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**FEATURE**

**Biomedical Research: An Indispensable Partner  
of Graduate Health Education**

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*ABSTRACT - Graduate health education is facing challenges for quality and global standards. The paper discusses the rationale and the strategies of how to face these challenges through instructional innovations and biomedical research. Conventional classroom instruction depends much on book knowledge that can lose credibility unless it is backed up by innovation and actual research by the professor and the students.*

*Graduate health education must be research-based and research-oriented. Credible graduate professors and their students are not mere users of knowledge but active generators of it. The graduate professors are expected to do research in their field of expertise. The first-hand knowledge that derives from their research increases their authority before their students when discussing related content. Furthermore, their study allows a deeper understanding of the content of the courses they are teaching and opens insights into instructional innovations. Students may well be inspired to become directly involved in research as part of the related learning experiences required for the course. These steps begin to address the challenges for quality and global standards in graduate health education. Research must be carried on by the collaborative efforts of experts in interrelated disciplines. This could lead to productive research output with highly efficient use of resources.*

**Introduction**

Graduate Health Education faces challenges in improving instruction through innovation and creativity. Quality and creativity

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are part of any research-based instructional program. It is through this program where the professor, the key mover of graduate education, brings research results into the classroom in order to understand the theories and concepts of human health and disease. Importantly, the scheme includes hands-on exposure of the students to actual research either by the direct supervision of the graduate professor or by collaboration with relevant research from other educational institutions. Thus, it is imperative that the graduate professors themselves be researchers so that they can establish their competence and credibility as educators in their field of expertise. This understanding of instruction implies that the graduate professors and their students are expected to be likewise authors or active generators of knowledge, not just mere consumers.

However, only a little over 60% of graduate professors in health education in the Philippines and 90% worldwide are actively involved in research. This means that the rest of them are hibernating in mere classroom instruction and book knowledge. This group keeps repeating the same lectures through the years. They often hold passive lectures without updating their lecture notes, references and other lecture materials, including their teaching strategies and approaches. Among them too, are those who depend much on the conventional chalk and board lecture because they resist or fear learning how to use the state-of-the-art computer technology, research facilities, and audio-visual materials. While graduate professors are expected to command their authority and inspire their students to learn from them, they must also be urged to research in their field of expertise.

The diversity of disciplines and depth of knowledge within a well-trained research group or laboratory have the potential to change the way people view problems and to minimize their tendency to make mistakes and to work on trivial problems. Scientists make major discoveries by working on significant problems, which are "do-able." For graduate professors to do research, it is best that they work with a research group that has diversity and depth; thus, the likelihood of straying into unproductive areas is reduced. If scientists work in environments where there is diversity across disciplines and depth, and have frequent and intense interaction with those having complementary interests, the probability is increased that the quality of their work will improve. It is the diversity of disciplines and

paradigms to which individuals are exposed with frequent and intense interaction that increases the tendency for creativity and for breakthroughs to occur. Working in an interdisciplinary environment without intense and frequent interaction among members of the work group does not tend to lead to new ways of thinking or major discoveries.

## **Graduate Health Education**

### **Beginnings of Health Education**

Health education can be traced from the 1930's along with the development of university-based professional preparation programs with bachelor's and graduate degrees. Health education degree programs in higher education came through the universities that had integrated both research and instruction. From the universities, then, came the schools of public health, schools of health, schools of health and human services, and the schools of the health professions. These schools commonly aimed to train competent health education professionals.

### **Learning Objectives for Health Education**

Clear and measurable learning objectives should be stated in terms of what the successful graduate students will know or be able to demonstrate after they have received a public health degree. Thus, it is important that these learning objectives be the basis for curriculum planning, development and revision of courses, evaluation of student achievement, and the evaluation of the whole program. Schools may vary in focus and orientation. Thus, orientation must also be considered in the development of the learning objectives.

### **Problem-based Curriculum**

Problem-based curriculum is a must in developing health education curriculum. It focuses on learners and what they can do, rather than on teachers, and tends to achieve better transfer of learning and more permanence research plays an integral in meeting the challenge of part. This learning method allows the development of

competencies needed to carry out the expected outcomes of learning. When learning problems are presented, research opens the gate to their corresponding solutions.

### **Basic Skills Training**

A program in health education provides basic skills that equip the student to carry out Problem Based Learning. Such skills are offered through the required public health core courses with research as their indispensable component. These include epidemiology, biostatistics, environmental health sciences, health services and administration, and the social and behavioral sciences.

### **Research Competence in Graduate Health Education**

#### **Technology For Research Competence**

The application of technology to research competence is imperative in graduate health education. Research uses technology in the generation of knowledge, insights, and new technologies. This forms a cyclical pattern of technology and knowledge as vehicles of research, which generates new knowledge and technology. The process requires interdisciplinary competence of the faculty and the facilities of the school in order for research to become possible. This implies that the emphasis on technology and research competence does not limit the school to board-and-chalk classroom settings. Rather, instructional facilities must provide hands-on experience for students through access to technology, laboratories, medical facilities, the community, and to information technology. Through these avenues, the impact of learning moves the student into a continuum of theory and practice.

