

Strengthening Undergraduate Human Nutrition and Dietetics Training in Uganda: The Need to Adopt Competency-Based Education

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Abstract

Competency-based education (CBE) is advocated for, to improve the competence of professionals for health systems performance in the 21st century. Limited evidence of efforts in advancing CBE in the training of Human Nutrition/Human Nutrition and Dietetics (HN/HND) at the undergraduate level exists in Uganda. Failing to develop and validate competencies required of HN/HND professionals to perform in Uganda's health systems may limit advances towards CBE of HN/HND in the country, lead to the adoption of inappropriate competencies, and cause inefficient investments in HN/HND professional education. The purpose of this review, therefore, is to create awareness for the need to: (1) identify competencies required of HN/HND professionals to competently perform in Uganda's health systems and (2) develop and validate a competency-based undergraduate HN/HND education model suitable for use in Uganda.

Keywords: Competence, Competency, Competency-based Education, Health professionals, Human Nutrition and Dietetics Competencies, and Validation

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1. Introduction

Good nutrition underpins human well-being (Fanzo et al., 2015); the need to improve nutrition is hence upheld in the United Nations (UN) 2030 Global Agenda for Sustainable Development, the UN 2016-2025 Decade of Action on Nutrition (United Nations, 2015 & 2016) and the World Health Organisation (WHO) 2025 global nutrition targets (Branca et al., 2012). Despite the past and present global declarations and commitments relevant to nutrition, the Food and Agriculture Organisation (FAO) of the UN estimated the number of people who are undernourished to have reached 821 million globally in 2017; with Africa having the highest prevalence of undernourishment at 21%, followed by Asia at 11.4% and South America at 5% (FAO et al., 2018). For children under five years, the 2018 Global nutrition report indicates that globally, 22.2% of children are stunted, 7.5% are wasted, and 5.6% are underweight (Development Initiatives, 2018). Given the global prevalence of undernourishment, the FAO predicts the risk of failure to achieve the 2030 Sustainable Development Goals (SDGs) target on reducing hunger in some countries (FAO et al., 2018).

In Uganda, of the 15 major health risk factors in health, eight are directly related to poor nutrition (Ministry of Health, 2015a). Uganda's demographic and health survey statistics indicate that 29% of children under five years are stunted, 4% are wasted and 11% are underweight. Additionally, micronutrient deficiencies, particularly iron deficiency are also of a public health concern as 53% of the children under five years and 32% of women are anemic (Uganda Bureau of Statistics and ICF, 2018). The effects of malnutrition were estimated to have cost Uganda 5.6% of its Gross Domestic Product in 2009 alone (African Union, 2013). The causes of malnutrition in Uganda reportedly vary from inadequate dietary intake; frequent illness; food insecurity at the household level; insufficient maternal and child care; limited access to health care and a healthy environment; limited livelihood opportunities; culture, education, and awareness; and limitations in policy and financing (Government of Uganda, 2011).

In view of the multifaceted causes of malnutrition and their associated effects, addressing malnutrition

necessitates having a competent health workforce, health, and education systems capable of meeting the country's health and nutrition needs. In Uganda, the Nutrition and Dietetics professionals are a key human resource needed in the fight against malnutrition. For effective performance, Nutrition and Dietetics graduates should be equipped with the knowledge and skills required in the national health systems if their services are to be valued. It is important to note that Nutrition and Dietetics professionals are trained in different countries to provide nutrition and dietetic care services at different health systems levels (National Academy of Sciences Institute of Medicine Committee on Nutrition Services for Medicare Beneficiaries, 2000). Hence, the definition and roles of a Nutritionist and or Dietitian vary in different countries depending on the existent country training, practice, registration, regulation, and or credentialing mechanisms (Academy of Nutrition and Dietetics, 2017; Health Professions Council of South Africa, 2016).

