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ROLE OF INFORMATION TECHNOLOGY IN ENABLING AND FACILITATING MULTIDISCIPLINARY RESEARCH AND INNOVATION

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ABSTRACT

This although an interdisciplinary idea, research and implementation has been around for a few decades in scientific research, engineering, medicine and other fields, but the terminology is fairly new. In the recent past multidisciplinary approach, especially in the fields like scientific research and engineering have shown great promise. The role of information technologies coupled with the indispensability of using technology as a learning and creating tool and the fact that innovations in data gathering from various fields and digitizing data and making it available on the internet, and ease of accessibility of information of all sciences, scientific research, engineering techniques and various social, artistic and other creative fields has enabled professionals, educators and students to be conversant in various fields other than their field of specialization. Fields such as astrobiology, bio archaeology, bioengineering, bioinformatics, biomedical engineering, biometrics engineering, biophysical chemistry. There have also been innovations in fields such as agriculture and in emerging creative and artistic fields. Information technology has been a driving force in bringing experts from specialized fields to collaborate, in finding solutions for unique challenges and IT has been pivotal in innovations in various fields and disciplines.

In this paper we will explore the progress and innovations achieved in various fields which have applied a multidisciplinary approach. We will also explore the role of information technology and sharing of digital information enabled by internet technologies, used as an essential tool to facilitate multidisciplinary spheres.

Keywords: Include Engineering, information technology, interdisciplinary, Multidisciplinary, Science, MDA (Multidisciplinary Approach)

INTRODUCTION

Although MDA has been in existence for decades, they are only recently gaining widespread acceptance and adoption. Most of what we know about MDA is based on experience rather than research, suggesting MDA practice may change with new knowledge. Communities have differing political issues, geographies (rural, urban, suburban), and demographics. Any community can develop an MDA, even communities with limited resources that preclude the development of a complex MDA mode .The size and structure of an MDA will reflect the needs and resources of the community in which it is developed. As it will be discussed in detail, starting an MDA is challenging. Teamwork does not arise through the simple organization of professionals and calling the group a “team.” Because MDA is so challenging to develop, it typically takes strong leadership to implement an MDA. There is frequently a charismatic and energetic leader in the community who advocates for a change in the system’s response [1].

RESEARCH IN MEDICINE

The Queen's University Cancer Research Institute (QCRI) in Kingston, Ontario, is home to three internationally recognized cancer research groups, which together encompass essentially all aspects of cancer investigation, from tumour biology through clinical trials and epidemiology to research outcomes and health-policy development. Encouraging interaction between researchers with many different perspectives on cancer research is one of the primary goals of the institute.

To achieve this goal, we have brought together the three different research groups into a single Cancer Research Institute building, where researchers and trainees in many different traditional disciplines can meet and exchange ideas.

To complement these informal interactions, QCRI, in conjunction with the Canadian Institutes of Health Research and the Cancer Research Society, has developed a new and exciting Training Program in Tran disciplinary Cancer Research, with the goal of training young researchers in a broad understanding of this health issue [2].

PATHOGEN BIOINFORMATICS

An area in which traditional microbiology and computer science intersect in the study of a variety of infectious diseases. This dual approach is very powerful, allowing us to analyze and prioritize the large amount of data provided by bacterial genome-sequencing projects, to rapidly identify features unique to particular pathogens (infectious disease-causing agents), and to rationally design vaccines and antibiotics to combat them. In addition, it works with a larger group of researchers in the new area of "pathogenomics," which involves using microbiology, evolutionary theory, computer science, medical genetics, and genomics to study how infectious disease agents interact with humans and then develop new approaches to manipulate these interactions to our benefit.
Most biologists have not had significant training in the computer sciences, or at the interface between biology and computer science, to undertake the more sophisticated computer analyses that may reveal additional genuinely novel insights. By using the knowledge of various fields, we are able to store, display, and analyze large amounts of genetic data in novel ways, presenting the data to other biologists and using the data ourselves to gain insights into how to prevent or treat infectious diseases. By using computational techniques, we can rapidly narrow down areas of research focus, saving us valuable bench time and hinting at what approaches and techniques might work best[3].

STRENGTHENING CONNECTIONS AMONG PUBLIC HEALTH, ENGINEERING, AND POLICY RESEARCH AREAS

Bridge science with engineering comes from recognizing how much human health and welfare may benefit from both fields. It is amazing how much physics and mathematics go into training an engineer versus how little they study biology and human health issues--after all, the purpose of engineered innovations is to promote better quality of human life. Also, engineers recognize the need to consult with environmental health experts but are often frustrated by having to conform to too many external policy regulations, which they feel are not always relevant. Poor communication between environmental consultants and engineers may be part of the problem. Because policy is often a matter of politics, environmental health science and engineering must complement each other in order to validate or refute existing environmental health regulations and implement improved ones. Finally, environmental health research in particular can also have very limited scientific reward if it is not directly applicable to everyday situations [3][4]. Customizing scientific questions to engineering applications can be both academically satisfying and useful in modern day settings.

CONCLUSION

Multidisciplinary sphere may have become a buzz word, but the fact that such an approach has made possible various innovations and solutions in many fields, especially in research and other scientific fields. The possibilities of this approach can work in various other professional and social fields. Educational institutions from schools to universities are exploring the possibilities of this approach in enabling students of particular disciplines to incorporate other ideas from other fields to further enhance their primary subject of learning.
There is a great potential for interdisciplinary co-operation in arts, business, management political Sciences, sociology and other fields that have been stagnating from lack of innovation. To the question of sustainability of multidisciplinary spheres, it depends on the value gained from such

approach. The success of one field by this approach may not produce similar results in another, but the potentiality of success in applying such an approach holds promise.

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