#### **Evidence-Based Teaching**

The trend of graduate health education has shifted to evidence-based teaching that calls for the presentation of research results for the enlightenment of concepts. However, teaching does not end with the discussion and evaluation of research papers. They are not treated as mere support for book knowledge, but as challenges to carry out further investigation. From this standpoint, the classroom setting serves as the forum for the conception of research problems that can be addressed by the class. Skills in the conceptualization, design, data

gathering and interpretation of research results can then be developed through a facilitator-professor who is competent in research.

### **Research Pursuits**

Research methodologies do not need to be complicated in planning research endeavors, especially for students who are presumed beginners in research. The pursuit may start with simple surveys, assessments or evaluations before more advanced schemes can be employed. Further, respondents may not be large or distant, but the conditions and needs of the immediate communities should be assessed and addressed promptly before going any further.

Aside from classroom instruction, the challenges that go with the conduct of research activities require the graduate faculty and students to be equipped with health education research and technology through active attendance in seminar workshops in research. This will further develop competence and excellence in health science education and research for which the school can be known. Seminar workshops should include research design, statistical analysis and interpretation, writing and publication of research results, and the use of information technology in the promotion of health education research. All these are geared to fostering excellence in the teaching-learning process under the guise of research pursuits in health science education.

### **Research Consultation and Collaboration**

Graduate health education programs are improved when the school enters into a memorandum of agreement for mutual internship and research consultation and collaboration with a medical center facility and its faculty. This collaboration exposes the students to the clinical environment as fertile ground for the application, evaluation and testing of the concepts and theories learned in the classroom. Importantly, the medical center is also a rich venue for the conception of innovations in health education and research.

Research and health-related skills are acquired and developed from the academic and laboratory exposures of students. These skills are refined through consultation and collaboration with outside experts and related institutions. Other schools employ such schemes through supervised internship programs and direct consultation with the collaborating institution and its faculty. The collaboration

program allows both institutions to direct and assist students in hands-on exposure to the health service setting and in the conduct of health-related research, including standardization and strengthening of the content and the implementation of the program. Also, both institutions get mutual credit for research outputs arising from the collaboration through co-authorships and acknowledgments.

### **Current Research Challenges in Graduate Health Education**

#### **Trends and Opportunities**

Biomedical research in graduate health education has currently addressed researchable areas in the global perspective. With the completion of the human genome project, institutions have redirected their reservoir to funding those research projects that directly deal with specific human diseases. An expanded multidisciplinary approach has been employed in the understanding and treatment of disorders that plague the human race. In so doing, the state-of-the-art DNA technology has been fully used in coordination with other fields of expertise from the biomedical to physical sciences. Foremost among the diseases that are currently studied are cardiovascular diseases, cancer of all sorts, diabetes mellitus, lifestyle-related diseases, and a number of heritable disorders.

#### **Researchable Areas in Public Health**

Population and epidemiological studies that address public health concerns are important as bases for further investigations in the basic biomedical sciences. Thus, it is imperative that simple surveys, assessments and evaluations of community health be given equal importance. Public health research, indeed, caters beyond the individual in search for solutions to the characteristic problems that humans face at the population or community level. This context revolves within the framework that human suffering of illness and death can be prevented. And this is the essence of graduate health education.

Socioeconomic status has been regarded as the primary factor for health and well-being. Thus, the link between health and wealth has to be further addressed through research. Death and disease have been rampant among the rural and urban poor, among ethnic groups in the far-flung areas, and among the lower class workers in the

industrial sector. The poor are often the victims of unfair social treatment, poor education, lack of medical care, unemployment, and unhygienic surroundings. Other important reasons behind this picture have remained as challenges for research. These reasons must be known to become bases for definitive action and solutions.

## **Biomedical Research**

### **Basic Biomedical Research**

Basic biomedical research is research conducted to increase fundamental knowledge and understanding of the physical, chemical and functional mechanisms of life processes and disease. It seeks to investigate fundamental questions that add to the primary storehouse of knowledge. It often involves observing, describing, measuring and manipulating natural systems. It provides the building blocks upon which other types of research are based. Moreover, it discovers explanations of processes and phenomena in humans as highly complex organisms.

### **Applied Biomedical Research**

In contrast to basic biomedical research, applied biomedical research seeks to understand specific diseases in terms of their characteristics, onset, manifestations, management, treatment, and their relationship with predisposing factors. These diseases are addressed in a macroscopic view from the patient or victim to their characteristic behavior in the population.

### **Features of Biomedical Research**

**Scientific.** Biomedical research is a scientific endeavor. It employs the scientific method of investigation. It starts from the identification and definition of the research problem, thorough planning, designing and implementation of the data gathering procedure, data analysis and interpretation, and finally a dynamic pursuance of further investigations.

