

IT-BASED SMART-UNIVERSITY DRIVEN MANAGEMENT OF HIGHER EDUCATION TRAINING ACTIVITIES

Le Van Tan

Information Technology Center, Cyber School, Vinh University, Vietnam

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Abstract: The IT-based management of training activities at universities has many inadequacies. According to the facilitation of comprehensive IT system application under digital transformation in education sector with the aim of smart-university driven model application, this paper provides a systematic view of a smart university, and analyses some issues related to IT-based training management, which supports Vietnamese universities to integrate smart-university driven management systems.

Keywords: Training; management of training activities; smart university; information technology platform.

1. Introduction

Nowadays, the trend of university internationalization, the development of information technology (IT), the knowledge mining and the context of digital transformation in the field of education posed urgent requirements for universities in building an effective organization model for management and administration to perform their important roles in knowledge creation, provision of high-quality human resources, innovation - creativity, and international integration. Standardizing the management processes on the platform of IT to improve the training quality is the current issue for universities in Vietnam.

In Vietnam, most universities are gradually transitioning to the model of "innovation - creativity universities" with the main feature being the start-up university model with the spirit of creative entrepreneurship (Dinh Van Toan, 2019). Advanced university governance associated with quality assurance, including the administration of training, scientific research and community service functions, ensures the university implements its development strategy. Among those functions, management of training activities is the core function, which plays the most important role in the operations of the universities. Approaching from the perspective of quality assurance, higher education management includes activities from enrollment, development of training programs, teaching and learning activities, assessment of learners' learning outcomes, serving and supporting learners, and managing training results. In the context of digital transformation, training management must be established on a technology platform, implemented by an intelligent management system.

In recent years, smart university (SmU) is not only a research topic of interest but has become a development trend of higher education in developed countries. However, for Vietnamese higher education, this is still a new issue. There are many definitions of SmU from different points of view. T. Roth-Berghofer described SmU as "a platform that acquires

and delivers foundational data to drive the analysis and improvement of the teaching and learning environment by retrieving sensor-data, and using linked (open) data and formalized teaching knowledge” (T. Roth-Berghofer, 2014). This is a merely technological approach and M. Coccocoli et al. (2014) have observed that technology is just one among the many variables to take into account. The authors have presented an smart education model which supported by smart technologies, next generation network services and portable devices with advanced applications in highly interactive frameworks. According to Heinemann, SmU “is a place for seamless knowledge sharing and a green, powerful, personalized, accountable, interactive and adaptive system that is accessible anywhere, anytime and from any device” (Colleen Heinemann and Vladimir L. Uskov, 2017). Uskov et al. have developed a SmU model in the direction of identifying and classifying the main intelligent features, components and relationships between components, interfaces, inputs, outputs and limits/constraints of SmU (Vladimir L. Uskov et al., 2017). A correct and comprehensive awareness of SmU, associated with the context of each university to build and implement a most appropriate SmU application roadmap will help universities in Vietnam fulfill their mission and strategic goals and effectively manage their training activities.

2. The use of information technology in managing training activities

The current Industrial Revolution 4.0 has integrated of the IT system with the physical system to get a virtual network that brings the real world into a virtual reality. Fourth Industrial Revolution connects embedded systems and intelligent manufacturing facilities to create digital convergence between the Industry, Enterprises, functions and internal processes. Its outstanding feature is the combination of technologies together, blurring the boundaries between physics, digital and biology (M. Gneuss, 2014). To benefit from the 4.0 Revolution, enterprises, organizations and every country need to build a modern, smart and secure digital technology platform to connect all members with each other as well as with each other systems. Digital transformation is considered an inevitable trend in the activities of businesses, universities and the state.

Higher education is one of the areas that are strongly influenced by digital transformation and faces different challenges caused by rapid and diverse changes in a volatile environment. Digital technology is becoming a driving force of change in higher education, impacting all the activities in the university and also to lecturers and learners. In the educational sector, students, faculty, staff and graduates can be the target consumer and both learners and lecturers can benefit from digital transformation in the universities. Digital transformation affects the university's IT architecture, driving the trend of developing new educational service business models. The IT architecture of a modern university should be built on a cloud computing platform that can provide innovative scientific products and digital education services (Kaminskyi et al, 2018).

Approaching from the perspective of open system theory, higher education management includes subsystems namely enrollment management system, training program management system, teaching - learning activity management system, student assessment management system and training results management system. Training management at universities is based on IT with the goal of integrating independent systems into an overall information system according to the intelligent management model and quality assurance as shown in the Diagram 1.

