Students' Digital Based Achievement and Reputation Data Literacy: The Implementation of UNNES's Paperless Policy

Abdurrahaman[1], Tommi Yuniawan[2], Amud Sunarya[3]

[1]Universitas Negeri Semarang, Indonesia, abdurrahman@mail.unnes.ac.id
[2]Universitas Negeri Semarang, Indonesia, tommiyuniawan@mail.unnes.ac.id
[3]Universitas Negeri Semarang, Indonesia, sunaryaamud@gmail.com

Abstract-This research highly depends on Semarang State University's conservation vision policy, particularly with regard to paperless policy. The purpose of this research is to design a prototype of students' digital based achievement and reputation data literacy system. This research employs a study and development method, which is a method to study, develop, and examine students' digital based achievement and reputation data management system. The result of this research is that the students' digital based achievement and reputation data literacy system has features to upload, validate, display, and print students' achievement and reputation data recapitulation. The development of this prototype meets the functional suitability, performance efficiency, usability security reliability, compatibility, maintainability and portability. The target users of this system are students, lecturers, administrative staffs, faculty leaders and higher education institution leaders.

Keywords-*data literacy, paperless, students' achievement and reputation, digital system.*

I. INTRODUCTION

Semarang State University's decision to proclaim itself as a conservation university is not for no reason. When some higher education institutions choose and proclaim themselves as entrepreneur university, research university, teaching university and tecnopreneur university, that many other higher education institutions have followed, UNNES chooses not to tail or follow those higher education institutions that have proclaimed themselves as mentioned above. UNNES initiates and chooses to be a conservation university. Seemingly, it is the first conservation university (*conservation—minded—university*) in Indonesia and is the one to make the new trend or standard (*trendsetter*) which is then followed by other higher education institutions.

The research conducted by Mikulik and Babina (2009) states that Higher Education Institution (PT) should be concerned about the environment for sustainable development, so that it is necessary to formulate protective attempts. Therefore, as part of Indonesia, Semarang State University (UNNES) has confirmed itself to be a *Conservation University* on March 12, 2010. Regulation of Rector of UNNES Number 22 of 2009 on UNNES as a Conservation University states that conservation university is a university which adapts, in its implementation of education, research and public service, a concept which refers to the conservation principles (protection, preservation and sustainable utilization) with regard to conservation of values and characters, arts and cultures, as

well as natural resources and environment. This implies that the implementation of *tri dharma* in UNNES keeps prioritizing and considering the conservation principles and concepts. Therefore, UNNES sets its vision to be a conservation university with international reputation (Regulation of Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 49 of 2016 on the Statute of UNNES). This shows that Higher Education Institution, in this case UNNES, realizes the campus to be a center of activities and empowerment in preservation of function of the environment, prevention of environmental contamination and damage and realizing clean, healthy and green campus.

Furthermore, to strengthen the policy with regard to university governance, Regulation of Rector of UNNES Number 6 of 2017 on the Conservation Spirit of UNNES is issued. This regulation issuance is in consideration that, as a conservation university, its governance is based on the conservation spirit and conservation spirit symbol. According to the regulation, UNNES's conservation spirit is *arum luhuring pawiyatan ing astanira*, "this area's fame and glory rely on our hands".

Conservation spirit means house of science meant to develop excellent civilization, as confirmed by Rokhman (2014:3-4), that the real basic purpose of higher education institution is to be the house of science. Therefore, all ideas, attitudes, motions and movements of campus inhabitants should be science based. Moreover, conservation spirit is represented with the conservation symbol at the top of UNNES's conservation monument. This conservation spirit is supported by three pillars, namely (1) values and characters, (2) arts and cultures, and (3) natural resources and environment, which are previously seven pillars, namely (1) biodiversity, (2) green architecture & internal transportation, (3) waste treatment, (4) paperless, (5) clean energy, (6) ethics, arts and cultures, and (7) conservation cadre. Besides, conservation spirit may also be described in eight values, namely inspiration, humanism, care, innovation, creativity, sportsmanship, honesty, and justice.