In Uganda, the undergraduates of the Bachelors of Science in Human Nutrition offered by the Makerere University, Bachelor of Science in Human Nutrition and Dietetics offered by the Kyambogo University, and the Bachelor of Science in Human Nutrition and Clinical Dietetics by the Uganda Christian University were the legally recognized 'Nutritionists' in the country at the time of undertaking this review (Republic of Uganda, 2018b). Throughout this review, we use the term Human Nutrition/Human Nutrition and Dietetics (HN/HND) professionals to refer to the Nutrition professionals trained at the undergraduate level in Uganda and recognised as so by the Allied Health Professionals Council of Uganda (Republic of Uganda, 2000, 2018b). Other Universities offering food and nutrition related programmes at different levels exist in Uganda; the Victoria University in particular has a undergraduate programme in Human Nutrition and Dietetics while the Islamic University in Uganda has a running programme in Food Science and Nutrition. Despite the existence of HN/HND programmes in Uganda, no legal professional regulations differentiating between a Nutritionist and a Dietitian existed at the time of writing this review. Across the different universities, the traditional curriculum that is contents-based using the Carnegie Hour/Credit Unit metric of measurement is in use. The use of the contents time-based curricula is criticized for falling short of equipping graduates with the requisite competencies due to it being insufficiently adapted to the national contexts (Silva, White and Toch, 2015).

According to the United Nations Educational, Scientific and Cultural Organisation, "effective and relevant learning outcomes [in higher education] can only be achieved through the provision of quality inputs and instructional processes which enable all learners to acquire relevant knowledge, skills, and competencies" (United Nations Educational Scientific and Cultural Organisation, 2015, p. 37). Given the limitations of the traditional system of education, the need for adopting competency-based education (CBE) in the training of HN/HND in Uganda is critical if the graduates are to be adequately equipped with the knowledge and skills required for national and global health systems performance. Efforts to design and implement CBE in the training of HN/HND at the undergraduate level in Uganda require a clear understanding of the activities, roles, and existent regulations in which the HN/HND practitioners are expected to perform. There is however limited evidence of national efforts towards this endeavor despite the finding that "university graduates' training in Uganda was not exactly linked to the skills required by the employers" (National Council for Higher Education, 2013b, p.3). A study by Mucha & Tharaney (2013) observed that failure by countries with a high burden of malnutrition to "professionalize nutrition throughout the health and other sectors" was a big hindrance to scale up nutrition interventions in those countries. This review aims to create awareness for the need to: (1) identify the competencies required of HN/HND professionals to competently perform in Uganda's health systems and (2) develop and validate a CBE Undergraduate HN/HND model suitable for use in Uganda.

2. Training and Regulation of the Nutrition Profession in Uganda

A number of universities and tertiary institutions in Uganda offer academic programs in the area of human nutrition; human nutrition and dietetics; food science, food processing, and preservation; food security; and food production that are accredited by the National Council for Higher Education of Uganda as summarised in Table 1. Of all the Universities that offer undergraduate programs with a bias to food, nutrition, and dietetics in Uganda, only three universities; Kyambogo, Makerere, and the Uganda Christian University have programs whose graduates are currently recognized by the Allied Health Professionals Council to graduate as nutritionists in the country (Republic of Uganda, 2018b). However, given the difference in naming of the University programs, the undergraduates are awarded degrees in Human Nutrition, Human Nutrition and Dietetics, and or Human Nutrition and Clinical Dietetics depending on the institution awarding the degree.

The undergraduate training in HN/HND was started by the Kyambogo University in 2002, followed by the Makerere University in 2010, and other Universities thereafter. The curriculum used in the training of HN/HND by the different Uganda Universities specify learning outcomes based on the credit hour system of education. Though often used interchangeably, it is important to distinguish learning outcomes from competencies;

Student learning outcomes can be defined in terms of "the particular levels of knowledge, skills, and abilities that a student has attained at the end (or as a result) of his or her engagement in a particular set of collegiate experiences" (p. 6), but when describing learning outcomes in terms of competencies, "such

goals describe not only what is to be learned but also the specific levels of performance that students are expected to master... (Klein-Collins, 2012, p. 9).

The East African Qualifications Framework for Higher Education on the other hand notes that “Competences are fundamentally a statement that a person is able to do after achieving a particular level of learning. Some formulations of learning outcomes may not be able to satisfy this requirement for contextual specification” (East African Community, 2015, p. 32).

