approved curriculum menu for primary education has 10 teaching subjects. To date, five of the 10 subjects on this curriculum menu have not been assessed at the national level, although the first cohort was supposed to be assessed on this curriculum in 2012. One key observation about the subjects that have not been considered for national examination is that they are all skill-based, as opposed to knowledge-based.

In the wake of addressing the increasing pressure to improve the quality of education, the Government of Uganda made a decision to reform the lower secondary education curriculum by commissioning a team to study the issues at stake and guide the reform process in 2006. Clegg, Kornberger & Rhodes (2007) conducted a study to answer the question “why does Uganda need a new secondary education curriculum?” After discussing and consulting with some thirty-one (31) key stakeholders, they conclude that the education system was failing to produce competitive graduates due to, among other things, a lower secondary school curriculum that was too congested, overly theoretical, with little relevance to Uganda, lacking or ill-equipped with facilities, and putting too much emphasis on exams. These findings show that focus is mainly placed on assessment, and not on the curriculum that should direct assessment.

It is worth noting that the reform process of the Lower Secondary School Curriculum has been faced with many challenges (MoES, 2016). The curriculum reform process continues to struggle to gather support and acceptability by stakeholders, and understanding of the innovation in general in low (MoES, 2016). The new curriculum framework includes 21 subjects and aims at creating a balance between the three learning domains: cognitive, affective, and psychomotor.

This curriculum framework was based on the findings of labour market surveys in Ugandan society. At the same time , it enabled learners to acquire the skills required in the 21st century. However, it has struggled to gain acceptability across stakeholders.

#### **4.4 Barriers that obstruct the focus on curriculum outcomes and insist on assessment in Uganda**

Curriculum change is an important component of educational improvement. As a result, this process needs to be effectively managed for it to be successful and for the new curriculum to be relevant to the target groups (Rudhumbu, 2015).

The literature reveals a number of factors that act as barriers to the successful planning and implementation of curriculum change by academic middle managers (Kgosana, 2006; Mafora & Phorabatho 2013; Ndou, 2008). Such factors include the following: institutional factors, middle manager-related factors, teacher-related factors, physical resources-related factors, and financial pressures (Rogan & Grayson 2003; Hall & Hord 2006; Geijssel et al 2003).

##### **Institutional factors**

Institutional factors refer to conditions or situations within an organisation that influence or affect successful implementation of curriculum change (Rudhumbu, 2015). These barriers fall into the political dimension category of curriculum change and relate to power and influence, including administrative support and leadership, collaboration and the negotiation and resolution of conflicts in institutions and departments (Morgan & Xu 2011; Collopy, 2003). These factors also relate to the cultural dimension of curriculum change that relates to the values, beliefs, and norms, both consensual and competing among individuals, groups, departments, and institutions (Rogan & Grayson 2003; Hall & Hord 2006). In Uganda, the National Curriculum Development Centre (NCDC) introduced the thematic curriculum, but due to such barriers the change from the traditional subjects and use of local languages in the initial stages to practical themes like music, news, arts and crafts, and physical education which build a child's thinking capability have

only been implemented by a few schools while most of the schools, both public and private, have not taken the step to implement this proposed curriculum.

### **Middle manager-related factors**

A middle manager is one who manages at least one level of staff and reports to a higher level of managers (Croner-i, 2018). The managers duties typically include delivering the strategic view of the establishment and directives from the senior management team at an operational level and supervising their teams to ensure the smooth running of their area across the institution. Their influence can have both political and technical implications on curriculum change (Morgan & Xu 2011). The technical dimension asserts that knowledge and skills as well as their acquisition and classroom practice, are key to successful implementation of curriculum change. Middle managers not only mediate tensions between funding and curriculum change as potential barriers to effective curriculum change, but also filter competing messages from above and below that are concerned with interpreting curriculum policy into practice (Wolverton, 2005). Despite their roles in curriculum change, teaching and scholarship, middle managers have to supervise and evaluate staff performance, handle conflicting and competing demands and goals, as well as deal with student problems in their departments (Scott, Geoff, Coates, & Anderson, 2008). The curriculum reforms have probably failed to take off because middle managers have not identified with the changes enough to effectively deal with barriers to curriculum change as well as to harness enablers (Rudhumbu, 2015).

A lack of professional training for middle managers in curriculum planning and implementation has been cited as one of the major barriers to effective curriculum change (Harris, 2000). Without adequate knowledge of what constitutes curriculum planning and implementation, it is impossible for middle managers to effectively lead curriculum change in their departments. (Harris, 2000). The reality is often ignored that some teachers do not have the skills, the resources or the time to develop learning content (Mkandawire, 2010).

### **Teacher-related factors**

Curriculums are implemented through teaching and learning. Successful curriculum change cannot occur if staff are not properly trained to implement the new approaches in the curriculum (Seehorn, 2012). When teachers are not well-trained, they possess poor content knowledge, are also poor in understanding and implementing curriculum change (Rogan & Grayson, 2003).

The epistemological beliefs of staff have an important impact on the success of curriculum change (Blignaught, 2001; Alexandre, 2009). Teachers' epistemologies refer to their beliefs about the content, pedagogy and specific context that may impact their ability to accurately interpret and successfully enact curriculum changes (Blignaught, 2001). Without massive investment in time, money and appropriate coaches to adequately capacitate staff in a timely manner to implement a new curriculum, there will always be resistance to curriculum change (Seehorn, 2012). Resistance to change is viewed as a natural and expected part of any major curriculum change (Fullan, 2005), as change always involves a sense of loss for the participants (Cragg, 2011).

### **Physical resources-related factors**

Literature shows that curriculum change can succeed if it is resourced with good quality student materials (Ball & Cohen, 1999). The presence of appropriate text books has been found to have a positive impact on the success of curriculum change and by extension, on student learning (Collopy, 2003).

### **Status quo comfort**

According to Seehorn (2012), staff, senior management, parents and students may resist curriculum change because they are comfortable with the way things are, especially when the institution is performing well. Given such a situation, without factual, effective and adequate communication to all these people about the benefits of curriculum change, it will be very difficult to get their support for the proposed change. According to Fullan (2005), by adequately communicating the

change to all stakeholders, middle managers enable them to see that the benefits of the change, for themselves and the students, outweigh the likely personal cost, and such stakeholders are likely to make the sacrifice required (Fullan, 2005). This is attested to by the current resistance to a skills-based curriculum in favour of knowledge and certification after passing high stake examinations at a time when the world of work demands skills.

## **4.5 The Context of Assessment and Curriculum in Uganda**

Assessment is defined as the process of collecting information about pupils' learning outcomes in order to make appropriate decisions (Kellaghan, 2004; Greaney & Kellaghan, 2008). Some authors, such as (Bennett, 2011), Dunn & Mulveno (2009), and Florez & Sammons (2013) have defined assessment according to its purpose and have thus coined the term "assessment for learning," which is also known as "formative assessment," "assessment as learning," "assessment of learning," and "summative assessment." Uganda has over the years focused on rewarding learners based on summative assessment.

School-based assessment is an assessment that is aimed at appraising student achievement levels at regular intervals against curricular goals. School-based assessment could be in the form of formative assessment if it is subsequently used to inform classroom practice, or summative if used to make educational or administrative decisions about learners including promotion or accountability. Public/national examinations refer to examinations that are often administered at the end of an educational cycle. In Uganda's case this happens at the end of the primary education cycle, and is called the Primary Leaving Examinations (PLE) for the purposes of certification and governing the transition to post-primary education. Besides the PLE, there are other public examinations in Uganda such as Uganda Certificate of Education (UCE) examinations, Uganda Advanced Certificate of Education (UACE) examinations, and the Uganda Business and Technical Examinations (UBTE). However, in this study, public examinations are limited to PLE, UCE, and UACE.



In Uganda, as elsewhere, educational assessment has become a colloquial topic. This is evidenced by the on-going government programmes, debates, conferences and symposia aimed at improving Uganda's assessment system (Allen et. al., 2016; MoES, 2017a). This study perceives the increasing attention to assessment as a highlight of the critical role assessment plays in the pupils' learning journey(s).