Ever since UNNES declares itself as a conservation university, it has made many policies and attempts to socialize to, explain and move all campus inhabitants and or the society in realizing and confirming this conservation vision. This means that UNNES becomes the pioneer in conservation and uses the power to lead the society towards its ideal, which is a prosperous society equal to global society. As a conservation university, UNNES is obligated to fulfill its mandates and responsibilities while holding firm

conservation as its identity. This implies conservation as its identity in all mandates and responsibilities it assumes from planning, implementation to settlement. This attempt is an activity to make an image and reputation of a conservation university.

Literacy is individual's capability to process and understand any information he/she obtains during a reading or listening process. However, in this millennial era, many technologies and information have developed. Literacy is individual's reading, writing, speaking, calculating and problem solving capabilities at a level of expertise needed in works, family and the society. This conforms to Baynham's opinion (1995:5), that literacy is the integration of listening, speaking, writing, reading, and critical thinking capabilities. Literacy is all the time identical to reading and writing capability. In general, it is linguistic capabilities which cover listening, speaking, reading and writing. The first two capabilities are linguistic capabilities included in oration capability, while the second two capabilities are included in literacy capability. Oration capability is one related to oral language, while literacy capability is related to written language.

The past definition of literacy is merely reading and writing capabilities. At the time, reading and writing are deemed sufficient for human's education basis to face any challenges of the era. The rapid age development also opens the cover of literacy. Literacy also means social practice and relationship related to knowledge, language and culture. Therefore, literacy involves a set of learning which enables individual to achieve knowledge, develop knowledge and participate fully in limited and wide communities (UNESCO 2005:1).

The UNESCO Declaration (2005) also states that literacy information is also related to the capability to identify, determine, find, evaluate, create in an effective and organized way, use and communicate information to solve various problems. The capabilities are needed for every individual as a requirement for participation in information society and are part of human rights with regard to lifelong learning.

Moreover, Boeriswati (2017:38) asserts that literacy is the capability to identify, understand, interpret, create, communicate and calculate, use printed and written materials related to various contexts. Therefore, definition of literacy develops from time to time. Literacy is not merely reading-writing. Literacy is cultural practice related to social and political matters. Therefore, education experts present new definitions of literacy. The word *literacy* is now paired with other words, such as computer literacy, virtual literacy, mathematical literacy, etc. This is a transformation of definition of literacy as a matter of time.

Furthermore, students' life development cannot be separated from the national education system. It is to prepare students to readily face globalization challenges, not merely academic matter, but also to instill soft skills with students' various activities. Campus life itself cannot be separated from various activities which are prepared to develop students towards concept expansion, reasoning enhancement, professionalism, interest, talent, and unity. This development should be well supported by student

institution and driven towards achievement. Therefore, students are the next generation that should be prepared with capabilities pursuant to their interest and talent as well as potential for them to compete in the global era.

Students are expected not only to master *hard skills* pursuant to their competence of science, but also to master *soft skills* which may support their success in the future. Therefore, students and graduates will have expected excellent characters, which may be realized under full support from higher education institution and student division. This support may be in the form of institutionalization of student affairs and encouraging students to gain achievement in various championship activities. In support of such expectation, the Directorate of Student Affairs, Directorate General of Learning and Student Affairs programs student ranking for student institution and student achievement as ranking assessment of higher education students. Student ranking assessment is determined based on four assessment aspects, namely: (1) institution, (2) non-competitive activities, (c) independent co- and extracurricular activity achievement, and (d) Belmawa co- and extracurricular activity achievement.

Semarang State University stipulates a policy to realize students with achievements and characters. Various coaching and guiding programs related to reasoning and science, interest and talent, technology interest, sport, art, religious, social and characters fields are planned, implemented and evaluated annually.

