# A Conceptual Framework for Informatics

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## Abstract

The purpose of this paper was to briefly address the need for a conceptual framework for informatics and develop a preliminary conceptual framework. The review of the literature on informatics and the approaches to a conceptual framework tend to be linked to discussion concerning designing curriculum rather than attaining a better understanding of the principles and concepts underlying informatics. A conceptual framework for informatics was developed based on an alternative perspective which entailed borrowing from the Conceptual Framework for Financial Accounting.

## Introduction

In recent years Information System (IS) also known as Information Technology (IT) programs have been experiencing a sharp decline in student enrolments (Pollacia & Lomerson, 2006; Becerra-Fernandez, Elam & Clemmons, 2010; Tabatabaei & Tehrani, 2010). This trend is common across the globe and is prevalent in the United States of America where it has been considered to be the "Death of the MIS degree" (Saunders & Lockridge, 2011). Various reasons have been offered to explain this phenomena such as the outsourcing of jobs to other countries, the changing professional requirements of employers, and even a general decline in student numbers (Helfert & Duncan, 2007).

The term informatics does differ to some extent between Europe – which use the term to describe computer science and the USA – which is more broad a discipline that is concerned with solving problems by applying computing solutions in relationship to the discipline or domain specific area in which the problem exists – medical (Zimmerman, 2003)., nursing (McEwen & Brown, 2002; McBride, Tietze & Fenton, 2013), financial planning (Casas, 2008), engineering (Fernandes, van Hattum-Janssen, Ribeiro, Fonte, Santos & Sousa, 2012).

## Curriculum Design Concepts

There are several approaches to curriculum design (Saylor & Alexander, 1974) and theses are identified as generally falling into one of the following:
1. Specific competencies design – focus is on specific competencies;
2. Subject discipline design – requirements are set by the specific discipline eg Law;
3. Social activities design – focus is on social activities;
4. Problem focus design – addressing a specific problem;
5. Process skills design – skills rather than content;
6. Individual needs and interests design – needs and interests of the learner.

Adopting a sequential approach to the process of curriculum development means that a conceptual framework needs to be devised that addresses philosophy and goals of the discipline A conceptual framework, within the concept of curriculum, should identify the building blocks or concepts upon which to lay development of the specific curriculum.

## Informatics

Mulder and van Weert (1998) defined informatics as a discipline that deals with –
- " the manipulation of objects;
- the aim to solve a problem;
- specified by a requirements analysis;
- under a given set of constraints;
- resulting in a maintainable working system
- with an automated component;
- in which men/women and machine interact adequately."

This definition extends perspective by itemising the various aspects and concepts of informatics in terms best describing the processes involved. However, it is not complete in providing any link to a unifying theory or philosophy that might be essential. It seems the theories and philosophies tend to be somewhat discrete.

The overall relationship of disciplines within the central theme of informatics is considered to be guided by the following (refer Diagram 1). This has four major areas that are considered to be integral to the existence of informatics as a discipline – computing science; information systems; organisation studies; and library and information science.