It is, however, argued within educational and political discourses (Allen, R. et al, 2016) that Uganda's current assessment system does not produce the requisite results to build a labour force fit to meet existing and future economic, social and political demands pertaining to the Government White Paper (1992), the National Vision 2040, or the Sustainable Development Goals (SDGs). More so, the current educational assessment is criticised for not assessing the required skills, attitudes and competencies to meet the market demands of the 21st Century (Allen, R. et al, 2016). Moreover, it is alleged that most of the knowledge and skills learners need today and for their future has little or no role in formal tests and examinations (Allen, R. et al, 2016; Odongo, 2018).

Most assessments in Uganda focus on "the evocation of responses that involve repetition rather than critical analysis and reflection. There is lack of procedures designed to improve students' higher-order cognitive skills (Altinyelken, 2015:6; see Odongo 2018)." Yet, the graduates of primary education are expected to portray higher order thinking skills such as problem-solving, critical thinking, communication and creativity, emotional intelligence skills and other soft skills (Cefai, Ferrario, Cavion, Carter, & Grech, 2014).

Further still, Odongo (2018) argues that educational assessment in Uganda urgently requires a realignment from being largely summative, as it is now, to include other forms of assessment that are more suitable to evaluating skills and competencies that are more easily assessed over time. The need to align educational assessment has attracted efforts from a number of assessment bodies and organisations each contributing in its own way and capacity. However, it remains unanswered as to whether or not all these efforts are improving the quality of assessment in Uganda. As earlier noted by Allen et al. (2016), Odongo (2018) continues to argue that most assessments in Uganda leave out the deeper understanding

of concepts and values needed outside school. What is assumed to be important knowledge is often left out, and instead all that is assessed is the recall of information.

Possibly the most active area of assessment system reform was around the introduction of continuous assessment. According to Muskin (2017), continuous assessment is best understood as having four key features: it is a form of assessment primarily linked with the classroom teacher; it covers the full set of subjects, it permits teachers to understand a range of aspects of student learning and change in that learning over time, and it provides opportunities for feedback to the teaching process at an individual level. Because many continuous assessment policies have been in place for more than a decade, it is possible to get a perspective on its impact.

Browne's (2016) review of research on continuous assessment, including case studies of practices in South Africa, Ghana, Malawi, Nigeria, Zambia and Uganda, provides the most comprehensive picture of these specific aspects of reform in assessment systems. The main overall finding is that teachers are not using continuous assessment in their classrooms, in large part because of the absence of institutional support, few exemplars, and a lack of training. Browne's research also points to the lack of understanding of the purpose of continuous assessment and the top-down manner in which it was introduced to schools. Despite sporadic efforts to reform assessment systems, summative high-stakes examinations continue to dominate, with the net effect that secondary teaching is heavily skewed towards "teaching to the test".

Assessment is an integral part to all areas of the curriculum, and covers the various aspects of learning. Archer (2017) presents the purpose of assessment in the form of an "assessment purpose triangle" that depicts each of the basic purposes of assessment on opposing sides: *assessment to support learning*; *assessment for accountability*; *assessment for certification, progress, and transfer* (Archer, 2017). Archer goes ahead to note that the positioning is important for contributing towards the quality of education. An over-emphasis on any one of the purposes of assessment will affect the other sides, thereby adversely influencing the quality of education (Archer, 2017). In Uganda, assessment is known

mainly for certification, progress and transfer than any other function and could be part of the problem this paper aims to address.

Armstrong (2009) records that for a curriculum to be all inclusive, it should take care of the eight intelligences of linguistic, logical-mathematical, spatial, bodily-kinaesthetic, musical, interpersonal, intrapersonal and naturalist. Similarly, authentic assessment of multiple intelligences can only be achieved by observing students manipulating the symbol systems of each intelligence. This is something that cannot be achieved through standardised tests (Armstrong, 2009). The assessment system used in Uganda for the end-of-cycle is mainly in the form of written examinations. Whereas this can be used to test a number of intelligences, it is more aligned towards linguistic and logical-mathematical intelligences. The remaining six intelligences are hard to examine using this approach. This is central to Uganda's philosophy on holistic assessment that takes into account the personal, social, academic and non-academic competencies that enable a person meet the current and future economic, social and political demands and situations.

It is argued that Uganda's current assessment system is not holistic and does not fulfill the country's educational aims to meet existing and future economic, social and political demands pertaining to the Government White Paper (GWP, 1992), the National Vision 2040, and the Sustainable Development Goals (SDGs) (Allen, Elks, Outthred, & Varly, 2016). It is used as the basis for making decisions about learners' grades, placement, advancement, instructional needs, curriculum, and funding from donors. In simple terms, assessment is the process by which schools find out what a learner's understanding, knowledge, and skills are, and the level at which the learner is achieving (MoES, 2015). This argument may allude to a misalignment between educational aims, the curriculum, and educational assessment.

Across the continent, most of the studies of continuous assessment focus on the take up of the practice by teachers. For example, Dagnew's (2017) study of continuous assessment in Awi Zone secondary schools in Ethiopia explored the level of teachers' implementation of alternative assessment practices. The research found that the implementation of continuous assessment in schools was low. The major barriers to the

effective utilisation of alternative assessment included time constraints, large class sizes, student absenteeism, the absence of government guidelines for common record keeping, a lack of teacher interest and commitment, and perceived heavy workloads.

## **5.0 Methodology**

This paper utilized data collected using analysis of documentary evidence which is a relevant and major method of social research (Jwan & Ongondo, 2011), and it was used in the current study because of the need to analyse the preconditions for successful curriculum development, the barriers existing that obstruct meaningful curriculum reforms in Uganda, and examine the extent to which the nature of assessment represents the needs and the required capabilities of learners in Uganda. To generate the required information for the current study, a search of published studies on Google Scholar and Web of Knowledge was carried out between 2<sup>nd</sup> July 2019 and 10<sup>th</sup> August 2019; all articles that could be accessed on these databases were considered for inclusion in the review.

## **6.0 Findings**

### **6.1 Preconditions for successful curriculum development**

The study found that the factors that influence curriculum development in Uganda include the skill of experts, societal needs, political forces, culture and resources (Mafora & Phorabatho, 2013). In Uganda some communities have resisted domineering cultures and government ideologies, and hence affected the implementation of the centrally-planned curriculum; for example, the use of mother tongue as a medium of instruction in lower primary has not been practically possible in urban schools.

Teachers have tended to concentrate on subjects that promote academic excellence that obviously affects the achievement of the broader goals and objectives of the curriculum (Rudhumbu, 2015). It was found that as a result of the concentration on assessment of only the cognitive

domain, while ignoring the affective and psychomotor domain, the entire curriculum development process in Uganda falls short of realizing the intended curriculum outcomes such as creativity, critical thinking, cognitive flexibility and emotional intelligence, as well as possession of employability and entrepreneurial skills by school graduates.

## **6.2 Barriers existing that obstruct the focus on curriculum outcomes and insist on assessment in Uganda**

First, the study found that there was a mismatch between the enacted curriculum and the assessed curriculum, as the enacted curriculum in Uganda theoretically focuses upon all three domains (Allen, R. et al, 2016), i.e. the cognitive, affective, and Psychomotor domains. However, in practice, the nature of assessment at primary, lower secondary and upper secondary is proven beyond reasonable doubt to only focus on the cognitive domain (Rudhumbu, 2015).

Lack or shortage of funding is a barrier to effective curriculum change, but also filters competing messages from above and below that are concerned with interpreting curriculum policy into practice (Wolverton, 2005).

Conflicting goals and different levels of information among the stakeholders within the country is a barrier to curriculum development in Uganda. Furthermore, according to the findings, the middle managers' lack of professional training in curriculum planning and implementation has been cited as one of the major barriers to effective curriculum change (Harris, 2000).

Poor training among curriculum development stakeholders and possession of poor content knowledge were found to be among the barriers that affect the nature of curriculum development in Uganda. Literature also shows that curriculum change can succeed if it is resourced with good quality student materials (Ball & Cohen, 1999).

### **6.3 Extent to which the nature of assessment represents the needs and the required expectations of the curriculum in Uganda**

This study found that recent reports such as that of Allen et al. (2016) and that from the Ministry of Education and Sports (MoES, 2017a) indicated that educational assessment in Uganda neither meets the current and future needs of Ugandans, nor is it responsive to the country's social, political and economic contexts.