Some of the HN/HND units of study undertaken in the different universities are principles of human nutrition, human anatomy, human physiology, basic chemistry, communication skills, computing, diet therapy, farming, biostatistics, professional ethics, nutrition assessment, food microbiology, clinical medicine, entrepreneurship skills, research methods, mother and child care and development, food chemistry and analysis, dietetic guidance and counselling, product development, immunology, pharmacology, sports nutrition, resource and institutional catering, emergency nutrition, food and nutrition security, project planning and management. In the different university curricula, these study units are stated in terms of outcomes expected to be learned by the students but not as levels of competence that students should be able to demonstrated upon completion of studies. Worth noting too, is that differences in curriculum content exist for the different universities. Given the lack of uniformity in units taught by the different universities, the level of competence of the HN/HND graduates has informally been reported to differ both within and across universities. As a consequence, this creates challenges for both the graduates and employers.

Credentialing¹, certification², accreditation³, and licensing⁴ are all critical in professionalising the nutrition workforce (Mucha and Tharaney, 2013). The legal registration and regulation of the Nutrition Profession in Uganda is recent, having been officially started in 2018 by the Allied Health Professionals Council of Uganda. Formerly, Nutrition and Dietetic graduates practiced as “professionals” upon obtaining degrees from the respective universities without obtaining any other formal regulation and legislation. Some graduates were registering under the then existent professional bodies of the Uganda Action for Nutrition (now known as the Nutrition society of Uganda) and the Uganda Dietetic Association. Registration under the two bodies was not mandatory as none of either entity was legally recognised as a professional body by law. The two bodies however played and still play a pivotal role in uniting Nutrition and Dietetic graduates and other like-minded professionals.

The statutory requirement by the Allied Health Professionals Council currently only defines who Nutritionists are in Uganda’s context, do not differentiate between a Nutritionist and a Dietitian, and neither do they specify the standards of training and practice for the Nutrition profession (Republic of Uganda, 2000, 2018b; Allied Health Professional Council-Uganda, 2018). In some countries, unless explicitly mentioned, Nutritionists and Dietitians are registered as different professions each needing different credentials for entry into the profession. The legal mandates of the Allied Health Professionals Council of Uganda entail registration of the recognized allied health professionals; licensing and registration; and undertaking disciplinary measures against errant Allied Health Professionals (Allied Health Professional Council-Uganda, 2018).

¹ The establishment of a self-regulatory process instituted by the relevant profession to determine and acknowledge that an individual has demonstrated competence to practice (Mucha and Tharaney, 2013)

²Signifies that one has successfully completed a training course and met performance standards (Mucha and Tharaney, 2013)

³Means that training programmes are periodically evaluated based on well-defined standards (Mucha and Tharaney, 2013)

⁴Involves individuals adhering to formal legal requirements for practicing a profession and may include competency testing (Mucha and Tharaney, 2013)

Table 1: Accredited Academic Programmes in Uganda with a Bias to Food, Nutrition, and Dietetics

University		Programme Name
Bugema University	i.	Bachelor of Food Science and Human Nutrition
Gulu University	i.	Master of Science in Food Security and Community Nutrition
	ii.	Bachelor of Science in Food and Agribusiness
Islamic University in Uganda	i.	Bachelor of Food Science and Nutrition
Jimmy Sekasi Institute of Catering	i.	Certificate in Food Production Management
	ii.	Diploma in Food Production Management
Kyambogo University	i.	Bachelor of Food Science and Processing Technology
	ii.	Master of Science in Food Technology
	iii.	Bachelor of Science in Human Nutrition and Dietetics*
	iv.	Certificate in Food Processing Technology
	v.	Diploma in Food Processing Technology
	vi.	Certificate in Food Processing and Preservation
Makerere University	i.	Bachelor of Science Food Science and Technology
	ii.	Bachelor of Science Human Nutrition*
	iii.	Master of Science Applied Human Nutrition
	iv.	Master of Science Food Science and Technology
Mildmay Uganda	i.	Diploma in Human Nutrition and Clinical Dietetics
Ndejje University	i.	Bachelor of Sports Nutrition and Management
Uganda Christian University, Mukono	i.	Bachelor of Science in Human Nutrition and Clinical Dietetics*
	ii.	Master of Science in Human Nutrition
Uganda Institute of Allied Health and Management Science	iii.	Diploma in Clinical and Community Nutrition**
Victoria University	i.	Bachelor of Science in Human Nutrition and Dietetics
St. Francis School of Health Sciences	i.	Diploma in Clinical and Community Nutrition
Uganda Catholic Management Training Institute	i.	Diploma in Food Science and Nutrition
Bishop Stuart University	i.	Master of Science in Climate Change and Food Security
Uganda Martyrs University	i.	Doctor of Philosophy in Agro ecology and Food Systems
St. Augustine International University	i.	Bachelor of Clinical Nutrition