**Diagram 1.**
*Informatics General Overview*
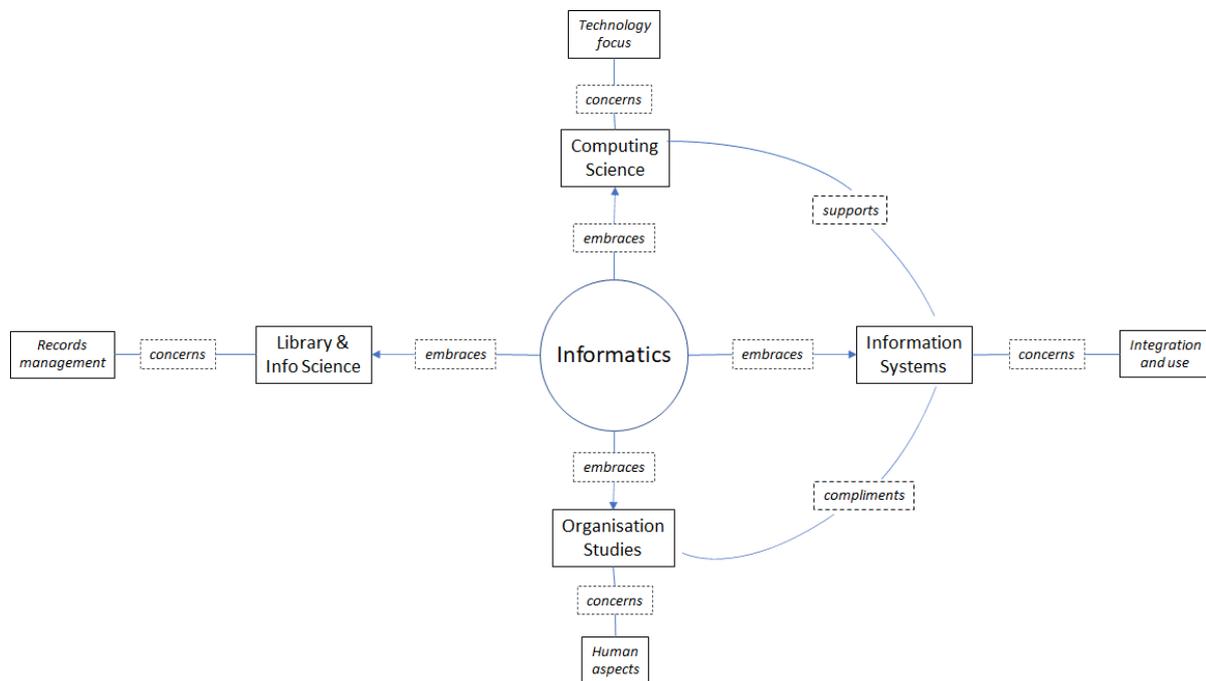


## Conceptual Framework

Jabareen (2009) defined a conceptual framework as *a network, or "a plane," of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena*. The concepts embedded in the conceptual framework thus provide support for one another, they communicate their respective phenomena, and ultimately create a framework-specific philosophy.

Therefore, a conceptual framework in this instance would be more concerned with the concepts or elements that constitute informatics. Which leads to the exploration of the various concepts underpinning the very essence of informatics. To address these requirements the Conceptual Framework of Financial Accounting is employed as a guide for the development of the preliminary Conceptual Framework for Informatics. This is an early attempt to make some giant leap away from thinking about the framework in terms of curriculum development alone and draws on the concepts raised by Helfert (2008).

At the base of the triangle is the Foundation or more generally foundation principles – these are mathematics and logic; information and communication technology; and programming and algorithms – which are considered to be basic requirements for the progression of unfolding the informatics framework.

The next stage is referred to as the Characteristics and this is thought to be next step in the informatics process – this area referred to as Structural Science and the components are - decision theory and methods; statistics; quantitative modes; operations research; and computational modelling & simulation.

The third stage is referred to as Objectives and the most telling objective is to achieve an outcome by applying – knowledge of the domain (under investigation); skills

to solve the problems (as identified); and development of computer based tools (as required).

The final stage is the pinnacle of the conceptual framework and it is focused on the need to meet the User Needs – that is to solve the problem – provide computer tools – and generally satisfy the needs of the users. The Conceptual Framework is presented in Diagram 2.

**Diagram 2.**
*Informatics Conceptual Framework*
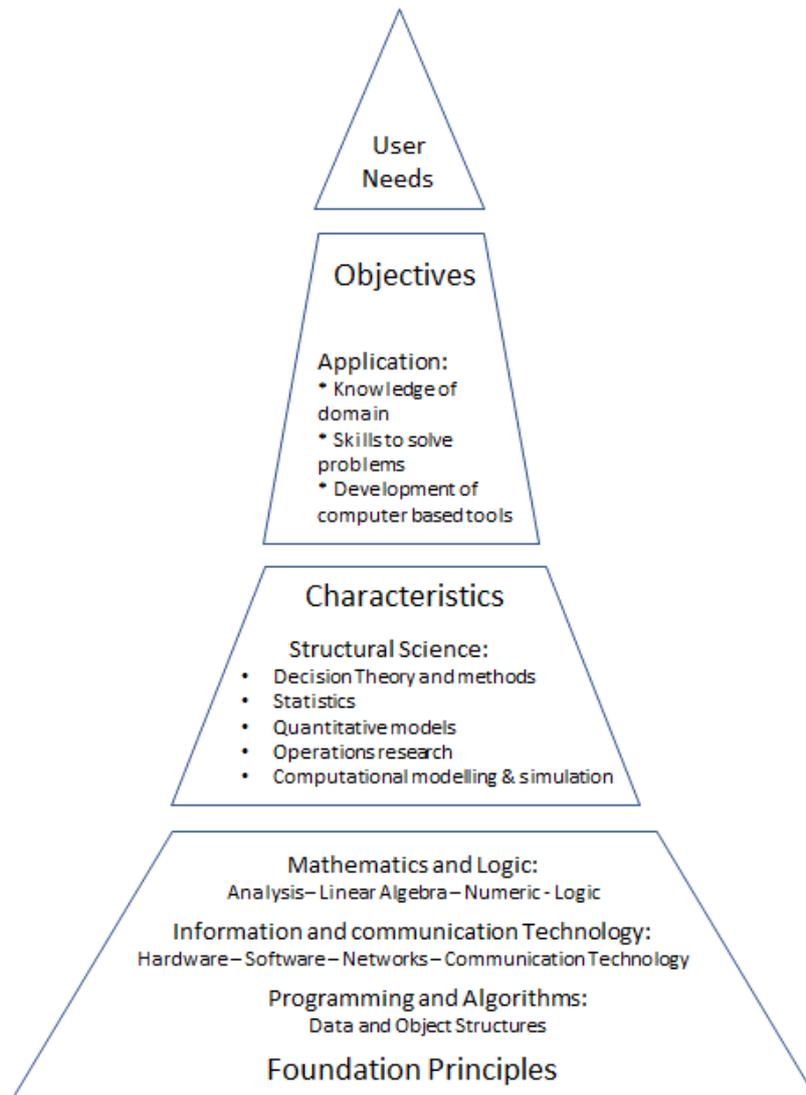


## Summary

The preliminary conceptual framework presented in this paper is acknowledged as being a starting point for further discussion and development. The point of this was to find an alternative approach that allowed for a more general understanding of informatics as a discipline and this approach should provide a continuation of the development process.

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