

## **A Curriculum for Master of Science in Physiology of Mbarara University of Science and Technology in Uganda**

Miriela Betancourt Valladares<sup>1\*</sup>

Kasiisi Balaam<sup>2</sup>

Namayanja Rosemary<sup>2</sup>

Kiguli James Mukasa<sup>2</sup>

José Luis Cadenas Freixas<sup>3</sup>

Genny Dominguez Montero<sup>4</sup>

Marjories Mirabal Nápoles<sup>3</sup>

José Enrique Alfonso Manzanet<sup>5</sup>

<sup>1</sup>Department of Biomedical Sciences, Faculty of Dentistry, Camaguey Medical University, Cuba. Staff member of Department of Physiology, Mbarara University of Science and Technology, Mbarara, Uganda from October 2012 to October 2016 and Head of Physiology Department from 2014 to 2016.

<sup>2</sup>Department of Physiology, Mbarara University of Science and Technology, Mbarara, Uganda.

<sup>3</sup> Universidad de Ciencias Médicas de Camagüey, Cuba.

<sup>4</sup> Florida Municipality Campus, Camaguey Medical University, Cuba. Staff member of Department of Pharmacy, Mbarara University of Science and Technology, Mbarara, Uganda.

<sup>5</sup> Universidad de Ciencias Médicas de La Habana, Cuba.

\*Author for correspondence. E-mail: [mbetan.cmw@infomed.sld.cu](mailto:mbetan.cmw@infomed.sld.cu),

[betancourtvalladares@gmail.com](mailto:betancourtvalladares@gmail.com)

## ABSTRACT

New regulations together with the development of science and teaching demanded to write a curriculum for postgraduate training in Physiology in Mbarara University of Science and Technology (MUST). Objective: to design a Curriculum for Master of Science in Physiology at MUST. Methods: A qualitative study was conducted during one year under the guidance of the Curriculum Committee. The process was organized in three major phases: identification of needs and analysis of relevant documents; curriculum writing; assessment, review and submission. Some accomplished tasks included analysis of regulations, guidelines and other postgraduate curricula; identification of the learning needs and mandatory courses; designing of courses and other components, meetings, discussions and workshops; submissions and internal review. Relevant theoretical and empirical methods included analysis and synthesis; interviews; scientific observation; documents and bibliography review and experts consulting. This curriculum review process allowed to incorporate a new side to the previous programme: the teaching skills and aspects of Pathophysiology. Results: The curriculum was designed, presented, reviewed and approved to resume the training by the Department of Physiology, MUST and the first group of postgraduates started it in August 2016. Conclusions: the curriculum for Master of Science in Physiology, produced in less than one year of collective and intense work is being followed to train postgraduates at MUST. Without this curriculum, the training of Physiologists at MUST was not going to be possible despite the needs of the University and the region.

**Keywords:** curriculum design, postgraduate training, learning needs, physiology, competencies.

## INTRODUCTION

MUST was founded in 1989, and ever since its Academic program me sare intended to be tailored towards the Government effort of solving Uganda's economic problems by producing the skilled manpower in all relevant areas. The process of curriculum development at MUST (like other Universities in Uganda) is a responsibility of the staff and the Faculty/University authorities which could call experts or get assistance from experienced Universities or professionals in specific fields.

There are seven Degree Programmes and 12 Master's Degree Programmes currently running within the Faculty of Medicine, one of which used to be Physiology. The Department of Physiology was a pioneer in the Faculty and had been training postgraduate students for some time with a curriculum that followed the standards of the past. New regulations and guidelines together with the development of science and teaching in the country, the region and the world, demanded to write a new Curriculum for Master in Physiology in order to resume the training at MUST according to the current needs and standards, concurrently with the migration of the University to the Semester system.

## **METHODS**

Under the guidance of the Curriculum Committee Faculty of Medicine; based on the experience of the staff in Physiology Department and with the support of other Departments of the University and experienced colleagues; from June 2015 to June 2016 a qualitative study was conducted.

The process was organized in three major phases where the following tasks were accomplished:

### **Phase 1:** Identification of needs and analysis of relevant documents

1. Analysis of the New Guidelines and Regulations
2. Identification of the learning needs to be satisfied during the training
3. Identification of the basic skills to be developed in the trainees
4. Identification of mandatory courses to be included in the curriculum based on the identified needs
5. Identification of other needs or areas to be covered besides the science related but to satisfy the demands of the University/country/region
6. Analysis of current curricula followed by several universities in Uganda and abroad
7. Analysis of the old curriculum followed by the Department to train Physiologists

**Phase 2: Curriculum writing**

8. Interviews with personnel from other Departments to be involved in training
9. Designation of staff members to be responsible for designing the courses/components of the curriculum
10. Designing of courses and other parts of the curriculum by the designated members
11. Groups discussions, workshops and meetings to review and improve the product and its components.