Furthermore, the recent symposium report on assessment and examinations in Uganda showed that Uganda's assessment system concentrates on pupils recall of information and rote learning of what is easily quantifiable, but neglects other intelligences such as the interpersonal and intrapersonal intelligences that are considered crucial to the life of learners in the 21<sup>st</sup> century (Mitana, Muwagga, & Sempala, 2018).

Available studies and practical experience suggest that the current assessments and examinations in Uganda fall short of evaluating the quality and relevance of education (Allen, R. et al, 2016). Studies have variously expressed the need for assessments to go beyond the measurement of a single intelligence factor to include multiple intelligences—a person's ability to understand, rationalize, and effectively face life situations (Lippman, L. H. et al, 2015).

From the literature, it is argued that Uganda's assessment and examinations system does not produce the requisite results to build a labor force fit to meet existing and future economic, social and political demands pertaining to the National Vision 2040 and the Sustainable Development Goals (SDGs).

## **7.0 Conclusion**

This study shows that there is a mismatch between the written curriculum and the assessed curriculum. The written curriculum focuses on the three domains of knowledge acquisition, skill development and value development, while assessment is focused mainly on testing only the single domain of knowledge acquisition.

The way assessment is conducted is something to consider. The current practice is to subject the learner to an assessment process without any form of guidance from the teacher. This is mainly administered in the form of tests, quizzes and examinations. All of which are forms of summative assessment (assessment of learning). For assessment to fully play its intended role in the education system, there is need to integrate all three forms (assessment of learning, assessment as learning, and assessment for learning). This is the recommendation of the Government White Paper on Education of 1992.

The assessment system favours learners who are intelligent in the logical-mathematics and linguistic areas, which are only two out of the eight multiple intelligences that learners possess. It is possible to assume that learners who drop out of school belong mainly to these neglected intelligences.

This study reveals that the way curriculum is delivered and assessed in Uganda is unfair to learners. It portrays some learners as failures, when in reality they have strong intelligences that are not developed and assessed by the system. More so, the one-time end-of-cycle assessment that is used to pass judgment on the learner cannot assess all the knowledge, skills, values and understanding the learner will have acquired over the period being assessed.

The assessment does not test individual pupils' ability to face the daily reality of life. Yet, life outside of school requires a mastery and practice of skills and competencies beyond the set rules, regulations and standardized content.

Assessment in Uganda is looked at mainly as a means for certification, progress, and transfer, leaving out the rest of the functions of assessment. This view is mainly driven by the parents and the general public, who demand performance from students and schools. The measure for this achievement is passing high-stakes end-of-cycle examinations.

## **8.0 Recommendations**

- As Uganda plans the implementation of a new curriculum, the middle managers should be given adequate initial training to ensure that the new curriculum is properly interpreted and implemented. Consideration for continuous support of the same group should be given adequate consideration and support.
- The law on curriculum development and assessment needs to be studied further to ascertain whether the interaction between the curriculum body and assessment body is enough to produce the required harmony between the written and assessed curricula.
- There should be sensitisation programs for the general public on the role of assessment and curriculum in the education sector.
- The assessment of the curriculum should be streamlined to assess all three domains in the curriculum by implementing continuous assessment. The same recommendation is specified in the Government white paper on Education of 1992. With continuous assessment, values can be measured through assessment by conversation with the learner, coupled with observing them throughout the teaching and learning period, while the level of skills acquisition will be seen through the products one is able to produce as a result of learning.
- The process of curriculum development and assessment should be done with due consideration of the fact that the learners who are to be trained and assessed on the curriculum



possess multiple intelligences that require different approaches to effective learning and assessment. Unless this factor is considered, many learners will continue to be judged wrongly and their strengths and talents will remain untapped, because the curriculum delivery and assessment was conducted in a way that does not appeal to them naturally.

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# INVESTIGATING THE SCHOOL EFFECT IN ENTRY SCORES AT UNIVERSITIES IN UGANDA: A MULTILEVEL ANALYSIS

By

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## Abstract

University entry at Ugandan universities relies almost totally on applicants' scores in the national examinations at "A" Level. In recent years, competition for university entry, especially for the merit-based tuition subsidies offered at public universities, has become stiffer than ever. Alongside this has been the emergence of super-performing schools, leading to an over representation of students from these schools at both public and private universities. The purpose of this study was two-fold:

1. To investigate the extent of a "school effect" within students' performance at "A" level, and what school characteristics could explain this school effect (if any); and
2. To investigate the extent of a "school effect" within the entry grades of university students at universities in Uganda.

It turns out that school-level factors explain fully 30% of the variation in student performance in the national examinations, so that the university student population ends up being disproportionately made up of students from a small handful of schools. Given such a high school-level effect, then: to what extent are the entry grades of university students a true reflection of their intellectual ability?

**Keywords:** Multilevel Analysis; University Selection; Ugandan Higher Education; School Effect.

## **Introduction**

### **University Education in Uganda**

There are six public universities and over thirty recognised private universities in Uganda, with a total annual freshman enrolment of over thirty thousand students. To qualify for university entry, a student needs at least two principle passes in the national examinations at the end of the Advanced Level of Secondary school (A-Level), but due to limited places available, only half the qualified students can actually find a place. Competition is particularly fierce to enter the public universities, since the best performing students are eligible for merit-based tuition state subsidies. Beyond that, entry into Makerere University, the oldest, biggest, and best-known university in the country, is an additional attraction.

Most universities in Uganda utilise a process of weighting subjects done at A-Level with regard to their relevance for a particular degree programme. The legal minimum qualification is a principle pass (a score of “A”, “B”, “C”, “D” or “E”) in at least two subjects (the other possible scores being “O” and “F”). Taking the example of Makerere University, any A-Level subjects considered “essential” get a weighting of three, “relevant” subjects get a weighting of two and any other subjects get a weighting of one or a half. The Joint Admissions Board (JAB) publishes these requirements every year, and depending on the places available in each degree programme, calculates entry cut-off points for each year.

Over the last few years, however, university academics have expressed increasing dissatisfaction with the quality of students admitted through this process, and have observed that students’ entry grades are no longer a reliable indicator of their university potential. This is highlighted by a decision by the Law School at Makerere University some years ago to introduce a separate entry examination in addition to the university-wide selection. This was after they observed that the best performing students upon entry, especially those from particular schools, did not necessarily go on to perform well at university. Indeed, following the entry examinations, some of the students with lower A-Level grades were selected over those with higher grades; more interestingly, the

distribution of schools within the selected students changed dramatically from the previous year, with only a few of the students from the schools that previously provided the majority of entrants passing the entry examination (The Observer, 2012).

### **Quality of Pre-University Education.**

With the introduction of Universal Primary Education (UPE) in 1997, and Universal Secondary Education (USE) ten years later, there have been concerns that the singular focus on achieving universal enrolment pursued by these policies has had adverse effects on the quality of education being given (Wael & Omoeva, 2020). Even in 2012, for instance, over 30% of primary school children still did not have adequate sitting space, with those most affected being in the first and second year of primary school, where rates are 48% and 40 % respectively (Uganda Bureau of Statistics, UBOS, 2012). This is of concern because another study found that the two most significant determinants of learning achievement in primary school were that a pupil had their own place to sit, and the number of teachers in a school with the mandatory two years of teacher training (Kasirye 2009). The situation was found to be slightly better in secondary school with an average of 7.5% not having adequate sitting space, although all students in the advanced level of secondary school had adequate sitting space (UBOS, 2012).

### **Determinants of Learning Achievement in Pre-University Education**

The Uganda National Examination Board (UNEB), which is responsible for setting the national examinations at all education levels except university, carries out the annual National Assessment of Progress in Education (NAPE) at primary three (P.3) and primary six (P.6). This is aimed at monitoring student achievement in mathematics and English language, and the findings indicate that while there are hardly any gender differences in performance, there are wide regional variations, with pupils in urban schools doing significantly better (see NAPE, 2011). In addition, pupils in government-funded/public schools perform significantly worse than those in private schools. The possible reason for this is that the students enrolled under the UPE scheme are mostly enrolled in public schools, meaning more overcrowding and therefore fewer resources to

go around. Similar trends are found at lower secondary school: students in urban schools perform better than those in rural schools, and students in public schools that do not run the USE programme perform best, while students in government and private schools that run USE perform worst.