Student ranking organization aims at: (1) driving higher education institution to enhance the quality of student service and student activities at regional, national and international level, and (2) raising higher education institution's concern about developing students' interest, talent, reasoning and creativity and entrepreneurship so that they will have achievement at regional, national and international levels and contribute to national development. Student ranking organization encourages all parties to enhance the quality and quantity of student activities. Therefore, it is necessary to develop UNNES student activity achievement and reputation data collection system to strengthen student performance ranking.

II. METHODOLOGY

This research employs research and development method, which is one to study, develop and examine a product. This method is employed to produce certain product and test the effectiveness of the product (Sugiyono 2011). The product developed is a prototype of students' digital based achievement and reputation data literacy system as a strengthening of students' performance ranking in UNNES.

According to Borg and Gall (1983), conceptually, the research and development method covers 10 general measures, namely (1) literature study, observation and preparation, (2) determine purpose, (3) develop the initial form of product at each phase, (4) initial limited-scale field trial, (5) initial product improvement, (6) main trial, (7) main trial correction and improvement, (8) validity test for product, (9) product final improvement, and (10) dissemination of developed product.

The small-scale, limited research is only conducted on the phase to obtain a prototype of students' digital based achievement and reputation data management application system as a strengthening of students' performance ranking in UNNES and takes procedural model. In general, the research is conducted in two phases of activity. The first phase is introduction activity, in which it will identify the level of necessity (study and planning). The second phase is development, including arranging a prototype of application system, limited trial, experts test, correction and improvement.

The instruments of the research are: (1) questionnaire of analysis on necessity, (2) questionnaire of criteria of students' digital based achievement and reputation data management application system, (3) questionnaire of literacy test, (4) test, and (5) observation and interview instrument. The Instrument of analysis on necessity level is arranged for the purpose of collecting data of students' digital based achievement and reputation data management application system as a strengthening of students' performance ranking in UNNES ever or is currently used, and what is desired.

The data analyzed in this research are: (1) information of the necessity level of students' digital based achievement and reputation data management application system, (2) arrangement of the prototype of students' digital based achievement and reputation data management system, and (3) effectiveness of the prototype of students' digital based achievement and reputation data management system. The data are collected by employing the following techniques: Focus Group Discussion (FGD), interview, observation, questionnaire and document analysis.

III. RESULT AND DISCUSSION

Conservation University: Paperless Policy

On March 12, 2010, UNNES declares itself as a Conservation University. Conservation University is a university which, in its education, research and public service implementation, adapts a concept which refers to the conservation principles (protection, preservation and sustainable utilization) with regard to conservation of natural resources, environment, arts and cultures. This conforms to Richmond and Bracker's opinion (2009:xiv) who define conservation as a complex and continuous process involving determination of what is deemed as heritage, how to keep it, how to use it, by who, and for whom. The heritage mentioned in the definition does not only include physical matter but also culture. Therefore, definition of conservation is not only regarding maintenance, preservation and protection of the nature, but also regarding preservation of cultural heritage and human civilization.

Formally, there are currently Regulation of Rector Number 22 of 2009 on Conservation University, Regulation of Rector Number 27 of 2012 on the Governance of Conservation Based Campus, and Regulation of Rector Number 6 of 2017 on UNNES's Conservation Spirit. In Regulation of Rector Number 27 of 2012, the implementation of Conservation University is supported with seven pillars of conservation, namely: (1) biodiversity conservation; (2) green architecture and internal transportation system; (3) waste treatment; (4) paperless policy; (5) clean energy; (6) conservation of ethics, arts, and cultures; and (7) conservation regeneration.

The biodiversity conservation pillars aims at wisely and sustainably protecting, preserving, utilizing and developing the environment, flora, and fauna in UNNES and its surrounding. The biodiversity conservation pillar program covers wise protection, preservation and utilization of flora and fauna at campus, breeding activity, plants planting and cultivation, and monitoring of biodiversity in UNNES and its surrounding to protect the ecosystem.

The paperless policy pillar aims at efficiently applying conservation administration and governance. The paperless policy pillar program is applied through optimizing information technology based system, efficient paper usage, utilization of recycled paper, and environmentally friendly paper usage.

