Chapter 6
Management Information Systems for Higher Education Institutions: Challenges and Opportunities

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ABSTRACT

Modern universities thrive on the information gathered through well-managed information systems. The overall process of developing and maintaining Academic Information System (AIS) all within the university and without any external assistance is generally regarded as a mark of achievement. This chapter deals with various aspects of AIS such as requirements, development, testing, overall security, etc. Two major options, developing AIS from scratch and deploying a commercially available software solution, are discussed. Typical management strategies are suggested to combat possible resistance from users and to serve a wider-ranging user community in an effective manner. A strong case is made in favor of in-house development of AISs to reduce initial costs and maintenance expenditure. Importantly, the process of design, developing a functional prototype, and overall security aspects are presented in detail. Several recommendations are made to deal with various operational challenges through well-known practices.

INTRODUCTION

Effective management of any educational institution requires a lot of information that is properly captured, processed and managed. Raw data or Information, in various forms comes from various corners on continuous basis and generally educational institutions use various automated tools to process the same, besides manual or legacy methods. In the current digital age, university communities heavily depend on free flow information. Some of the instances include - students need information on possible course registration options, examination timetables; academic councilors may need to access up-to-date

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transcripts; bursary staff may need information on current and past budgetary expenses to determine fee structures, scholarship funds; managers may need access to payroll for processing salaries etc. Naturally, there will be wide ranging tasks and requirements for core activities (or business processes) of any typical higher education institution (HEI). Then, requirements for information vary widely based on the type of user. It is common to see that HEIs using different software applications for different purposes and naturally spend a lot of money towards procuring and periodical renewal of licenses. Hence, it is imperative for the HEIs to rely on information systems and continue to invest in their management to enable everyone to function properly.

Information Systems for HEIs have been reported widely over the years. There are different layers and categories in which these information systems operate and thus have different objectives. For instance, phrases such as Student information systems (SIS) or Academic Information systems (AISs) have been generally used for information systems that mainly manage student related data in any HEI. In the literature, phrases such as Education Management Information Systems (EMIS) or simply Management Information System (MIS) or Information System for Higher Education (ISHE) have been typically used for integrating information from different universities to bring them to a common operating platform for analysis or data aggregation purposes. In general, EMIS is smaller layer and works on top of AIS, which is larger layer. Then EMIS typically integrates different database layers such as AIS, HR, Payroll and other financial aspects of different HEIs. EMIS typically obtains information from various HEIs. Figure 1. shows a typical hierarchy of various information systems, one EMIS that works from different information systems of two different HEIs.

Over the years, various authors have reported on different aspects of information systems, specifically for HEIs such as – design and development experiences, data quality and management, impact of information in decision-making, web portals with academic information etc. Tahvildarzadeh et al. (2017) have reported various issues with data quality and the need of having an institutional policy on data quality management. Their study clearly emphasized on having high quality information systems is essential for university administrators in managing the ever-changing requirements. A few authors (Sastry, 2007; Soares et al., 2013; Motta, 2010; Zilli, 2014) have presented data models, relationships and Design and development processes of academic information systems or student information systems which typically operate at the university level. Indrayani (2013) reported on an information system that was developed in the city of Bandung, to gather data from 18 different HEIs and to determine various common quality indicators. In-house development (HEIs developing AIS within their own organization using their own resources) and successful deployment experience of an information portal in the University of Pretoria, South Africa was reported many years back (Pienaar, 2003). This portal is meant for assisting researchers and professors (and not for serving the wider university communities as moderns AISs would do);

Figure 1. Hierarchy of information systems