Uganda also participates in international assessments, such as that carried out by the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) for pupils in P.6. There have been three cycles of the SACMEQ surveys, and Uganda has participated in the last two. In the SACMEQ III, Hungi (2011) found that contrary to the NAPE findings, there are strong gender differences in performance, with boys outperforming girls in both reading and mathematics. Hungi also found that the most important student level effect on performance was age and the amount of homework (given, corrected and explained to pupils), while the school level effects concerned school resources, school location (urban vs. rural) and school ownership (private vs. public). Further, Zuze&Leibbrandt, (2011) carried out a multilevel analysis on the SACMEQ II data, and found that the slope of socioeconomic status (SES) on reading achievement was generally positive, but that it was steeper in schools with a higher average SES. That is to say: overall achievement was higher in schools with higher average SES, but this advantaged the wealthier students the most. Adding school physical resources to their model, however, weakened the effect of SES on reading achievement, suggesting that equipping schools better would lead to meaningful gains for lower SES students.

Another interesting finding was that the achievement advantage experienced by private schools was partially explained by a lower average age, as well as a higher average SES. It was also found that teaching resources (the presence of a chalkboard, chalk, wall charts, teacher table, etc.) had a positive effect on pupil scores, while teacher workload (weekly teaching hours) had a negative effect. Finally, teacher workload had a negative and significant slope, indicating that heavy teaching workload had the worst effect on the performance of pupils of lower SES.

## **Determinants of Learning Achievement at A-Level and Beyond**

The specific focus of this paper is to determine if the student and school level effects on student achievement observed at primary and lower secondary level continue through to A-Level, and further, the extent to which they explain selection for university. National and international assessments at primary and lower secondary have revealed that at student level, there have been achievement effects due to gender, SES, age, access to own learning materials, and the amount of homework and feedback, among others. Effects at school level have included ownership (public/private), teacher workload and resources, school resources, location (urban/rural), among others. This study wishes to extend this analysis to the performance of students at A-Level, and further, investigate the variation in the A-Level grades of students that do get admitted to university. The particular variables that will be investigated in this study at student level are: gender and age, and the school level variables are school size, being private/public, boarding/non-boarding and single-sex/coeducational.

### **Research Questions**

In order to investigate the patterns of variability in the A-Level grades of students sitting the national examination, as well as the A-level grades of students admitted to university, the following questions were investigated:

1. What is the school effect in the A-Level grades of all students who sit the A-Level national examinations? Further, what is the school effect in the A-Level grades of students who gain admission to university?
2. What characteristics of students' former secondary schools explain the school effect (if any) at A-Level and at entry to university?
3. Do the age and gender differences in performance found at lower levels of schooling in Uganda persist to A-level and university enrolment?



## Methodology

The aim of this research study was to find out the extent to which various characteristics of the former schools of university entrants explained the variation within their entry grades. The university programmes sampled were chosen on purpose: they represented degree programmes that spanned the humanities, business and technology, and were also the only programmes offered at all the twelve public and private universities in Uganda save for one. Thus, they were deemed to be a good representation of the general university population.

### Multilevel Analysis

As has become common practice in educational research, a multilevel approach to analysing the data was taken. Multilevel analysis pays attention to the fact that the students in the sample form part of a “nested” structure, and that this has implications in the calculation of regression coefficients. What this means is that when students attend the same school, their performance will depend partly on their own ability, but also on factors related to the school, such as the school size, its location, teacher qualifications, school facilities, the philosophy of education that a school hold, and so on. Additionally, student performance could be partly influenced by factors related to the combined character of the students themselves, such as if they are of a similar or mixed social economic status, if there are more girls than boys, or all girls or all boys. As a result, the trends in performance within the same school may be different from the trends in a different school, and in addition be driven by the factors mentioned to a different extent. To investigate these school level effects on individual student performance, a measure of the “within-school variance” (the extent to which students within a given school differ on their individual performance) is compared to a measure of “between-school variance” (the extent to which schools differ in their mean performance); this measure is represented by the “Intra-class coefficient” (ICC), which is given by:

$$ICC = \frac{\text{between school variance}}{\text{within school variance} + \text{between school variance}}$$

Values of the ICC range from 0 to 1, with values very close to zero indicating very little similarity between individuals who attend the same school, and that the nested structure of the data does not affect the estimation of regression coefficients; values as low as 0.1 (or 10%), however, may indicate enough variation between mean school performance as to be worth exploring (Kahn, 2011). Using ordinary regression analysis in such a case (which ignores the nested structure) results in stronger associations within the data than really exist in the population due to the covariance between the performance of students in the same school.

### **Predicting the Student Score**

In ordinary regression analysis, the outcome variable such as the student score in this case is predicted by some variables according to a regression equation with an intercept, a regression coefficient (or the slope) and an error term, and these parameters are fixed for all values of the explanatory variable. However, if the students for whom the scores are being predicted are grouped within schools, it is possible, as has already been explained, that due to factors unique to that school, the relationship between a predictor variable and an outcome variable may be different from school to school. Take a predictor variable like age: based on the data of a given school, the predicted average performance of 12-year olds in one school may be higher than the predicted average performance of 12-year olds in another school, leading to school specific intercepts and slopes, which may be different from those calculated for all 12-year olds over the entire population of schools. Multilevel analysis is a procedure that allows the relationship between the explanatory and outcome variables to vary from school to school, so that rather than the resulting regression equation having a fixed intercept and slope for all students, it can have a random intercept, and even a random slope. Put differently, the intercept (and even the slope) in such a regression equation, being random, would each have its own regression equation, complete with predictor variables and error term. This idea can be better seen in the multilevel regression equation predicting student scores (1) below:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(x_{ij}) + r_{ij} \quad (1)$$

Where

$Y_{ij}$  = the A-Level score of an individual student  $i$  in a given school  $j$

$\beta_{0j}$  = the random intercept

$x_{ij}$  = the value of a predictor variable  $x$  for student  $i$  in school  $j$

$\beta_{1j}$  = the regression coefficient/slope (may be fixed or random) for the predictor variable  $x$

$r_{ij}$  = the residual of the performance of student  $i$  around the mean performance of school  $j$  (variance of  $r_{ij} = \sigma^2$ ; also known as the “within-school” variance)

### The Random Intercept

The random intercept,  $\beta_{0j}$ , is then further predicted by the following regression equation:

$$\beta_{0j} = \gamma_{00} + \mu_{0j} \quad (2)$$

Where

$\gamma_{00}$  = mean intercept (mean of all school-specific intercepts)

$\mu_{0j}$  = residual of school-specific intercepts around the average mean or prediction error (variance of  $\beta_{0j} = \tau^2$ ; also known as “between-school” variance)

As already mentioned, the intercept is random because of differences between the mean school performance, which may be predicted by school level variables such as school size, the average social economic status of students within a school, whether it is in an urban area or a rural area, etc. You can imagine that these factors may affect the average performance of a school, and indirectly the individual performance of a student. Adding such predictor variables to equation (2), it becomes:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(z_{1j}) + \mu_{0j} \quad (3)$$

Where

$\gamma_{00}$  = mean intercept (mean of all school-specific intercepts)

$z_{1j}$  = the value of a school-level predictor variable  $z$  for school  $j$

$\gamma_{01}$  = the regression coefficient/slope for the school-level predictor variable  $z$

$\mu_{0j}$  = residual<sup>1</sup> of school-specific intercepts around the mean intercept

There can be more and more predictor variables at both student and school level that can be introduced into equations (1) and (2), as will be seen in this study. For a more in-depth understanding of multilevel analysis, see Snijders & Bosker (2012); Kreeft & De Leeuw (1998); Enders & Tofighi, (2007); and Zuze & Leibbrandt (2011).