Referring to the statute of UNNES (Regulation of Minister of Research, Technology and Higher Education Number 49 of 2016) and UNNES Development Master Plan year 2016, UNNES sets its Vision to be a *Conservation University with International Reputation*. This vision is a very strategic reference in the organization of education, research and public service, development of good governance through the application of integrated quality management and the implementation of mutually beneficial institution cooperation. UNNES's vision bears an underlying meaning derived from 'conservation university with international reputation'.

Moreover, in consideration of its status as a conservation university, its management is based on conservation spirit and conservation spirit symbol, so that Regulation of Rector of UNNES Number 6 of 2017 on UNNES Conservation Spirit is issued. According to this regulation, conservation spirit is the spirit, moral or soul which underlies UNNES's conservation implementation. Conservation symbol is a figure which confirms that UNNES is a conservation spirit based university. In the regulation, UNNES's conservation spirit is *arum luhuring pawiyatan ing astanira*, which means a house of science meant to develop excellent civilization (Rokhman 2014:1-4).

Furthermore, conservation spirit is represented with the conservation symbol at the top of UNNES's conservation monument. The symbol is only used for the purpose of conservation monument and conservation monument replica in appreciation of conservation. This conservation spirit is supported by three pillars, namely (1) values and characters, (2) arts and cultures, and (3) natural resources and environment, which are previously seven pillars, namely (1) biodiversity, (2) green architecture & internal transportation, (3) waste treatment, (4) paperless, (5) clean energy, (6) ethics, arts and cultures, and (7) conservation cadre. Besides, conservation spirit may also be described in eight values, namely (1) inspiration value, always has ideas to readily act to perform activities for

national and international excellence; (2) humanism value, always respects others, expects and struggles for realization of fame and glory of UNNES inhabitants in particular and of the society in general; (3) care value, always complies with, notice and concerns about other UNNES inhabitants, society, and surrounding natural environment; (4) innovation value, always uses ideas, imagination, stimulant and environment to generate novel products; (5) creativity value, always thinks and acts to solve problems smartly based on norms to generate new way or outcome from what in possession; (6) sportsmanship value, always shows nobility, honesty, fairness and willingness to acknowledge others' power and success and to acknowledge self-mistake and weakness; (7) honesty value, always behaves on attempts to make UNNES inhabitants trustworthy individuals in words, attitudes, acts, works and daily life based on prevailing norms; and (8) justice value, always be impartial, pro right and does not harm others and himself/herself, gives advice to others pursuant to his/her right (Regulation of Rector UNNES Number 6 of 2017).

Conservation mind/concept (*wawasan konservasi*) is defined as a model to be followed and imitated, in the form of faith underlying a point of view or how to see and treat an issue which is a focus of concern, which is conservation. Conservation mind/concept becomes a reference mutually agreed upon and used by the society of academicians of UNNES as an academic community. Conservation mind/concept takes the main position in confirming the direction and guiding the attitudes and behaviors in working on or prioritizing something which is worth of choosing with attitude and commitment to develop science, human and humanity (2016 UNNES Development Master Plan).

Furthermore, the direction of UNNES conservation development in 2020 is to realize a *campus with glorious culture*. UNNES consistently makes efforts for achievement through preservation, study and application of values and characters it deems excellent with the three pillars of higher education, constituting measurable inspiration, humanism, care, innovation, creativity, sportsmanship, honesty, and justice which show broad achievement starting from students to all UNNES inhabitants, including in the management of UNNES and its supporting elements. The priority of activity strategy covers prevention of drug distribution and abuse, prevention of free life, prevention of plagiarism, prevention of growth and development of radical movements; enhancing love of the country through state defense activity, and increasing the number of competent and able conservation cadres to contribute to campus internal and external communities.

