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Research Article

Academic Information System in Higher Education Institution toward Education 3.0: A Preliminary Study

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Abstract. Many higher education institutions (HEIs) have implemented information and communication technology (ICT) in their management processes. One of the implementation is used in academic affair management usually called academic information system (AIS). Some of the institutions also have implemented Education 3.0 paradigm in their learning processes. However, most of the existing AIS was only used for the administrative purpose and only support users from the internal of the institutions. In the other way, the characteristics of Education 3.0 are consisting of learning and administration processes and also support involvement from parents and industry. This study will use Sistem Informasi Akademik Universitas Langlangbuana (SIAk UNLA) in Bandung, Indonesia as a case study and analysis the gaps between existing AIS and the characteristics of Education 3.0 paradigm. The results are recommendation functionalities to be added to AIS in the case for supporting Education 3.0 paradigm.

Keywords. AIS; HEI; Education 3.0

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1. Introduction

Information and communication technology (ICT) has become an important tool in the modern management of higher education institutions. This is because information is a critical tool in facilitating management decisions and therefore, ICT is seen to be a crucial tool to help

in facilitating the acquisition of this information required in management decisions for institutions [1].

Usages of ICT in the management of higher education institutions include, but not limited to (1) academic affairs, (2) financial and accounting affairs, (3) inventory and procurement affairs and (4) general affairs [2]. Use of ICT in the management of academic affairs is the most important of the whole institution management. Therefore, many institutions have been built academic information system (AIS) based on ICT to support their academic affairs management [3].

Nowadays, there is a paradigm in education called Education 3.0. In Education 3.0, students are empowered to produce, not merely to consume the knowledge [4]. According to [5], many education institutions have practiced the principle of Education 3.0 in their learning process. But the implementation and usage of ICT in the management of academic affairs called AIS mostly used for administrative purpose only. However, Education 3.0 uses e-learning technology to produce and share knowledge and also involves people from external of the institutions. There are gaps to be analyzed between existing AIS and Education 3.0 paradigm. The analysis results can be used to improve AIS for supporting Education 3.0.

2. Methodology

This research uses case study method. Primary data will be obtained through observation and secondary data will be obtained from the documentation. The analysis will use gaps analysis. The study will use SistemInformasiAkademikUniversitasLanglangbuana (SIAk UNLA) in Bandung, Indonesia as a case study. This study observed some users of SIAk UNLA when they used the AIS. The documentation of SIAk UNLA used for known its specifications, procedures, and functionalities. The collected data will be compared with the characteristics of Education 3.0 and analysis the gaps. The action plan can be used to improve SIAk UNLA.

3. Results and Discussion

A. Academic Information System

Academic Information System (AIS) is software intended to process the academic data of an educational institution. Most higher education institutions use web-based AIS connected to an intranet or internet [6]. The study mentioned the AIS only used for the administrative purpose. The users of AIS from this study only student and administration staff.

The AIS will provide information to the leaders or the decision makers that can be classified in different utilization and different purposes [3]. AIS in this study not only used for the administrative purpose but also used by leaders of the institution to help them make a decision for institutional development. The AIS used by students, lecturer, administration staff and executive.

An academic information system has to cater to the needs of students, faculty and administrative staff [7]. The study found that AIS mostly has same procedure and function. Hence, they also suggested AIS must be flexible for development. This helps the system to remain up to date and provides better functionality with changing technology and the needs of the users.

B. Education 3.0

The internet has changed student habit in learning, especially those brought up in the digital era. Some people said this generation as digital native students. Through the internet, they get information and knowledge from various sources. The Education 3.0 is taking the value of this era. Social networking becomes a new role in allowing students to collaboratively create and share in learning artefacts. The availability of huge information must be a choice by the student. The student becomes as a producer and collaborator in the generation of content [8].

The behaviour and habit of new students are very much different from what they used to be. The improvement of education must handle this behaviour and must able to create innovative entrepreneurial graduates. In Education 3.0, the students are given a great opportunity to learn by themselves, to innovate, collaborate, experiment and explore all possibilities. The characteristics of Education 3.0 are given in Table 1.