## The Data

Data for this study was obtained from two sources: the admission offices of selected universities, and the UNEB. The student admission data were provided by eight of the twelve public and private chartered universities in Uganda, and were collected for students enrolled in the three most popular study programmes offered at university level in Uganda: Bachelor of Business Administration (BBA), Bachelor of Development Studies (BDS) and Bachelor of Information Technology (BIT). Where possible, these data were collected for cohorts joining university between 2006 and 2010, and included entrants' gender, former schools (where they did their A-Level studies), and subject combinations at A-Level. The data from the UNEB was of all students country-wide who attempted the national examinations over the period 2005-2010. These data only included gender and age at student level, as any other information was deemed confidential.

The A-level examinations are scored using letter grades; for the purposes of this study, these were translated to numbers as follows: A-6; B-5; C-4; D-3; E-2; O-1; F-0. This is also the transformation that most universities use in calculating cut-off points to determine admission. The outcome variable in this study is the student score averaged over the scores of the subjects taken at A-Level; this was preferred to the total score since some

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1 Note: all residuals are assumed to be normally distributed with a mean of zero, and be mutually independent; additionally, these residuals are assumed to have the same variances for all groups

students choose three subjects, and some choose four. Table 1 shows the sample sizes and the average performance for students sitting the “A” Level examinations as well as the students in the university sample for the years 2005-2009. The information for the performance at A-Level was obtained from the UNEB, and represents the entire population sitting the examinations in a given year. The sample of university entrants are all students admitted to the three most popular study programmes offered at university level in Uganda: Bachelor of Business Administration (BBA), Bachelor of Development Studies (BDS) and Bachelor of Information Technology (BIT). This data was obtained from the registry departments of eight public and accredited private universities, and as far as possible collected for cohorts joining university between 2006 and 2010.

**Table 1: Sampled students and their mean scores**

Examination Year	No. of students		Mean Score (S.D)	
	A-Level Population	University Sample	A-Level Population	University Sample
2005	70,548	1,320	2.25 (1.282)	3.94 (0.896)
2006	70,574	2,749	2.10 (1.210)	3.11 (1.036)
2007	84,930	2,744	2.04 (1.254)	3.09 (1.052)
2008	88,377	2,414	2.08 (1.255)	3.32 (1.138)
2009	96,633	2,999	2.25 (1.348)	3.73 (1.274)
2005 - 2009	411,062	12,226	2.15 (1.277)	3.39 (1.153)

## Some limitations of the study

The national and international assessments reported earlier found that student characteristics such as Socioeconomic Status, and other such student background variables, played an important role in explaining student achievement at primary and lower secondary schooling level. However, student-level data in this study is limited. The data on university entry grades was obtained from the registry departments of the various universities, but universities generally do not collect background information on students at enrolment; critically missing from the university data, for instance, is student age. The second set of data, the results of all students sitting the A-Level examinations between the years 2005 and 2009, had some of the information withheld for purposes of confidentiality; fortunately, student age for this data was supplied. As such, the analysis will only contain two student level explanatory variables: gender (both data sets) and age (only for A-Level Examination results data).

## Findings

**Question 1: What is the school effect in the A-Level grades of all students who sit the A-Level national examinations? Further, what is the school effect in the A-Level grades of students who gain admission to university**

University entry data was available for the academic years 2006/2007 through to 2010/2011; as such, the A-Level data analysed was that for students sitting examinations in 2005 (entering university in 2006/2007) through to 2009 (entering university in 2010/2011). All analyses were carried out using the SPSS software. It should be noted that although these are independent data sets, many of the students who enter university in a given year will have sat the A-Level examination the previous year, and so the data set of university entrants may be considered as a replication of the A-Level data set. Similar trends are therefore expected, but due to the restriction of range, the university data will produce higher values of regression coefficients.

In order to determine the school effect within both sets of data, it is necessary to fit the so-called “empty” model to both sets of data, or a model without any predictor variables in it, so as to calculate the ICC for each data set. The empty model is represented by equation (5), and the results are reported in table 2.

$$Y_{ij} = \beta_{0j} + r_{ij} \tag{5}$$

Substituting for  $\beta_{0j}$  from equation (2)

$$Y_{ij} = \gamma_{00} + \mu_{0j} + r_{ij} \tag{6}$$

And the ICC is calculated according to:

$$ICC = \frac{\text{between school variance}}{\text{within school variance} + \text{between school variance}}$$

**Table 2: Intercept and ICC for A-Level performance and University entry grade**

	A-Level Students (2005-2009) (N = 411,062)			University Entrants (2006-2010) (N = 12,226)		
	Parameter	S.E	Sig.	Parameter	S.E	Sig.
<b>Intercept (<math>\gamma_{00}</math>)</b>	1.93*	0.019	.000	2.96*	0.024	.000
<b>Variance of <math>r_{ij}(\sigma^2)</math> (Within-School Variance)</b>	1.022	0.002	.000	0.921	0.012	.0003
<b>Variance of <math>\mu_{0j}(\tau^2)</math> (Between-School Variance)</b>	0.427	0.018	.000	0.344	0.023	.000

<b>Intra Class Correlation (ICC)% <math>(\sigma^2)/(\sigma^2 + \tau^2)</math></b>	29%	27%
<b>*A-Level letter grades have been transformed to a scale between 0-6, with 0 being the lowest.</b>		

It turns out that the proportion of student “A” Level grades that can be explained by school-level variables is 29% for the A-Level data set, and 27% for the university entrants. In educational research, a school effect (ICC value) of 10% and more is deemed worth exploring (Khan, 2011), and the school characteristics that can help explain this school effect were investigated in Question 2. It is also worth noting that the intercept has a higher value for the university entrants than for the A-Level students as a whole, meaning that the average performance of students admitted to university is higher than that in the general population. This is not surprising since the better performing students out of the students who sit the A-Level examinations are admitted to university.

**Question 2: What characteristics of students’ former secondary schools explain the school effect (if any) at A-Level and at entry to university?**

As already demonstrated by running the empty models, a sizeable proportion of students’ performance at “A” Level is due to a school effect. The only school level variables available in this study were those of students enrolled at university, and this included school ownership, denomination, whether schools were single-sex/coeducational, and whether they were day/boarding schools. It turns out that the majority of students enrolled in the study programmes sampled at the eight universities were found to have come from a small proportion of schools in the country: 10% of the whole sample came from just six secondary schools. All these top schools were private and co-educational, and the top three were all located in the same district (Uganda is divided into almost 90 districts). This observation motivated the second question being investigated in this study: what characteristics of these schools accounted for their success? Studies at lower levels of the education system show,



for instance, that students enrolled in private schools performed better than those in public schools (NAPE, 2011). Further, studies in other parts of the world show that larger schools tend to perform better on average. To investigate the extent to which school characteristics could explain the performance of the students who sat the “A” Level examinations, as well as those who were later admitted to university, three models were developed:

**Model 1: Public Vs. Private Schools; Boarding Vs. Non-Boarding Schools; Single-sex Vs. Co-educational Schools**

The following null hypotheses were tested in this model:

- a) *Students from private schools will have higher average scores than students from public and community schools.*
- b) *Students from boarding schools will have a higher average performance than students from non-boarding schools.*
- c) *Students in single sex schools will have a higher average performance than students from co-educational schools; further, students in all-girls’ schools will perform better than those in all-boys’ schools.*

The results of running this model are shown in Table 3, and looking at school ownership, attending a public, private or community school for one’s A-level does not add any particular advantage to performance – this is contrary to what has been found at primary and lower secondary school level where students in private schools perform significantly better than the rest. On the other hand, attending a co-educational school lowers the predicted average score of a student at A-Level but there is no noticeable difference between students attending all-boys or all-girls schools. This effect, however, disappears at entry to university. The strongest overall predictor of performance appears to be whether or not a student attends a fully boarding school or not, with students attending boarding school scoring almost half a letter grade better than those in non-boarding school within the general “A” Level population, and one third of a grade higher at entry to university.

With regard to the extent to which these school level variables explain the school effect found within the performance of students, running model 3 revealed that they explain about 15% of variation between average school performance and 8.5% of school level variation for students enrolled at university. The lower value for the university student sample can be explained by the fact that only the best performing students are enrolled at university, which contracts the sample to the upper levels of “A” Level performance, and therefore less variation for school characteristics to explain.