The next direction of UNNES conservation development is to realize a *campus with excellent academic civilization*. In the development strategy of 2016-2020 period, UNNES preserves, studies and implements artworks, cultures and sports. The exploration prioritizes excellent local arts and cultures to generate a number of creative works in the form of art, cultural and sport performances/events. In 2020, UNNES is expected to have its own power through creative arts and cultures to obtain external funding. The dependence on government and students' funding may be put to minimum while UNNES's creative works get to be known and needed by the society.

The realization of *independent green campus* becomes the direction of UNNES conservation development in strengthening UNNES's identity as a conservation university. UNNES consistently preserves, studies and utilizes natural resources and environment. Indonesia has abundant biological wealth of resources (SDH) but the amount of wealth in possession is still uncertain until now. In the 2016-2020 period, UNNES optimizes utilization of resources and collections in possession. At the end of 2020, UNNES will have had cooperation and competitive ability to draw funding because of its collection management ability.

Analysis on the Necessity for UNNES Students' Digital Based Achievement and Reputation Data Literacy System

Necessity analysis is a phase to collect any information of system/software to be specifically developed. Necessity analysis includes analysis on functionality necessity, analysis on hardware necessity and analysis on software necessity to obtain specific necessity pursuant to what users need. Information collection process for necessity analysis is conducted by observation, interview, literature study of software and quality standards for software.

The application of Semarang State University students' achievement and reputation data management should be accessible at any time, from anywhere, so that it should be web based. The application is installed on a server with web server and database server configuration after installation of PHP 5.4 or the latest. In this research, both the web server and the database server are of open source. The web server employs nginx, and the database server employs MySQL server. Users can use computer or laptop installed with web browser application with internet connection in order to run the students' achievement data management application. Users consist of 4 groups with certain access right, namely super admin, administrator, validator and student.

Design

Design phase is a multistep process which focuses on designing software including data structure, software architecture, interface representation, and coding procedure (Rosa & Shalahuddin, 2013:29). The design phase is based on the necessity analysis made in the previous phase. The design phase includes Unified Model Language planning, database planning and interface planning.

The design of application of Semarang State University students' achievement and reputation data management includes: (1) UML design (UML design in this research serving as system work flow includes sequence diagram, activity diagram and class diagram), (2) Database design (database design employs ERD), (3) Interface design (interface design employs wireframeI).

Implementation

Implementation or coding phase is a phase to translate the design made in the previous phase to be software using programming language. *First*, the Database implementation used for the application of students' achievement data management is MySQL. Below is the result of database implementation of the application of students' achievement data management using MySQL. *Second*, the implementation of developer of application of students' achievement data management system uses code editor sublime text 2 and framework Laravel 4.2 for coding. Framework Laravel 4.2 uses Model- View-Controller (MVC) pattern with 3 components, namely Model, View and Controller. Model is responsible for the data of the application, View is responsible for displaying the data, and Controller is responsible for processing the data obtained from Model and giving them to View for display. *Third*, interface implementation employs HTML script, CSS and Javascript pursuant to interface design.

Test

This phase tests the quality of software developed pursuant to the standard of ISO/IEC 25010 to check whether the software worthy of using by users. The test is conducted on the functional suitability, performance efficiency, usability, security, reliability, compatibility, maintainability and portability aspects.

The functional suitability is tested by 6 experts of web development from PT. Hulaa Travel Indonesia. The test results in X value = 1, which means that all features are successfully implemented, so that the functional suitability is satisfied. The performance efficiency is tested using a tool from GTMetrix. The test results in average time of page making of 2.45 seconds. The usability is tested using 20 points of USE Questionnaire using Likert scale with 80 respondents. The test results in Cronbach's alpha value of 0.75 and percentage of 85.05%. The result shows that the application is quite worthy and is well consistent in satisfying the usability aspect. The security is tested using Acunetix Web Vulnerability Scanner 9.5 application. The test concludes that the application of Semarang State University students' achievement and reputation data management has security level 2.