*Graduates Recognised as Nutritionist; **Graduates Recognised as Assistant Nutritionists

Source: National Council for Higher Education (2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018)

3. History of the Credit System of Education

The use of the credit system of education dates back to 1905 when the Trustees of the Carnegie Foundation for the Advancement of Teaching, founded by the U.S. industrialist Andrew Carnegie to support college professors through a pension scheme, undertook wide consultations and came to a conclusion that units needed to be used as the metric for gauging student entry requirements to colleges. At the preparatory school level, a unit represented a course consisting five periods undertaken weekly across the academic year and fourteen units were the minimum required of students to be admitted for college studies (Silva, White and Toch, 2015). Morris Cooke recommended the use of the Carnegie's student hour unit as a metric of standardizing in higher education (Silva, White and Toch, 2015). The standard Carnegie Unit was described as:

120 hours of contact time with an instructor, which translates into one hour of instruction on a particular subject per day, five days a week, for twenty-four weeks annually....In higher education, students receive "credit hours", a metric derived from the Carnegie Unit and based on the number of "contact hours" students spend in class per week in a given semester. A typical three-credit course, for example, meets for three hours per week over a fifteen-week semester. A student, then, might earn fifteen credit hours per semester (fifteen is standard full-time registration for a semester, thirty for an academic year) enroute to a four-year bachelor's degree requiring a total of 120 credits (Silva et al., 2015, p. 8).

The Carnegie unit/Credit hour/Credit unit system of education has since its adoption been the main standardization feature for the educational system of America and has also been adopted and used to define, develop and organize most education standards globally. Adaption of the Carnegie unit was based on the need to describe the meaning and use of the credit hour units in the determination of teaching loads but not for assessing how students learned as is currently used (Seymour, Everhart and Yoshino, no date).

In summarizing the lessons learned through the use of the credit system of education in different countries, Regel (1992) noted that use of the credit system of education promoted student motivation, engagement, ease of

making course choices and combinations, allowed for continuous semester assessments hence reducing examination pressure on the students, permitted better comprehension of course contents and materials by students, and to an extent reduced student repetitions. They, however, faulted the system for fragmenting knowledge and learning into small units that are sometimes unrelated.

3.1. Critique of the Carnegie Unit/Credit System of Education

The Carnegie unit has been criticized by educators and policymakers in education who want the performance of students to be more transparent and delivered in a more flexible way with options for including CBE models (Silva, White and Toch, 2015). It is argued that by mainly emphasizing the duration of time learners spend in the classroom instead of the extent to which learners master subjects, the Credit hour/Carnegie Unit metrics as used the traditional education system do discourage educationalists from closely examining the strengths and weaknesses of learners hence affecting the quality of learning (Silva, White and Toch, 2015). Also, because of the continued use of the Carnegie unit, a perceived mismatch has been viewed to exist in the knowledge and skills provided by the traditional education system vis-à-vis the needs of the employers (Seymour, Everhart and Yoshino, no date).

The processes around the credit system/hours/units have also been viewed as being “based on industrial-age, highly-structured, time-based educational models, presenting challenges in adapting these processes in an information-age economy that relies on greater flexibility and the ability to apply learning in rapidly changing circumstances” (Seymour et al., n.d., p. 4). The credit system of education has further been criticized for distorting students learning and for fragmenting higher education into unrelated small segments that often fail to produce an educated person; instead of focusing on gainful learning, the students mainly aim to accumulate academic credits (Regel, 1992).

