# Information Oriented Technology Curriculum Design and Development: The Need for A Paradigm Shift

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## Abstract

Developing information systems curriculum has been a topic of discussion by information system educators and industry practitioners for many years. While the demand for information systems professionals continues to increase, the dynamic nature of the field will continue to challenge information systems educators to be creative and innovative in their approaches to curriculum development. The proposed paradigm attempts to accentuate the planning and the implementation of academic programs that require computing and communications technologies, and is oriented to the new breed of students. This paradigm has been utilized as a framework in developing information systems programs at several academic institutions. The paradigm encapsulates five common components that are considered to be effective for curriculum development in information systems (curriculum development, curriculum contents faculty, technical resources, teaching methodology, and faculty). These components will contribute to successful academic program implementation.

**Keywords**: Curriculum development, curriculum content, information systems curriculum, and technology-oriented programs.

### 1. INTRODUCTION

Developing information systems curriculum has been a topic of discussion by information system educators and industry practitioners for many years. Curriculum development for the information systems discipline has gained tremendous significance and relevance by senior academic administrators, senior industry leaders and faculty. Information systems educators are challenged like many other educators by the changes that are currently influencing higher education in general and the information systems field in particular as we are entering the new millennium.

Changes in areas such as technology, regional and global economic factors, and the shifts in students' and workforce demographics only few that are exerting a profound impact on how academic programs in technology-oriented areas are developed and delivered.

The 1960s are considered the beginning of information systems as a field of academic study. During the past

thirty some years, the filed has grown tremendously, undergone significant changes in term of its focus, changes of its nomenclature, its academic relevance and governance structure.

Moreover, the proliferation of technology, the reliance on information technology by many businesses as an enabling force for change, and to remain competitive has increased the level of significance of the field to be responsive and to meet industry needs.

The transformation of many business enterprises and educational institutions, and the emergence of the Internet and e-commerce as critical components of the new economy have created new challenges as well as new opportunities for the field of information systems education. The increased reliance on the Internet as a modality to deliver academic programs in a technology-oriented academic curricula is a challenging task that requires educators to pay special attention, be creative and innovative in their efforts to develop academically sound and relevant academic programs. Therefore, information systems educators must fundamentally re-examine their paradigms and strategies of developing academic programs and curriculum that are capable of responding to the many challenges of the new millennium.

## 2. PURPOSE

Technology has been used by many academic institutions as a critical component of both overcoming obstacles to delivery of educational programs and as a focus of instruction. The emphases of this paper is on a new paradigm for the planning and the development of academic programs that require computing and communications technologies, and are oriented to the new breed of students.

## 3. THE TRADITIONAL APPROACH.

Degree oriented programs in traditional setting split courses that require technology into laboratory and classroom components. This paradigm tends to emphasize the conceptual components of technology over the applied components. The laboratory component is typically given reduced course credits on per hour basis. Often faculties are in an oversight capacity rather than a direct instructional role for the lab component. In fact graduate students teach laboratories in many instances.

Traditional residential students are expected to expend the hours required to figure out laboratory challenges. The hours of frustration in satisfying laboratory assignments, with only minimal assistance, are considered a valuable lesson in itself.

The changes and the challenges that were delineated earlier have contributed significantly to the changes in student and learner demographics. Learners are older, possess basic competencies in productivity tools and may already have been exposed to some programming and technical skills. Moreover, many of the new learners are enrolling in information systems programs to change careers or to ameliorate their professional portfolios. The shift in student demographics may have contributed to the lack of appreciation of the benefits of the traditional split classroom/laboratory approach by the learners.

Learners in many circumstances are savvy consumers who place a premium on their own time. Less and less learners subject themselves to sorority/fraternity, hazing or school dances.

The new learners seek rational approaches to meeting educational objectives that value the individual student. They know the work-place values accomplishment with the most economical use of resources. The new learner may be a practitioner of “just in time” management. The perceived “waste” of hours of time to learn something that could be easily demonstrated is not appreciated.

## 4. THE NEW PARADIGM

The challenge of developing courses or programs that require both conceptual and applied learning has increased in information systems disciplines. The computing and information sciences disciplines are as dynamic as the changes in technologies. These changes necessitate applying new paradigms, strategies and educational philosophies to developing information sciences programs.

The computing and information sciences academic programs should be learner-centered, need-based, relevant, flexible, and diversified in teaching and learning methods. Innovations play an integral part in the relevance and the uniqueness of technology oriented academic programs. The philosophy that should guide the development of these academic programs is to:

1) Deliver high quality curriculum.
2) Meets the special needs of all learners.
3) Satisfy the individual careers objectives.
4) Serve constituent communities through preparing individuals to contribute to building technological infrastructure.

### Curriculum Development Paradigm

While the demand for information systems professionals continues to increase, the dynamic nature of the field will continue to challenge information systems

educators to be creative and innovative in their approaches to curriculum development. While this paradigm does not describe the actual courses or topics that should be included, it does facilitate the implementation of many of the proposed curricula that were recommended by professional associations.