Table 1. The Characteristics of Education 3.0 [4]

	"Knowledge Producing" Education 3.0
Meaning is . . .	Socially constructed and contextually reinvented knowledge
Technology is . . .	Everywhere (digital natives in a digital universe) for ubiquitous knowledge construction and transmission
Teaching is done . . .	Teacher to student, student to student, student to teacher, people-technology-people (co-construction of knowledge)
Schools are located . . .	Everywhere in the "creative society" (thoroughly infused into society: cafes, bowling alleys, bars,
Parents view schools as . . .	Places for students to create knowledge, and for which parents may provide domestic, volunteer, civic, and fiscal forms of support
Teachers are . . .	Everybody, everywhere, backed up by wireless devices designed to provide information raw material for knowledge production
Hardware and software in schools . . .	Are available at low cost and are used purposively, for the selective production of knowledge
Industry views graduate as . . .	As knowledge-producing co-workers and entrepreneurs who can support the development of focused knowledge construction

According to [5], many education institutions have practiced the principle of Education 3.0 in their learning process. As we can see in Table 1, the teaching characteristic in Education 3.0 was more connected with technology. They use e-learning technology to produce and share knowledge. Mostly, HEIs implemented e-learning using a ready-to-use application such as Moodle LMS, Edmodo, etc [9].

Considering that most of the time that students spent in HEIs with their lecturers and at home with their parents [10]. In Edmodo, teachers are able to notify parents of their child's progress and provide feedback on how to support continued growth. Parents can also proactively monitor their child's upcoming assignments and ongoing activities to ensure success [11].

After parent involvement, there is another stakeholder involves in Education 3.0 characteristics. The characteristic is industry involvement. Mostly, industry and HEIs already collaborated in strategic levels such as research, knowledge transfer and curriculum development [12]. But at the operational level, such as recruitment, the collaboration happens

after students graduated. The industry gets information about students' achievement after they graduated [13]. Ideally, the industry also can involve in their learning process. Industry can access students' portfolio and achievement during the semester, or they can be reviewers in the related assignment. With those, the industry can select prospective candidates early before they graduated. To do so, the industry must be active in the system.

Based on the facts above, for HEIs that have implemented Education 3.0 characteristics in their learning process are suggested to transform their AIS to support those characteristics. Especially for HEIs that already used e-learning or mobile learning or blended learning and also for those who already implemented student centred learning, the transformation becomes a priority.

C. Current state of SIAk UNLA

Based on the observation and documentation, the current state of SIAk UNLA from information system (IS) perspective can be shown below. IS have several components, there are hardware, software, database, procedures, people and network [14]. The current state of SIAk UNLA based on IS components is given in Table 2.

Table 2. SIAk UNLA state based on IS components

IS Components	SIAk UNLA
Hardware	For both server-side and client-side already met the TIA-942 hardware standard
Software	Already using open source OS and applications
Database	Using MySQL database
Procedures	AIS usage only for academic administration
People	Users are lecturer, students and administration staff
Network	Already connected to the internet

D. Analysis Results

After knowing the current state of SIAk UNLA, the next phase is analysis the gaps between SIAk UNLA and the characteristics of Education 3.0 paradigm and match the IS components with Education 3.0 characteristics. The gap analysis is given in Table 3.

4. Conclusion

Currently, many higher education institutions have implemented ICT in their academic affair management called AIS. Most of AIS is used for administrative purpose only. As today, some institutions also have implemented Education 3.0 principle in their learning process. Education 3.0 used most of the technology in the learning process. With its ICT capabilities, AIS can support the related characteristics in Education 3.0.

The gap analysis gives us information that SIAk UNLA needs improvement to support the characteristics of Education 3.0 paradigm. Major improvement must be focused on procedures and people/users because it's more reflected the characteristics of Education 3.0 paradigm from AIS perspective. SIAk UNLA can be integrated with their own e-learning and involve parents and industry as their users. It's recommended to guide the transformation of SIAk UNLA using a model.

Table 3. The gap analysis between SIAk UNLA and Education 3.0 characteristics

IS Components	SIAk UNLA	Education 3.0 characteristics	Action Plan
Hardware	For both server-side and client-side already met the TIA-942 hardware standard	Low cost and standardized	Need improvement to support users addition
Software	Already using open source OS and applications	Low cost and open source	Need improvement to support users addition
Database	Using MySQL database	Low cost and open source	Need optimization to support e-learning integration
Procedures	AIS usage only for academic administration	AIS can be used as e-learning/mobile learning	E-learning must be integrated into AIS
People	Users are lecturer, students and administration staff	Users are lecturers, students, administration staff, parents and industry	Must add parents and industry as users
Network	Already connected to the internet with limited bandwidth	Internet of things	Need improvement of the internet bandwidth

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

All the authors contributed significantly in writing this article. The authors read and approved the final manuscript.

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