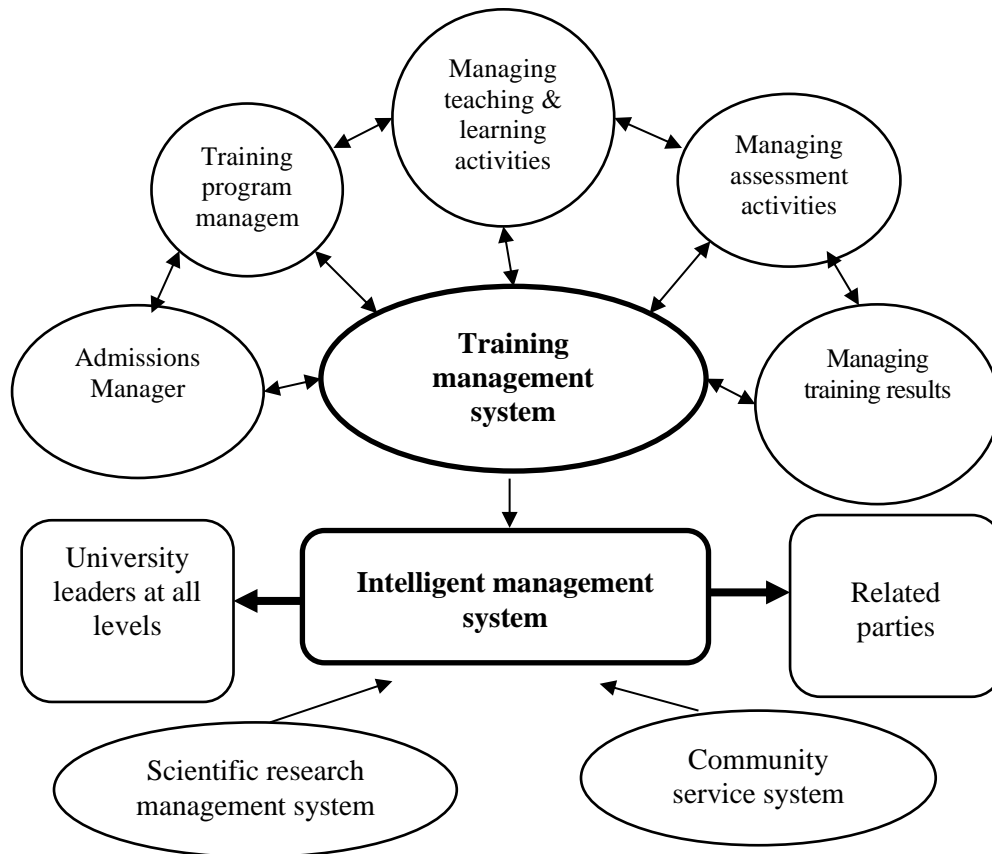


Diagram 1: *Smart university management information system*

With the structure described in Diagram 1, all the administrative data is integrated on an overall information system, connected to the website and other applications, along with the decentralization of information access to provide information to users for management decision making. Leaders at all levels can use these information to come up policies and to implement measures to meet the university's development goals. Learners can self-assess the learning process, actively develop personal learning plans, develop personalized training trends. Employers can consider the appropriateness in the design and implementation of training programs, training results associated with the candidate's ability to make recruitment decisions and provide additional training if necessary. Lecturers are also provided with information to improve the organization, teaching methods, and assessment of results to meet practical requirements. The training management system and its subsystems are closely related to each other, performing a 3-stage process from data collection, processing and information provision. The processing method of the training management system plays a very important role in providing useful, timely and reliable information for leaders at all levels of the school and stakeholders to achieve management objectives.

The processing handling of the university training management system is described in Diagram 2.

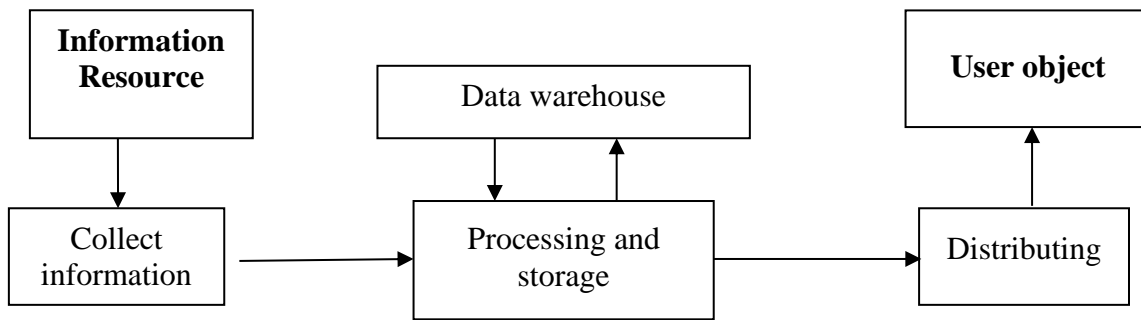


Diagram 2: *Process handling of the university training management system*

The training management system based on IT includes the following 5 subsystems:

- *Management system for enrollment and admission:* On the basis of IT, this system is linked to the university's website, connecting data with the overall management system in order to collect and provide information for users and look up information. From the perspective of quality assurance of SmU, this subsystem supports the university in planning enrollment strategies, developing policies and enrollment plans for training programs as well as student selection criteria, communication and advertising support. It provides a process with hierarchical scientific management to monitor enrollment and admission. This system also allows storing documents of the university on enrollment, the entire database on enrollment and admission. In addition, it provides reports on enrollment, annual admission, results of analysis, measurement, and evaluation of enrollment and admission in each stage through an intelligent administration system so that the university can take timely improvement measures, ensuring the appropriateness and effectiveness.

- *Training program management system:* The system standardizes processes to manage training programs, supports the design, development and evaluation of training programs for each major. This is a place to store and provide documents related to training management, different versions of program learning outcomes, framework programs, detailed course outlines, teaching plans and schedules. In addition, the system also manages the entire database of surveying stakeholders' opinions on training programs, domestic and foreign comparison programs, and provide the leader at all levels of the university as a basis for reviewing and improving to meet the needs of the related parties.

- *Teaching - learning activities management system:* The system supports the establishment and selection of teaching - learning activities in accordance with the educational philosophy of the university and to achieve the learning outcomes. The assignment of lecturers of each department is managed according to the professional qualifications, achievements, experience and capacity of the lecturers. The system also supports setting training plans and timetables; training management by project, theory and practice associated with a diverse learning environment with an innovation space, helping learners achieve the learning outcomes. Teaching activities are managed by blended learning method, online learning aims to increase the level of digital interaction with the trend of personalized training. The system supports the monitoring of teaching and learning activities, managing data related to the evaluation of lecturers, teaching methods, and results of stakeholder surveys in each subject of each semester. The system connects with the business intelligence system, the portal of staff and learners to provide information and

reports according to the management hierarchy to improve the quality of teaching and learning activities.

- *Learner assessment management system:* The system provides a procedure for assessing learners, storing and publicizing regulations and guidelines on testing and evaluation. The system is capable of supporting the development of appropriate criteria, content and methods of testing and assessment in the studying process in order to achieve the learning outcome associated with each module in the training program through the data analysis and the evaluation form of learner results. Assessment results are promptly announced to learners. The system also manages a database of surveys to get feedback on tests, assessments, student complaints and provide information to help lecturers and the university review and improve to ensure reliability, fairness, transparency, and aim to achieve learning outcomes and strengthen individualized support for learning and lifelong learning.

- *Training results management system:* The system manages data on student results, automatically makes statistics and provides information related to the percentage of learners who meet the requirements of each module, the rate of students graduating, dropping out, the rate of learners have jobs of each training program. It stores plans, regulations and documents of the university on training results. The system also supports the monitoring of training results, automatically compares training programs and supports comparison of training programs in each discipline with domestic and international training institutions. The system is also capable of managing a database of surveys on the satisfaction of stakeholders, providing information through the business intelligence system as a basis for implementing improvement measures to improve quality.

3. Conclusions

The development of smart technology has set new requirements in university governance in order to implement the development strategy towards a SmU. This paper presents the results of research on training management based on IT, it is necessary to approach based on system theory to divide this system into 5 subsystems. In each system, it is necessary to focus on designing and building in association with each quality assurance content with the IT architecture of a modern university. The training management system is integrated with the university's management systems to form the overall management system of the SmU.

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TÓM TẮT

QUẢN LÝ HOẠT ĐỘNG ĐÀO TẠO ĐẠI HỌC TRÊN NỀN TẢNG CÔNG NGHỆ THÔNG TIN THEO HƯỚNG ĐẠI HỌC THÔNG MINH

Lê Văn Tấn

Viện Nghiên cứu và đào tạo trực tuyến, Trường Đại học Vinh, Việt Nam

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Quản lý đào tạo trên nền tảng công nghệ thông tin ở trường đại học hiện đang tồn tại nhiều bất cập. Trên cơ sở xu hướng ứng dụng hệ thống thông tin tổng thể trong bối cảnh chuyển đổi số mạnh mẽ lĩnh vực giáo dục đại học hướng đến ứng dụng mô hình đại học thông minh, bài viết cung cấp góc nhìn hệ thống về đại học thông minh, làm rõ một số vấn đề về quản lý đào tạo đại học trên nền tảng công nghệ thông tin, giúp các trường đại học Việt Nam tích hợp các hệ thống quản lý theo hướng đại học thông minh.

Từ khóa: Đào tạo; quản lý hoạt động đào tạo; đại học thông minh; nền tảng công nghệ thông tin.