The Carnegie Foundation in defending the usefulness of the Carnegie Unit reiterated that the Carnegie Unit was only developed with an intention of contributing to the standardization of how students were to be exposed to the learning material through adequate instruction but not the measurement of what was learned by students. In its view, instructors are the ones mandated to assess real student learning through the use of different assessments. As such, the foundation concluded that those using the Carnegie Unit for assessing the quality of learning by students overlooked the intended use of the Carnegie Unit (Silva, White and Toch, 2015). The Carnegie Foundation further argues that limited evidence exists in support of the idea that shifting from the Carnegie unit would improve the way students perform or reduce the imbalances and inadequacies existent in education. It, however, called upon educators and education policymakers to “systematically test new learning standards, high-quality assessments, and accountability models that focus greater attention on student learning-exploring not only which innovations work, but for whom and in what circumstances” (Silva et al., 2015, p. 31).

4. Conceptualising Competency, Competence, and Competency-based Education

Some authors use competence(s) and competency(ies) interchangeably (Sultana, 2009). According to Royce Sadler as cited by Blomeke et al., a competency is a skill or a practice that can be identified whereas competence comprises of “discrete competencies which can be tested independently by objective means... involves being able to select from and then orchestrate a set of competencies to achieve a particular end within a particular context” (Blömeke, Zlatkin-Troitschanskaia, Kuhn, & Fege, 2013, p.5). Other authors define competence as an individual’s “proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development” (European Commission, 2015, p.22). The Accreditation Council for Education in Nutrition and Dietetics in reference to the Dreyfus Model of Adult Skills Acquisition recognizes that professional skills development in nutrition and dietetics occurs in a number of stages; from being a novice to an advanced beginner, competent, proficient, and eventually an expert (Bruening *et al.*, 2015); progress from one level to another requires didactic education and supervised practice.

4.1. Competency-Based Education

Those in critique of the traditional system of education, which is based on the Carnegie/Credit Unit of measurement, support reforming higher education through use of the CBE approach. CBE has also been forecast to lead to education reforms and transformations in the early 21st century (Frenk *et al.*, 2010). The Council on Education for Public Health (Council on Education for Public Health, 2011) defines CBE as:

An institutional process that moves education from focusing on what academics believe graduates need to know (teacher-focused) to what students need to know and be able to do in varying and complex situations...CBE is focused on outcomes (competencies) that are linked to workforce needs, as defined by employers and the profession...Competencies reinforce one another from basic to advanced as learning progresses (p.1).

Medina (2017) highlighted that unlike as is in the credit systems of education, CBE emphasizes the measurement of how much students have learned not the time they spend learning. Mcclarty & Gaertner, 2015)

explained that models of CBE are developed in different forms but usually have two elements in common; a competency framework and competency assessments. Accordingly, the knowledge, skills, and abilities essential for performing the particular tasks are comprised in the competency framework.

Adopting CBE models has been shown to have societal, practice, and policy implications. At the societal level, CBE models are reported to have the ability to open up possibilities for higher education to transition from the industrial to an information society as well as allow for the restructuring of the economics of higher education and increase the access to education by the underserved population. At the practice level, CBE models are reported to have the ability to solve the issues achieving outcomes and accountability that face many institutions. At the policy level, it is thought that if policymakers realise the value of CBE and have it funded as the credit hour based systems there will be potential for growth of CBE programs (Seymour, Everhart and Yoshino, no date). As a critique to CBE, Oyugi (Oyugi, 2015) argues that implementers of CBE will have to deal with what he described as “very complex problems [that] go beyond the capacity of any one organisation to understand and or respond to” (p. 74).