**Table 3: Model 1**

	A-Level Students	University Students
Intercept:	2.27	3.07***
<b>School Ownership</b>		
Private Schools	0.00	0.00
Community Schools	0.09	-0.05
Public Schools	-0.10	-0.05
<b>Boarding School Status:</b>		
Non-Boarding Schools	0.00	0.00
Fully Boarding Schools	0.47***	0.33***
<b>Co-educational Status</b>		
All-Girls	0.00	0.00
All-Boys	0.05	0.07

Co-educational	-0.41***	-0.19
School-Level Variance	0.364***	0.315***
(Explained Variance) $\hat{\alpha}$	(14.9%) $\hat{\alpha}$	(8.5%) $\hat{\alpha}$
*Significant at the 0.05 level (2-tailed);** significant at 0.01 level; *** significant at 0.001 level		

### *Model 2: School Size as a Predictor*

School size is generally expected to be predictive of student performance, but keeping in mind that some schools were over represented in the university sample, the number of students from each individual school in the University sample was added as a covariant to the model. As such, model 2 tested the following null hypotheses:

- a) *Controlling for school ownership, boarding and co-educational status, the larger the former school of a given student, the higher his/her predicted A-Level performance.*
- b) *Controlling for school ownership, boarding and co-educational status, the higher the number of students admitted at university from a given school, the higher the predicted entry "A" Level grade for students from that school*

The results are presented in table 4, and it is found that the effect of the size of the school at which a student does their A-Level is negative for the A-Level School sample, but becomes positive and more significant for students at entry to University. Nevertheless, though significant, it is only a slight effect. Adding the number of students from the same school as a covariant to the model for the university sample, however, resulted in the disappearance of the small effect of school size all together, while also resulting in a positive and significant slope for this variable (0.62). Further, with the addition of this covariate, the explained school effect went up by 21% from 12.4% to 33.4%. This means that the predicted entry grades of a university student given that they came from a school with a higher total number of students enrolled at the university was also higher.

**Table 4: Model 2**

	A-Level	University	University
<b>Intercept</b>	2.26***	3.20***	3.51***
<b>Size of Former School (standardised)</b>	-0.02**	0.17***	0.01
<b>No. of university students from same former school (Standardised)</b>			0.62***
<b>Level Two Variance (Explained Variance) â</b>	0.368*** (13.9%)â	0.301*** (12.4%)â	0.229*** (33.4%)â
<p>** Significant at the 0.05 level (2-tailed);** Significant at 0.01 level;  *** Significant at 0.001 level</p>			

**Question 3: Do the age and gender differences in performance found at lower levels of schooling in Uganda persist to A-level and university enrolment?**

Studies involving pupils and students in primary and lower secondary school showed that gender and age were significant predictors of performance (NAPE, 2011; Hungi, 2011). Given a smooth transition through school, students should sit their A-Level examinations around the age of 18. Of the students who sat their A-level examinations between 2005 and 2009, almost 20% were 18 or younger, 55% were between 19 and 20, with the remaining students were older than 20. With regard to gender, many more boys than girls took the A-Level examinations: 60% vs. 40%; however, the distribution within the sample of university students was about half and half.

#### **Model 4: Age and gender effects**

Building on model 3, model 4 explores the additional explanatory effects of age and gender for the school effect found in the performance of

students at “A” Level and at entry to university. Student age as a variable was only available for the A-Level data, but gender was available for both the A-Level data and the university sample. The null hypothesis being tested in this model is the following:

*Controlling for school characteristics, the effects of gender and age differences on student performance decrease, but retain the direction found at lower levels, both at A-Level and at entry to University.*

Since this model now includes student level variables, the level one variance ( $\sigma$ ) will also be reported, and the results are as shown in table 4. Looking at the results, it is interesting to note that males perform slightly better than females within the general A’ Level population, but that females are enrolled with slightly higher average A’ Level grades at entry to university. The addition of gender to the prediction model for university entry grades explains a further 1.7% variance at school level, but none at student level. Further, older students perform slightly worse than younger students at A’ Level, reflecting the trend at lower levels but to a much lower extent. Finally, looking at student and school level variation that is explained by the addition of these variables, one can conclude that they no longer as important for student performance as they are at lower levels of the education system.

**Table 5: Model 3**

	A-Level	University
Intercept	2.43***	3.44***
Student Gender		
Male	0.00	0.00
Female	-0.13***	0.07**
Student Age		
Centred at 18 years	-0.04***	N/A
Level One Variance ( $\sigma^2$ ) (Explained Variance)	1.014*** <sup>ä</sup>	0.922*** <sup>ä</sup>

Level Two Variance ( $\tau^2$ ) (Explained Variance)	0.349***â	0.223*** (35.1%)â
* Significant at the 0.05 level (2-tailed);** Significant at 0.01 level; *** Significant at 0.001 level		

## Discussion:

This study was motivated by the observation that university entry, based largely on the results in the national examinations at “A” Level, is becoming increasingly competitive in Uganda. Further, there was found to be a disproportionately high number of students from only a few secondary schools being admitted to university. On the other hand, universities have observed that these entry grades are not always a reliable indicator of student performance at university. Studies at lower levels of the education system in Uganda have shown that various student- and school-level variables play a part in determining student performance in the national examinations, but not much is known of these effects at “A” Level or at entry to university. As such it was of interest to investigate the nature of the school effect both at the time students sit their A-Level examinations, and at selection for university.

It was found that the school effect within students’ “A” Level performance, as measured by the intra-class coefficient (ICC), was rather high at around 25%. It was found that school characteristics, such as being full boarding, gave students an advantage, but going to a co-educational school proved to be disadvantageous. Surprisingly, there was no advantage to attending a public or a private school, a finding contradicting findings at lower levels of education. Further, school size had a slightly negative effect within the A-level population, but a slightly positive one for selection to university; the effect of school size disappeared, however, when the number of students from the same school enrolled at the university was allowed for. On top of that, the predicted entry grades of a university student given that they came from a school with a higher total number of students enrolled at the university was also higher.

With regard to student level predictors of performance, student age had a small but significant negative slope for the A-Level students (the

variable was not available for students admitted at university), whereas the gender differences detected at lower levels of the education system have more or less disappeared by A-Level and university entry.

The main findings of this analysis have major implications for the adequacy of the university selection process. Given that it depends almost entirely on student grades in the “A” Level examinations, and seeing such a significant school effect in these grades, it is reasonable to recommend that we take a closer look at whether this is still a reliable indicator of student independent intellectual ability, and if indeed this is still a fair selection process.

A logical follow-up study would be to investigate the link between student entry grades, given their former schools, and their performance during, and at the end of university. More information on student-level variables such as socioeconomic status also need to be obtained in order to understand these effects even better.

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## SECTION 2:

### INDUCTED FELLOWS:

In this session, seven (7) distinguished scientists were inducted into the Fellowship of the Academy. Prof. Livingstone S. Luboobi, the Chairperson of the Fellows and Membership Committee of the UNAS Council presented the following nominees to the president and they were inducted into the UNAS Fellowship:



#### **Angelina Kakooza Mwesige, MB.Ch.B, MMed, PhD**

is a Senior Lecturer and Child Neurologist in the Department of Paediatrics and Child Health based at the College of Health Sciences at Makerere University Kampala, Uganda. Her major research interests are in the fields of infectious diseases and neurodevelopmental disorders, with a special emphasis on Epilepsy, Cerebral Palsy, and Autism.

She is closely involved in training postgraduate and undergraduate medical and paramedical students. She has over 20 years' experience in medical practice in low resource settings. She has led a team of researchers on a Fogarty/ NIH funded study on "Neuro Developmental Disabilities in Ugandan Children" and a Wellcome Trust (UK) multi-site study on the "Epidemiology of Epilepsy in Demographic Surveillance Sites". Currently she is a Co-PI and Ugandan team lead for an epidemiological and intervention study on "Cerebral Palsy in Ugandan Children", in collaboration with researchers from Karolinska Institute, Sweden. She is also Co-PI on a "Community-Based Cross-sectional Study of Epilepsy Prevalence and Barriers to Epilepsy Treatment in Uganda" in collaboration with researchers from Duke University, North Carolina, USA. She is doing a post-doctoral fellowship at the University of Cambridge (UK) on a study on "Zika virus: Neurocognitive Function and Genotype in Uganda". She is the President of the Commission for African Affairs of the International League Against Epilepsy (ILAE) (2017-2021). She is a board member on the African Child Neurology Association and the African Regional Committee of the International Brain Research Organization (IBRO-ARC) and founder member of

the East African Academy on Childhood Disability. She was inducted into the Fellowship of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.