**Scientifically diversified and multidisciplinary.** Experts in various biological disciplines and medical specialties and sub-specialties compose a team of researchers in biomedical research. It is recognized that tangible outputs come from the coordinated efforts

and teamwork of the researchers. Individual effort may claim research originality, but the significance and impact may not satisfy the expected role of research. In biomedical research, several experts pool their resources and expertise to attack a single but multi-faceted research problem.

**Emphasizes depth and quality.** Programs in biomedical research are composed of series of studies that are grouped according to specialized disciplines. These programs start from basic investigations that later proceed to in-depth investigations both in the laboratory and in field conditions. The various studies of the program address several specific aspects of the main research problem that go deeper and become more focused. The program scope is wide but each specific study permeates deep. The approach ensures quality output while the specifics of the problems are thoroughly investigated by experts of various specialized fields in the biomedical sciences and in the related disciplines.

**Discourages differentiation.** One important setting in biomedical research centers is the accessibility of each of the researchers and their respective research departments. The set-up encourages open consultation and communication of all the researchers at any time within the work hours. Likewise, they have common places to go to openly discuss their endeavor such as a researchers' lounge, central dining hall, central laboratory. There may even be the presence of journal clubs and interdisciplinary publications. Interaction between researchers is frequent and intense. In other words, the research activity is an undifferentiated enterprise where each researcher functions interdependently towards a common pursuit.

**Uses an integrated approach.** The approach in biomedical research is highly integrated. Under this approach is the use of methods such as chemical, mathematical and computer simulations, in vitro tests, cell cultures, whole animal models, and human epidemiological studies and clinical trials. Biomedical research scientists use a combination of highly interdependent, state-of-the-art methods.

**Employs visionary leadership.** Program and study leaders in biomedical research look beyond possibilities. They move in a definite direction that puts goals and objectives to work. Rigorous planning and determined implementation of the plans are necessities

to ensure significant research contributions. Planning not only caters to the design, approach, methods and techniques for the research endeavor, but also looks at the totality of the program, including the recruitment of sufficiently diverse and quality researchers in a rigorous but nurturing environment.

### **Implications for Graduate Health Education**

**The Graduate Professor as Doer and Catalyst of Biomedical Research.** Biomedical research requires expertise. It is necessary that the professor, as the recognizable expert in health research, spearhead the research activities. The professor acts as a catalyst in the conceptualization, implementation and packaging of research results.

**Instructional innovation.** Instruction is now recognized as both classroom and related learning experiences – the hands-on learning exposure of students to the concepts learned in the classroom. As an instructional innovation, biomedical research brings to the attention of students the realities of concepts that may be abstract at the start. Research is considered hands-on exposure of students that gives meaning and applicability to the concepts learned.

**Content of instruction.** As students are given the chance to learn through research, the learning of concepts is concretized rather than being abstract or unreal. Thus, research results become integrated with learning. Students indeed learn content as they pursue the real picture of what is described in the literature.

**Support to book knowledge.** Books provide basic knowledge and earlier discoveries. They are sources of established theories, concepts and principles. However, in the pursuit of advanced knowledge, research is required. Thus, biomedical research provides support for newer insights on what the books contain.

**Support to professional authority.** Research results are first-hand knowledge that could kindle further searches for more knowledge. When professors have developed the love of researching for knowledge, it is no longer difficult to see them as the authorities in their research line. They can present with confidence the research they actually performed without anyone questioning their authority. Discussions on a health concept when supported by research results gathered by the professor, for example, become enlightened by professorial authority and experience.

**Avenues for further investigations.** The motivation to carry out further research is founded on earlier successful research. Thus, biomedical research opens the avenue for further investigations, newer insights and prospectives for research.

### **Benefits of Collaboration**

**Sharing of expertise.** In the Philippine setting, universities and other educational institutions could be strengthened through collaborative efforts and sharing of expertise. Human resource development may not possibly cover all specialized fields. Through collaboration, however, experts could be pooled to carry out research activities for both developing and developed institutions.

**Sharing of facilities and material resources.** The foremost intention of collaboration is to have sharing of facilities, equipment and other material resources, including funding. Not all institutions can afford to buy expensive and sophisticated equipment to support research activities. Through collaboration, avenues for research expansion and networking go beyond these limitations.

**Sharing of results and of knowledge gained.** Through collaboration, the results of biomedical research could be packaged into technologies, products, books or scientific papers with a corresponding shared intellectual ownership.

### **Conclusion**

Graduate Health Education can meet the global challenges of improved quality education through innovations in instruction via biomedical research. It is in this context that universities can improve their graduate health education curricula where both graduate professors and graduate students must be actively involved.

Areas for biomedical research must include challenges for global health in the twenty-first century. The challenges must address "Health for All" across races, economic status and tongues. Institutions must endeavor to train graduate students with competencies they can use in the context of public health. Along with this is the challenge of generating knowledge that will lead to major discoveries to benefit mankind from classroom learning to actual situations in applied health. Indeed, biomedical research is an

indispensable partner of graduate health education.

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