4.2. Practices in Developing Competency-based Education Models

A review of effective practices for developing CBE models (McIntyre-Hite & Monica, 2016) identified some of the following practices effective: engagement of external experts, technical persons on the subject of concern, and employment agencies; identifying who the stakeholders are prior to writing the competencies; defining competencies first at the start of developing the program; using a backward design process i.e. what learners should know and be able to do if they are to become successful; engaging in an iterative process; getting information from numerous employment agencies within the field of concern so that the competencies developed reflect the diversity in what is expected and the roles; and using industry professionals standards. Developing competency-based programs also necessitates that different stakeholders have consensus on key aspects. The use of the ‘Delphi’ survey technique has been reported to enable decision making in situations where information may be contradictory or insufficient to establish consensus on a number of aspects (Felicity, Keeney and Hugh, 2000). Delphi is a process of establishing consensus on a given phenomenon whereby written documents are circulated to a selected group of specialists in a different round, with each round incorporating the feedback from the previous round until consensus has been achieved among the experts (Haggerty *et al.*, 2007).

4.3. Examples of Global and National Reforms towards CBE in Nutrition and Dietetics

Table 2 presents a summary of progress towards the development and uptake of Competency standards in the training of nutrition and dietetics cadres in different regions and some countries. Accordingly, the uptake of CBE exists more in the developed than in developing countries. In Europe, two projects; the Definition and Selection of Competencies: Theoretical and Conceptual Foundations and the Tuning Education Structures in Europe (also known as Tuning Project) were undertaken in the early 2000s. These projects broadened the understanding of competence and its eventual foundation in contributing to reforming higher education in Europe by the adoption of the CBE model (OECD, 2001 and González & Wagenaar, 2003). In the United States of America, the Commission on Dietetic Registration developed what it termed “Essential Practice Competencies for the Commission on Dietetic Registration’s Credentialed Nutrition and Dietetics Practitioners” (Accreditation Council For Education in Nutrition and Dietetics, 2015). Accordingly, the essential practice competencies “define the knowledge, skill, judgment and attitude requirements throughout a practitioner’s career, across practice, and within focus areas. Competencies provide a structured guide to help identify, evaluate, and develop the behaviors required for continuing competence” (p. 4).

In Africa, the African Union is undertaking efforts to enhance the quality of higher education; the CESA 2016-2025 is focused to enhance competency-based learning outcomes (African Union, 2016). In the Sub-Saharan Africa region, attempts towards CBE are noted to be taking root, however more in medical education (Ngassapa *et al.*, 2012 and Kiguli *et al.*, 2014). Only South Africa and Ethiopia seem to have defined and adopted competencies to inform CBE for their nutrition and or dietetic profession (Health Professions Council of South Africa, 2016, Save the Children & Jhpiego, 2012). There was limited evidence of national efforts to adopt CBE in the training of HN/HND at the undergraduate level in the six East African countries at the time of writing this review. However, these countries are expected to adopt and or adapt competencies from the East, Central, and Southern Africa (ECSA)-Health Community pre-service nutrition model curriculum (2017) to which they are members. For Uganda in particular, attempts towards instituting CBE in higher institutions of learning have only mainly been undertaken in medical education (Kiguli *et al.*, 2014) and in Business, Technical, and Vocational Education and Training (Uganda Ministry of Education and Sports, 2011).

Table 2: Nutrition and Dietetics Competencies in Selected Regional and National Frameworks/Models

