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A Model-Based Approach to Higher Education Instruction

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Abstract

This paper reports on an model-based approach to higher education instruction. The approach uses the web to promote Informatics instruction in tertiary schools, although not in the traditional way. The approach is of use to those teaching both in developing and developed nations. The approach, called the distributed informing science model, is a framework for re-conceptualizing university instruction that takes advantage of both global and local expertise as well as the current communication technology.

Introduction

Paul West, Director of the Centre for Lifelong Learning at the Technikon Southern Africa, writes of the limited money available for education (1997). The cost for tertiary education is high, particularly for developing nations, which have limited resources. For that matter, many tertiary universities in the developed world likewise suffer under budgetary constraints.

Academia has given much attention to both global and domestic informatics scholarship that focuses on generating new knowledge. It terms this type of scholarship as research. Another type of scholarship at present is given less respect within academia in general, and the informatics disciplines in specific. This other scholarship endeavors to create and provide effective dissemination practices, particularly for the universities’ teaching missions.

By definition, the field of informatics deals with developing and implementing effective systems for the formation and dissemination of information (e.g. Cohen, 1997). As such, scholarship aimed at improving the dissemination process of faculty teaching and student learning rightfully falls within the domain of informatics.

However, prejudice plagues the acceptance of this other half of informatics scholarship within academia. For this reason, university faculty are provided with few formal resources to learn and benefit from best practices. The bias within academia against anything educational hampers the development of an accumulation of knowledge, the basis for the scientific study of any field. Thus, course development accomplished at one university has little or no impact on course development at other universities.

A second obstacle to providing a cumulative basis for providing best dissemination practices is that the interaction between students and course content is complex. The author conducted field research from January 1996 to August 1996 on what is taught as informatics in various universities across a score of countries. One of that study's findings was that, while the content of the informatics curriculum has some similarity from university to university and country to country, there are striking differences in emphasis. Likewise, the student bodies of different universities have notably differing needs. For this reason, there exists no simple set of best practices. Topical coverage that is ideal for the situation in one university would be too fast or too slow, too detailed or too summarized, too technical or too humanistic for another.

This paper proposes a solution to these problems that uses the Internet to promote the quality of informatics education, but is not traditional web-based instruction. As Cormenzana and Girardi (1997) point out, the Internet provides new opportunities and challenges, in this case for tertiary education.

Distributed Informing Systems Model of Instruction

The author proposes a Distributed Informing Systems Framework of Instruction by which the tasks of instruction typically expected from each professor are distributed to specialists. At present, each professor must perform four separate tasks:

1. acquire knowledge of an ever-growing field,
2. format and frame this knowledge into teaching modules so as to make it accessible to students, develop courses that intertwine these teaching modules, and
3. deliver and administer these materials to students.

In other words, the professor must wear four separate hats. In this framework, different individuals may perform these different tasks.

Four Specialists

The Topic Author is a specialist in a given research area. The Topic Authors would prepare and offer to other professors the same teaching material they use in their own teaching Because their research in this area provides them with fertile material for instruction, their material will be more in depth than the typical coverage of any given area. For example, experts in data warehousing would prepare case studies, interview notes, and background readings in data warehousing.
The ACM provides a copyright model that seems appropriate for this published material. The author retains copyright and provides free use of the material for instruction, provided that the source is properly cited. It is hoped that the remuneration for this work will be provided through the reward structure that the host institution furnishes for scholarly work and contributions to the field.

The **Instructional Technologist**, a separate specialist, would take on the time consuming task of preparing these materials for use by others. Instructional Technologists have expertise in both pedagogy and technology and so can make the researchers materials more useful to the non-specialist.

The instructional technologist makes the material available in various forms and formats so that it may be used covered in varying degrees of depth. If the material needs to be translated from one language to another, that job would be accomplished here.

The **Course Developer** would evaluate and select the most fitting set of modules produced by Topic Authors and Instructional Technologists. Here I am using the term Course as it is used in America; Australians refer to this as a subject or paper. The task of the Course Developer is to sequence and form the modules into a course. Each course would be designed specifically to meet the needs of a specific set of students with their unique sets of level and background.

This course material will be more current and more focused than any that revolves around a text. Likewise, the material will be in greater depth than those based on research papers since the Topic Author can provide a large array of other resources, such as interviews.

Tertiary courses differ, from institution to institution, and even within institution. Consequently, the intellectual contribution of the course developer, to review, select, and sequence instructional modules within the constraints of the major and student attributes, is significant.

The **Course Implementor** conducts the course delivery, student feedback, and such. The Course Implementor guides students to the course resources, provides feedback and marking, and answers questions. In some U.S. universities, a teaching assistance provides these roles.

Figure 1 shows the relationship between these structures in the Distributed Informing Science Framework and the model of the virtual organization presented by Nolan and Croson (1995).

**Factors Required for Success**

Several developments need occur for this model to be effective. First, the reward structure within the university needs to change. Faculty research needs to be redefined to include the preparation and dissemination of expertise since these activities by Topic Authors advance the field (and their university’s good name).

Second, resources must be found to support Instructional Technologists. Currently each faculty member performs this function for each topic. Under the proposed structure, this work may need to be done only once, thus reducing the overall cost to institutions.

While each campus might provide its own support, another solution would be for this function to be supported by a grant.

Third, completed modules need to be placed so that they are accessible. The World Wide Web, for example, could be used to store and disseminate these modules. The Global IS Education site mentioned below would be one likely candidate.

**Dissemination**

Currently, resources on informatics education, such as those described here, are disseminated free of charge through a non-profit, unaffiliated web site called Global IS Education <http://gise.org>. This site uses the “free-ware” scheme for rewards
suggested above. It is expected that other fields will assemble their own web sites to disseminate resources pertaining to their areas.

**Conclusion**

In conclusion, the needs of developing and of developed nations coincide in one area. informatics education needs to be improved. The Internet can help in disseminating best practices, as it has through the Global IS Education site. But more can be done. The Distributed Informing Systems Framework of education outlined here can disseminate the knowledge and understanding of experts to millions of students around the globe.

**References**