The reliability is tested using a tool of PHP Unit to analyze the code coverage of source code of the students' achievement data management application. The result of analysis on the code coverage of source code of the students' achievement data management application is 29.25%. The result is then calculated using formula of TIOBE Quality Indicator and obtains TQI score of 65.25%. The table shows TQI score >= 50%, which means that the application well satisfies the reliability aspect. The compatibility is not tested since all information/resources are used by the students' achievement data management application. The maintainability is tested using a tool of PHP Copy/Paste Detector to analyze code duplication from the source code of the students' achievement data management application. The result of analysis on the code duplication of source code of the students' achievement data management application is 0.18%. The result is calculated using formula of TIOBE Quality Indicator and obtains TQI score of

83.88%. The table shows that TQI score >= 80%, which means that the application well satisfies the maintainability aspect. The portability test using 4 desktop browsers and 4 mobile browsers concludes that the students' achievement and reputation data management application has satisfied the portability aspect since it runs in various browsers.

IV.   CONCLUSION

This research generates a prototype of students' digital based achievement and reputation data literacy system which helps manage students' achievement and reputation data in Semarang State University. The application has the main features to upload, validate, display and print students' achievement and reputation data recapitulation of every faculty and university. The application also minimizes paper usage, so that it conforms to vision of a conservation university.

The development of the prototype of students' digital based achievement and reputation data literacy system requires additional special features for ease of management of students' achievement and reputation data like sms gateway or send email. The Semarang State University students' digital based achievement and reputation data literacy may help in students' performance ranking.

REFERENCES

[1] A.S, Rosa, & Shalahuddin, M. (2013). *Rekayasa Perangkat Lunak Terstruktur dan Berorientasi Objek*. Bandung: Informatika.

[2] Acharya, Anal, & Sinha, Devadatta. (2013). Assessing the Quality of M-Learning Systems using ISO/IEC 25010. *International Journal of Advanced Computer Research, 3*(3).

[3] Al-Fedaghi, Sabah. (2011). Developing Web Applications. *International Journal of Software Engineering and Its Applications, 5*(2).

[4] Baynham, Mike. 1995. *Literacy Practices: Investigating Literacy in Social Contexts*. London: Longman.

[5] Borg, Walter R., Meredith D. Gall. 1983. *Educational Research: An Introduction*. New York & London: Longman.

[6] Boeriswati, Endry. 2017. "Persoalan Literasi Abad 21". *Proceedings International Conference On Language, Literature And Teaching*, Konferensi Bahasa dan Sastra II, 10 Oktober 2017, halaman 38-60.

[7] Mikulik, J dan M. Babina. 2009. "The Role of Universities in Environmental Management. *Environmetal Study*, Volume 18, Nomor 4, pp. 527-531.

[8] Peraturan Rektor Universitas Negeri Semarang Nomor 22 Tahun 2009 tentang Universitas Negeri Semarang sebagai Universitas Konservasi. Semarang: Universitas Negeri Semarang.

[9] Peraturan Rektor Universitas Negeri Semarang Nomor 27 Tahun 2012 tentang Tata Kelola Kampus Berbasis Konservasi. Semarang: Universitas Negeri Semarang.

[10] Peraturan Menteri Riset, Teknologi, dan Pendidikan Tinggi Republik Indonesia Nomor 49 Tahun 2016 tentang Statuta Universitas Negeri Semarang. Semarang: Universitas Negeri Semarang.

[11] Peraturan Rektor Universitas Negeri SemarangNomor 5 Tahun 2017 tentang Kebijakan Tahun Reputasi Universitas Negeri Semarang. Semarang: Universitas Negeri Semarang.

[12] Richmond, Alison dan Alison Bracker. 2009. *Conservation: Principles, Dilemmasand Uncomfortable Truths*. London: Victoria and Albert Museum London.

[13] Rokhman, Fathur. 2014. *Membangun Rumah Ilmu*. Semarang: Gigih Pustaka Mandiri.

[14] Sugiyono. 2011. *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta

[15] UNESCO. 2005. *Development of Information Literacy: Through School Libraries in South-East Asia Countries*. Bangkok: UNESCO.