Region/ Country	Competency frameworks	Identified Competency Areas /Domains/Themes
Europe	Yes	“Healthcare professionalism; knowledge base of dietetics; dietetic process and reasoning; evidence-based dietetic practice; autonomy, accountability, and quality in dietetic practice; [and] communication, relationships, and partnerships skills in dietetics” (European Federation of the Associations of Dietitians, 2016, p.2).
United States of America	Yes	“Ethics and professionalism; communications; leadership and advocacy; critical thinking and decision making; informatics; research, evidence-informed practice and quality improvement; safety and risk management; food, nutrition and dietetics and physical activity; education and counselling; clinical care; business, industry and product development and marketing; community and population health; food service management; [and] organization management” (Accreditation Council For Education in Nutrition and Dietetics, 2015, p.5).
Canada	Yes	“Professional practice, communication and collaboration, nutrition care, population, and public health, and management (Partnership for Dietetic Education and Practice, 2013, p.2).
Australia	Yes	“Practices professionally; positively influences the health of individuals, groups and/or populations to achieve nutrition outcomes; applies critical thinking and integrates evidence into practice; collaborates with clients and stakeholders (Dietitians Association of Australia, 2015, p. 1-2).
Newzealand	Yes	Food, Nutrition and health expertise; communication and collaboration; management and leadership; professionalism; and scholarship (Dietitians Board, 2017).
United Kingdom	Yes	“Communication; personal and people development; health, safety, and security; service development; quality; equality, diversity, and rights; promotion of health and prevention of adverse effects; assessment and treatment planning; interventions and treatment; and information collection & analysis” (British Dietetic Association, 2018a, British Dietetic Association, 2018b, p.4).
East, Central, and Southern Africa Health Community	Yes	“Communication skills, basic applications in [information communication technology], principles of human nutrition, nutrition in the life cycle, nutrition assessment, ethics and integrity for professional practice, health education, nutrition in disease/conditions management, basic health information systems management, basic sociology, basic psychology, and leadership and management” (East, Central, and Southern Africa-Health Community, 2017, p.14). Note: No East African country (Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda) has rolled out CBE in HN/HND training; they are expected to adopt/adapt from this Regional Model Nutrition Curriculum.
South Africa	Yes	“Nutritional and other basic sciences; screening/needs assessment/situation analysis; nutrition planning, implementation, monitoring and evaluation; food service(management); food and nutrition security; communication and advocacy; management and leadership; education, training, promotion and capacity building; research; strategies, policies, and guidelines; and critical cross-field outcomes/student attributes” (Health Professions Council of South Africa, 2016, p.5).
Ethiopia	Yes	“Community mobilization; nutrition counselling; prevention and dietary management of diet-related, non-communicable diseases; nutrition information system-maintaining records, compiling and reporting; undertaking of rapid assessment and management of nutritional problems in emergencies; nutrition program planning (nutrition intervention planning); application of life-cycle approach in addressing nutrition problems (address nutrition problems in a life-cycle perspective); conducting nutritional surveillance; conducting nutrition-related operational research; and nutrition-related capacity-building (participate in nutrition training)” (Save the Children & Jhpiego, 2012, p.5-6).

4.3. Policy Basis for Adopting CBE in Undergraduate Training of HN/HND in Uganda

The need to transform higher education in Uganda mirrors recommendations by the experts attending the March

2014 Castel Gandolfo workshop that charged national academic institutes with the role of creating competencies matching the local needs and settings for the human resources needed for delivering nutrition in the SDGs era (Fanzo *et al.*, 2015). Policy frameworks, strategies and plans exist at global, continental, regional, and national level in support of the need to adopt CBE in the training of HN/HND in different countries. In Uganda's context, the need to adopt CBE in HN/HND training can be adapted from different frameworks. The Table 3 provides an inexhaustive summary of Declarations, policy frameworks, strategies and plans that can be reasoned upon in favour of adopting CBE of HN/HND in different Uganda and other countries.

Table 3: Examples of Declarations, Policy Frameworks, Strategies and Plans that can be used in Favour of Adopting CBE in Nutrition and Dietetics Training

Global
1. Transforming our World: The 2030 Agenda for Sustainable Development (United Nations, 2015)
2. Global Nutrition Targets 2025 (World Health Organization, 2014)
3. Incheon Declaration and Framework for Action for the Implementation of Sustainable Development Goal 4 (United Nations Educational Scientific and Cultural Organisation, 2015)
4. SUN Movement Strategy and Roadmap 2016-2020 (SUN Movement Strategy and Roadmap 2016-2020, 2016)
5. Rome Declaration on Nutrition (FAO and WHO, 2014)
6. United Nations Decade of Action on Nutrition 2016-2025 (United Nations, 2016)
7. Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition (World Health Organization, 2012)
8. International Covenant on Economic, Social, and Cultural Rights
9. General Comment 12 on the Right to Adequate Food (UN Economic and Social Council, 1999)
Continental
1. Continental Education Strategy for Africa 2016-2025 (African Union, 2016)
2. Multi-sectoral Nutrition Action and Plan 2018-2025 (African Development Bank, 2018)
Regional Frameworks
1. Principles and Guidelines for Quality Assurance in Higher Education in East Africa (Inter-University Council for East Africa, 2014)
2. East African Qualifications Framework for Higher Education (East African Community, 2015)
National Frameworks
1. The 1995 Constitution of the Republic of Uganda (as amended)
2. Uganda Vision 2040 (National Planning Authority, 2010)
3. Second National Development Plan (NDPII) 2015/16-2019/20 (Government of Uganda, 2015)
4. The Universities and Other Tertiary Institutions (Amendment) Act, 2016 (Republic of Uganda, 2006)
5. Health Sector Development Plan 2015/16-2019/20 (Ministry of Health, 2015b)
6. Social Development Sector Plan 2015/16-2019/20 (Ministry of Gender, Labour and Social Development, 2016)
7. Agriculture Sector Strategic Plan 2015/16-2019/20-Draft
8. Reproductive Maternal, Newborn and Child Health Sharpened Plan for Uganda (Republic of Uganda, 2013)
9. National Integrated Early Childhood Development Policy of Uganda (Republic of Uganda, 2016)
10. Other National Sector Policies, Strategies and Plans
11. National Anaemia Policy (Ministry of Health, 2002)
12. Second National Health Policy (Ministry of Health, 2010)