**Phase 3: Assessment, Review and Submission**

12. Final internal assessment
13. Departmental review
14. Submission to the Curriculum Committee
15. Review and Re-submission

**Relevant theoretical and empirical methods used are listed below**

Analysis and synthesis: of the documents, past and current situation; to characterize it and arrive to conclusions.

Interviews: to the university authorities, physiologists, experienced professors of higher education and students.

Scientific observation: to identify needs based on experience and skills of current staff; and new demands of the society and universities around.

Documents and bibliography review: to analyze them, establish tendencies, update information about curriculum design, guidelines and Postgraduate training in Physiology both national and abroad.

Experts consulting: to assess the validity of the methods, relevance of courses and contents, allocation, didactic conception.

**RESULTS and DISCUSSION**

The Curriculum was developed according to the current guidelines for Higher Education in Uganda and reflects the internationally accepted standards about appropriate graduate education in Physiology.<sup>1-4</sup>

The process incorporated a new side to the previous programme: the teaching skills and aspects of Pathophysiology.

The content intends to both recall basic aspects of Physiology and go further and deeper in this field.

The future Physiologist graduated shall be able to master general and basic phenomena related with all the living systems with a comprehensive approach, and will understand the specific mechanisms, showing detailed knowledge down to the cellular level reaching the molecular mechanisms implicated in the functions under study, to eventually integrate them in the body as a whole.

This curriculum will benefit in achieving a competent physiologist, capable of conducting independent research for the advancement of medical sciences, and a good teacher in Physiology that is not only the goal of Uganda and MUST but other countries as well.<sup>4-6</sup> Upon completion of the programme, the candidate is expected to exhibit the following core competencies:

- Competency as a physiologist with advanced knowledge of physiological processes integrated to achieve the overall function of the whole body in interaction with the environment and its changes.
- Competency to understand the pathophysiological mechanisms leading to disturbances in relevant conditions or diseases.
- Competency to understand the basics behind management/treatment of patients

The period of study for the Master Degree is four semesters for full- time and the maximum time allowed shall be 4 years. The program is based on lectures, course work, practical, self-learning and research. Students must attend all the Physiology lectures, practical and seminars with the Medical students in the Faculty of Medicine during the first year of studies and will work as demonstrators under the mentor supervision. The above is in agreement with the duration and structure of other graduate programmes established in other Universities all over the world.<sup>5-7</sup>

There is room, in this curriculum, for the postgraduates to have the opportunity to apply the theory to real cases/situations. The student will carry out a research, make the report/dissertation as well as will deliver lectures, conduct practical sessions and tutorials to undergraduates, under supervision by lecturers.

Six courses will be delivered each semester during first year. Four courses will be delivered in the second year first semester; one of which is the development of the research proposal. During the second semester second year, the student will conduct the experimental phase of the research and write the research report.

Three courses are designed for the student to develop practical skills. Two courses are designed to train the student in Research methodology and Biostatistics and two to acquire basic knowledge and skills in University pedagogy.

There is a course in the second year, thought for the student to link the physiology and the pathophysiology learned to clinical cases in order to strongly integrate the basic science with clinical knowledge as foundation of pathophysiology; in line with the international tendency.<sup>5,6</sup>

This Master's programme is therefore intended to produce in-depth specialized personnel to meet the prevailing high demand for professional Physiologists. The first group of postgraduates started their training, following this curriculum in August 2016.

The need for trained physiologists is better appreciated when one considers the spread of medical schools across the region (Africa and Uganda) and the staffing problem. New undergraduate and postgraduate programs are emerging in both recognized and recently opened Institutions which are demanding physiologists to train their students.

## **CONCLUSIONS**

Under the guidance of the Curriculum Committee, MUST; the support and mentorship from experienced colleagues; the staff of the Department of Physiology produced a Master of Science Curriculum in less than one year. The semester system curriculum follows the current guidelines and is in line with the national demands. Without this curriculum, the training of Physiologists at MUST was not going to be possible despite the urgent needs of the country.

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