### **Joel Bazira, MB.Ch.B, MMed, PhD**

is a Clinical Microbiologist, Senior Lecturer, and Head of the department of Microbiology, Faculty of Medicine, Mbarara University of Science and Technology (MUST), Mbarara, Uganda. He is a Fulbright Fellow. His expertise is in microbiological and genetic analysis. He has coordinated a postgraduate training in the Faculty of Medicine and established an MSc in Medical Microbiology at MUST. He has written over 40 articles and supervised over 10 graduate students. He has also conducted TB studies that showed the majority of tuberculosis cases in South Western Uganda were probably due to reactivation and not ongoing transmission which made giving of Anti-retroviral drugs to HIV patients to support the immune system the best way to prevent TB in this region. He has been involved in the campaign against antimicrobial resistance (AMR) through studies conducted in Mbarara. These studies have contributed to a UNAS report entitled *Antibiotic Resistance in Uganda: Situation Analysis and Recommendations*. That report was the basis for Uganda's AMR National Action Plan. In 2017, he organized the 2<sup>nd</sup> national AMR conference in Mbarara to raise awareness of the AMR. He has conducted several studies on neonatal sepsis to try to understand the etiology of neonatal sepsis. These studies have redefined the cause of neonatal sepsis in Uganda and now we are working on understanding the neonatal sepsisome and how we can predict it. Dr. Bazira was inducted into the Fellowship of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.





**Sabrina Bakeera Kitaka, MB.Ch.B,  
MMed, PhD,**

is a Senior Lecturer of Paediatrics and Adolescent Health at the College of Health Sciences, Makerere University, Kampala, Uganda. Prior to that appointment, she was a Medical Officer Special Grade at the Mulago National Referral Hospital in Kampala, as well as a Sewankambo Research Scholar. She has extensive experience in scholarship, education, and clinical practice. Her current research interests relate to health systems (specifically patient-centered outcomes) and infectious diseases (particularly among HIV infected adolescents). Her clinical interests are infectious diseases and growth and development outcomes, particularly the challenges of children transitioning into adolescence and then adulthood. She serves on various Boards and Technical Working Groups based in the Ministry of Health and she is also a reviewer of several journals. She has served as a member of the Uganda National Immunization Technical and Advisory Group (UNITAG) since its inception in October 2014 and its precursor, the Advisory Committee on Vaccines and Immunization (ACVI) from July 2012-October 2014. She has worked in the area of vaccines, including advocacy, and assessment of the effects of the HPV vaccine on sexuality of Ugandan Adolescents. She has also participated in advocacy campaigns for the Rotavirus, Pneumococcal, and other vaccines. She is a recipient of several awards. In 2003 she was a recipient of the Global Young Researchers' Award offered by the American Academy of Pediatrics. From 2004-2011 she was a recipient of the prestigious Sewankambo Scholarship which was sponsored by a Gilead Grant. She completed her Fellowship in Paediatrics Infectious Diseases in 2007. She did her undergraduate training and post graduate training at Makerere University. Dr. Sabrina B. Kitaka was inducted into the Fellowship of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.

### **Victor Musiime, MB.Ch.B, MMed, PhD**

He has worked mainly in HIV research, clinical care, and treatment. He played a key role in the setting up of the paediatrics department at the Joint Clinical Research Centre (JCRC) and was part of a team of personnel that initiated and followed up a cohort of over 2000 HIV-infected children and adolescents on antiretroviral therapy (ART). Over the years, he has been an investigator on several studies at JCRC and its collaborating institutions, including the following clinical trials: ARROW clinical trial ([www.arrowtrial.org](http://www.arrowtrial.org)), CHAPAS 2 clinical trial, CHAPAS 3 clinical trial ([www.chapas3trial.org](http://www.chapas3trial.org)), PENTA 16, PENTA 17 and PENTA 20 clinical trials ([www.pentatrials.org](http://www.pentatrials.org)), LIVING and LOLIPOP (“4 in 1”) trials sponsored by DNDi (<https://www.dndi.org>); as well as various social science studies among HIV infected adolescents; and basic science studies on both HIV exposed uninfected and HIV infected children. By February 2019, he had 64 peer reviewed scientific journal publications. He is a senior lecturer at Makerere University and in this role he supervises graduate research projects (both doctoral and masters projects). He has supervised 1 PhD and 13 masters student projects to completion. He currently has 2 PhD and 12 masters students under his supervision. His PhD research project investigated strategies to improve treatment outcomes among HIV infected children in resource limited settings, including approaches to treatment of bacterial co-infections, pharmacokinetics and dosing of first-line antiretroviral drugs (ARVs), and adverse events to the ARVs. Finally, he provides clinical care and clinical teaching (to both undergraduate and graduate students) on the paediatric wards at Mulago National Referral Hospital. Dr. Musiime was inducted into the Fellowship of the Uganda National Academy of Sciences in the category of Health and Medical Sciences.



### **Moses Osiru Omongin, PhD**

is Manager, Regional Coordination Unit (RCU) of the Regional Scholarship and Innovation Fund (RSIF), International Centre of Insect Physiology. He previously served as Deputy Executive Secretary at the Regional Universities Forum for Capacity Building in Agriculture

(RUFORUM). He holds a PhD in Agriculture (Plant Pathology). He previously worked as Regional Pathologist with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Eastern and Southern Africa and also for West and Central Africa. He has led the development of ECOWAS's Strategy and Action Plan for the Control of aflatoxins in West and Central Africa. As a consultant, he also undertook a needs assessment for African agricultural research and training institutions to enhance collaboration with Brazil. He currently serves on various Boards including that of the African Crop Science Society; the International Network for Higher Education in Africa (INHEA)<sup>2</sup>, the Steering Committee of Global Confederation of Higher Education Associations (GCHERA), the Alliance for African Partnerships of Michigan State University the World Bank funded Makerere University Regional Center for Crop Improvement and the recently launched Swedish Agriculture for Food Security 2030 Initiative Project (AgriFose). Dr. Osiru was inducted into the Fellowship of the Uganda National Academy of Sciences in the category of Agricultural Sciences.

### **Charles Masembe, BVM, MSc, PhD**

is a veterinarian, molecular geneticist, and Associate Professor at Makerere University. He has teaching and research experience in molecular genetics, diagnostics, evolution and epidemiology of important diseases of domestic animals, mainly Foot-and-Mouth Disease, African swine fever, and pathogen discovery. He has



been a visiting scientist under the Africa Biosciences Challenge Fund at the Biosciences Eastern and Central Africa (Beca-ILRI) with a main emphasis on Metagenomics. He has also been a Visiting Research Scientist at Yale School of Public Health and the Swedish University of Agricultural Sciences. Through the opportunities and platform provided by RUFORUM and other collaboration partners he has excelled in capacity and research-network building. He is now a Wellcome Trust fellow under the Intermediate Fellowship in Public Health and Tropical Medicine program; with a major focus on transmission dynamics of African swine fever in an endemic setting at the livestock-wildlife interface (<http://asf.mak.ac.ug>). He is experienced in the molecular biology and serological

techniques needed for sampling and genetics/disease investigations in a variety of species. Research in his team has generated and published scientific information for conservation of Africa's wildlife resources and patterns of disease transmission at the wildlife-domestic interface. This expertise has grown to a level that has genetically characterised animal epidemics with particular emphasis on foot and-mouth disease in the African Great Lakes Region, and is aimed at unravelling livestock-wildlife disease interactions to design efficient disease control strategies for FMD. His team has a vibrant research facility, which has in the recent past undertaken active research on a number of projects (e.g. EU-FP7-NEXTGEN; Livestock-Wildlife Diseases in EA-DANIDA; Molecular tools for schistosome biology EU-CONTRAST; Conserving biodiversity in Uganda DARWIN INITIATIVE; Smallholder pig value chain development in Uganda; ASF in Uganda-FORMAS). He holds an MSc in Environment and Natural Resources Management (Makerere University), a PhD in Molecular Population Genetics (Makerere and Copenhagen University), and Post-Doctoral training (Makerere, Copenhagen University, and the Technical University of Denmark). Dr.Masembe was inducted into the Fellowship of the Uganda National Academy of Sciences in the category of Veterinary Sciences.