5. Conclusion

Malnutrition undermines human wellbeing and development. A growing momentum hence exists at the global, regional, and national level to improve overall nutritional wellbeing. Nutrition and Dietetics professionals are a key human resource in the fight against malnutrition at all levels. To be competent however, the graduates of Nutrition and Dietetics ought to be equipped with the knowledge and skills required for national health systems performance. The current training of HN/HND across the different Universities in Uganda still follows the traditional time-based system of education that uses the Carnegie Unit of measurement. Use of the traditional contents based curriculum is criticised for falling short of equipping graduates with the knowledge and skills required for national health systems performance. Current reforms in higher education are currently geared towards the adoption of CBE which unlike the traditional education system focuses on equipping graduates with the competencies needed for work. A number of developed countries have undertaken reforms of their education systems towards the adoption of CBE in the training of Nutrition and Dietetics professionals. In developing countries, however, CBE is so far mainly being adopted in medical education.

In the face of the current global and regional shifts in responding to the burden of malnutrition, the need to:

define country-specific competencies required of HN/HND professionals, develop and validate an undergraduate HN/HND CBE model, and adopt CBE in the training of HN/HND at the undergraduate level in Uganda should not be underestimated. Also, given that the regulation and registration of HN/HND is recent in Uganda, much to be desired in the way of developing standards of training as well as the codes of ethics and practice for the nutrition and dietetics profession. Based on literature reviewed, this can partly be attained by undertaking research to answer some or all of the following questions:

1. What are the nutrition/dietetic needs and demands of the population in Uganda?
2. What is the scope of training of HN/HND in Uganda?
3. What are the competencies required of HN/HND undergraduates to perform in Uganda's health systems?
4. What are the characteristics of a competency-based education model that can be used for the training of HN/HND and Dietetics at the undergraduate level in Uganda?
5. To what extent do HN/HND curricula currently used by academic institutions of Uganda address the competencies comprised in the developed CBE model?
6. What is the expected practicality and effectiveness of using the developed competency-based education model in the training of HN/HND at the undergraduate level in Uganda?

Results of such a study can be used to: create stakeholder awareness on the need to promote CBE in HN/HND training; foster reformations in university HN/HND training so that curricula are more responsive in equipping graduates with the knowledge and skills to manage the national and population HN/HND needs; improve multisectoral nutrition stakeholders understanding of the value and roles of HN/HND professionals in Uganda; improve the quality of nutrition services delivered in the national health system; lead to the development of training and practice standards for the HN/HND profession as well as lead to improvement in the regulation and accreditation of the Nutrition and Dietetics profession in Uganda.

The failure to develop and validate competencies required of Nutrition and Dietetics professionals to perform in Uganda's health systems may on the other hand limit advances towards the adoption of CBE in training of HN/HND in the country. It may also cause the wholesale adoption of competency frameworks from other countries which may be irrelevant to the advancement of local health systems performance (Frenk *et al.*, 2010); lead to the adoption of inappropriate competencies, and cause inefficient investments in Nutrition and Dietetics professional education in Uganda.

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