This paradigm has been utilized as a framework in developing information systems programs at several academic institutions. This paradigm is intended to provide a new framework for developing relevant and academically sound information systems academic programs. Moreover, the paradigm encapsulates all the essential factors (faculty, resources, curriculum contents, and teaching methodology) that contribute to successful academic program implementation.

Based on many years of experiences in academic administration, curriculum development at several academic institutions and recent insights in the literature regarding information systems curriculum development, a paradigm for curriculum development has been articulated. Five common components are emerging for effective curriculum development in information systems. The first component that of curriculum development addresses how the academic programs is organized. The second one focuses primarily on curriculum contents. The third component delineates the essential role of technical resources to the curriculum. The fourth one emphasis the appropriateness of effective teaching methodologies that should be incorporated in teaching the curriculum. And, the last component is the faculty qualification and skills.

**Curriculum development:** The curriculum should be organized and divided into several modules. Each module may be comprised of three to four courses. Each module will provide a solid foundation of knowledge that is necessary for the next topic or modules. This type of modularization would simplify course scheduling, reduce any scheduling conflicts, and facilitate the student entry to the academic program where the student left off.

The curriculum modularization allows for flexibility to refine and enhance the existing module as technology requirement change. It also facilities the introduction of contemporary topics into the curriculum. It makes the academic program more responsive and adaptive to changes without significant interference or disruption to program's schedule and students' schedules. This approach reduces the risks of unfavorable impact on the institution, programs, faculty and students.

These modules are a unifying set of courses designed to achieve the curriculum objectives as well as to create a level of progression and inter-relationship in the module. Students can apply knowledge from pervious courses into their current course whenever possible. As a result of this, concepts are reinforced and/or reexamined in greater depth. The three criteria of continuity, sequence, and integration that were identified by Tyler (1950) for curriculum organization are evident in this paradigm.

**Curriculum content:** The content of the curriculum should be balanced by addressing product and process equally. Emphasis should be placed on a relevant and practical curriculum. All other aspects such as learning experiences, teaching methodology, the interaction between faculty and students and the motivation and the interest of the learner depend upon the flow from the curriculum content. It is the special function of the curriculum developer to select and arrange contents so that the desired curriculum aims, goals and objectives are most effectively achieved.

**Resource requirement:** The reliance of the information systems discipline on technology resources and technology-based tools as a crucial component of the learning process is more apparent now than ever before. However, the rapid changes in technology resources will increase the demands for the allocation of practical and effective set of technical resources that will enhance the learning process.

The selection of appropriate technologies and platforms and insuring their integration within the curriculum is essential to achieve a positive and effective learning experience. The resources should be at least the quality and capability found in industry. Academic institutions that charge additional fees for the use of computer laboratories will find it difficult to justify marginal technologies to learners paying hefty tuition.

Equally important is that the resources be integrated into the classroom experience. Learners appreciate having technical resources and the faculty integrated into a single high quality learning experience.

**Teaching methodology**: While separation of theory, principles and practice still predominates in traditional higher education, there have been an increasing number of educators calling for more relevant learning. Meaningful, relevant and appropriate approaches should be the essence of the curriculum, because they are influential in shaping the learner's experiences. An example of this is the team-oriented approach. Students benefit by participating in teams to work in real world applications or cases. This learn-by-doing approach has been proven to be effective. Enhancing learning experiences by fostering interaction between the student and the environment is essential.

The teaching methodology should augment the different learning experiences that will be encountered. Each module may require different teaching methodologies to facilitate the different learning experiences.

**Faculty qualifications**: The nature of the information systems field is technical and rapidly changing. Faculty (subject area experts) play an instrumental role in delivering quality academic programs. Faculty background and their abilities to teach are essential. Faculties who teach in these technology-oriented programs should be academically qualified and technically competent.

Their technical competency and skills need to be continually ameliorated. These faculty should possess an in depth knowledge of the theory and the practice of the field. Faculty should possess both the state-of-the-art theory and practice it. They should be versed in their field and have the abilities to synthesize concepts and reduce the complexity to a level that students will easily comprehend.

## 5. INSTRUCTIONAL STRATEGY

Developing high quality academic programs in technology related fields require a unique instructional strategy. The curriculum must provide a conceptual and applied knowledge of the subject as well as being relevant and practical. Introducing students to broader aspects of the field cannot be sacrificed to make the curriculum more relevant. Yet, students must satisfy their career objectives.

The special approaches we have found to be successful include:

1) Modular delivery system.
2) Relevant and practical curriculum content that also provides solid conceptual foundation.
3) Teaching using methodologies that promote learning through practice and simulations.
4) Classrooms and learning environment bringing the students, the faculty and the resources together simultaneously.
5) Faculty who are both academically qualified and practitioner of the discipline.

## 6. CONCLUSION

Technology is reshaping the local, national and economic landscape. Records number of traditional students and new students are turning to the information systems field to prepare themselves for a better future. Properly planned and implemented technology related academic programs with a well-designed curriculum cannot only lead to changing an individual's life, it can also contribute to a better society.

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