**Ronald Kakungulu-Mayambalall. B, Dip. L.P. (LDC), LL.M, S.J.D**

is an Associate Professor with the Human Rights and Peace Centre (HURIPEC) and formerly a Graduate Teaching Assistant at The University of British Columbia, Vancouver, Canada (2007-2008). He lectures on human rights in the domestic perspective, consumer law and protection, introducing law and legal methods, intellectual property law, equity and trusts to undergraduate students and international environmental law, and computers & the law to graduate students at Makerere University School of Law. He has extensive knowledge on international and comparative indigenous people's law, rights of ethnic minorities, oil and gas law, economic, social and cultural rights and has also done work on the rights of indigenous communities in East Africa. He is an Advocate of the High Court of Uganda. His doctoral thesis at The University of Arizona was entitled *Indigenous People, Human Rights, and the African Problem: The Case of the Twa, Ogiek and Maasai*. He has consulted for many

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international and national agencies including IDRC, CIDA, DFID, IGAD, SIDA, DANIDA, NORAD, EASSI, KCK, and ACODE. His research interests include oil and gas law, electronic communications law and internet governance, intellectual property law, electronic commerce law. He is also interested in labour law, competition law and policy, national security and counter-terrorism Law, environmental law and extractives industry, and international human rights and indigenous peoples Law. Dr Kakungulu Mayambala was inducted into the Fellowship of the Uganda National Academy of Sciences in the category of Humanities (Law).

## ANNEX: 1

### PROGRAM

#### Session I: Annual Scientific Conference

The overall objective of the Annual Scientific Conference is to provide an independent platform through which scientists exchange ideas, knowledge, and experiences on topical issues that foster national development.

**Moderator:** Peter N. Mugenyi, Chair, UNAS Research and Publications Committee

**08:00-09:00** Arrival and Registration

**09:00-09:15** Welcome and Opening Remarks

Nelson K. Sewankambo, President, Uganda National Academy of Sciences

**09:15-09:55** Expert Presentations (20 minutes each)

*Education in the Digital Age*

Paul BirevuMuyinda, Deputy Principal, College of Education and External Studies, Makerere University

*The Assessment and Curriculum Development in Uganda*

Grace K. Baguma, Executive Director, National Curriculum Development Centre.

**09:55-10:30** Discussants and Plenary (10 minutes each and 25 minutes of plenary)

Jessica Norah Aguti, Director, Institute of Open, Distance, and eLearning Makerere University

John Emolut Okumu, Makerere University



*EDUCATION SYSTEMS IN UGANDA*

**10:30-11:00**

**BREAK**

**11:00-11:20**

***Evaluating the Adequacy of A' level Examination Grades as the Sole Basis for Entry into Universities.***

Connie Nshemerirwe, Independent Science and Policy Facilitator

**11:20-12:00**

**Interactive Discussion**

## Session II: Induction of New Fellows of the Academy

The Academy inducts eminent scientists into the Fellowship of the Academy during its Annual Scientific Conference. These scientists are nominated, shortlisted, and vetted through a rigorous process by the Fellows and Membership Committee and an ad hoc select committee that makes recommendations to Council. In this session, nominees who have been deemed worthy of becoming Fellows of the Academy will be inducted into the Academy. They will join other distinguished scientists who form the Fellowship of the Academy.

**Moderator: Christine Dranzoa, Chair, UNAS Fellows and Membership Committee**

**12:00-13:30 Induction Process**

**The activities below apply to each Inductee.**

- Inductee Introduction (Nominators)
- Oath taking (Inductees)
- Signing of the register (Inducted Fellows, Nominators, and Seconders)
- Acceptance Remarks (New Fellows)

- |                                  |                             |
|----------------------------------|-----------------------------|
| 1. Dr Angela Kakooza-Mwesige     | Health and Medical Sciences |
| 2. Dr Joel Bazira                | Health and Medical Sciences |
| 3. Dr Sabrina Bakeera Kitaka     | Health and Medical Sciences |
| 4. Dr Victor Musiime             | Health and Medical Sciences |
| 5. Dr Moses Osiru Omongin        | Agricultural Sciences       |
| 6. Prof Charles Masembe          | Veterinary Sciences         |
| 7. Dr Ronald Kakungulu-Mayambala | Law                         |

## ANNEX 2

### PARTICIPANT LIST

No	Name	Organisation
1	Victor Musiime	Makerere University, College of Health Sciences
2	Paul Birevu Muyinda	Makerere University, College of Education and External Studies
3	Nelson Sewankambo	Makerere University, College of Health Sciences
4	Ofwono W.O	Ministry of Science Technology and Innovation
5	Margaret Nabasirye	Makerere University, College of Agriculture and Environmental Sciences
6	Pauline K. Byakika	Makerere University, College of Health Sciences
7	Abigail Osiru	
8	Jacob R Opolot	Parliament of Uganda
9	David J. Bakibinga	Uganda National Academy of Sciences
10	Livingstone S. Luboobi	Strathmore University/ Uganda National Academy of Sciences
11	Peter N. Mugenyi	Uganda National Academy of Sciences
12	Jonathan Baranga	Bishop Stuart University, Mbarara/ Uganda National Academy of Sciences
13	Flavia Kabeere	Independent Consultant/ Uganda National Academy of Sciences
14	Frederick Okiru	Kyambogo University
15	Adam Babale	Local Government Finance Commission
16	JumaMwavula	Uganda Private Teachers Association

17	Charles Masembe	Makerere University
18	Moses Osiru	ICIPE
19	Joshua Osiru	
20	Daphine Nyachaki Bitalo	Uganda National Young Academy
21	Diane NabikoloOsiru	Makerere University
22	Nanfuka Juliet	Uganda Teacher's Union
23	John Muyonga	Makerere University/ Uganda National Academy of Sciences
24	Felix Opio Okello	MUNI University
25	Connie Nshemereirwe	Independent Consultant
26	Maxwell OtimOnapa	Ministry of Science Technology and Innovation
27	EmorutOkum John	National Curriculum Development Centre
29	Sabrina Kitaka	Makerere University College of Health Sciences
30	John K. Kakitahi	Uganda National Academy of Sciences
31	Deborah Baranga	Makerere University
32	David Serwadda	Makerere University
33	David Kabugo	Makerere University
34	Patrick Rubaihayo	Uganda National Academy of Sciences
35	Freddie Kasirivu	Ndejje University
36	Angelina KakoozaMwesigye	Makerere University, College of Health Sciences
37	Denis K. Byarugaba	Makerere University
38	Cale Santus	National Curriculum Development Centre
39	Paul Waako	Busitema University

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40	Esezah Kakudidi	Makerere University
41	Ivan Lule	National Planning Authority
42	Jeninah Karungi	Makerere University
43	John RS Tabuti	Makerere University
44	Christian Acemah	Uganda National Academy of Sciences
45	Paul Edward Mugambi	Uganda Vice Chancellors Forum <sup>46</sup>
46	Mukwatampola M	Ministry of Education and Sport
47	Joel Bazira	Mbarara University of Science and Technology
48	Ronald Kakungulu	Makerere University
49	Leddinous Mwebembezi	Ministry of Science, Technology and Innovation
50	David Owiny	Makerere University
51	Siima Gilbert Gift	National Curriculum Development Centre
52	Luzze Rashid	Ministry of Finance Planning and Economic Development
53	Drake Mutahakana	Kampala Capital City Authority
54	Donald Kugonza	Makerere University
55	Twaha Basamba	Makerere University
56	Lucy Ampumuza	UNAS
57	Juliet Naluwemba	Uganda National Teachers Union
58	R. Nyakabwa Atwoki	UNAS
59	Joel Musagazi	Uganda Christian University
60	Brenda Otyek	NGO Bureau
61	Archleo Kaaya	Makerere University
62	Julius Tamale	Makerere University
63	Elly N.Sabiiti	Makerere University





