Implementation of Supply Chain Management Information System in Non-Formal Education Business

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Abstract. Information systems management is part of the implementation of educational management that must be prioritized for the advancement and development of education, so that output is in accordance with the goals made. The fact based on data from many institutions, both the government or PNF organizers, especially course and training organizers in the city of Semarang does not yet have the awareness to properly manage information systems. The aim of this study is to analyze and describe the effectiveness of the Supply Chain Management information syntem model in non-formal education businesses. This research design uses real experimental research methods (true experimental design) with pretest-posttest control group design design. This research population is participants and organizers of Course and Training Institute, Job Training Institute, Community Learning Activity Center, Course Institute, and Tutoring in Semarang city. The sampling technique used is simple random sampling numbering 260. Data collection using test instruments in the form of tiered scale coesioners. Analysis of this study data using the average difference test of two paired sample groups (Paired Sample T-Test). Based on the results of penelitian it is known that the implementation of supply chain management information system in noformal education business is effective as significant as a nonformal educational information system. Thus, supply chain management-based educational information systems that are often applied to business education at the higher education level are also relevant to be applied to nonformal education businesses.

Key words: information systems, supply chain management, non-formal education business

INTRODUCTION

Efforts to increase public awareness of education are not only completed with activities that are normative but need creative, innovative ideas by the government and society. One type of education is non-formal education (NFE) provides opportunities for each individual and society to enrich, deepen and augment science and technology through learning that lasts a lifetime (Romi & Schmida, 2009). Education management is a process to coordinate various educational resources such as teachers, educational facilities and infrastructure (Ratten & Jones, 2020) such as libraries, laboratories, etc. to achieve the goals and objectives of education, namely educating the life of the nation and developing the whole human being, namely people who believe and fear God Almighty and Virtuous, have knowledge and skills, physical and spiritual health, a steady and independent personality and a sense of civic and national responsibility. In its development, education management requires good management practice for its management(Foster, 2002). But in practice, it's still an exclusive thing. Many education organizers think that this is not an important thing.

In the era of technology, educational information is an important part of the construction of the internet and Indonesia educational information systems have made significant advances in research and development. The application of information technology, office efficiency, management efficiency, and education service level has increased rapidly (Siswanto et al., 2018; Cai, 2018) . According to Purnama (2016) information systems have the goal of producing information, information is data that is processed into a useful form for the wearer. Information systems have a key role in organizational development, enabling them to reduce costs, increase productivity, efficiency and effectiveness, improve the quality of products and services, and optimize decision making (Tarafdar &Gordon, 2007). Therefore, given the importance of information system, it must be designed to generate organizational knowledge and intelligence. As educational development institutions and organizations need to continuously increase the level and density of business knowledge to make business decisions that make it possible to maintain competitiveness, their need for information systems enables transversal level integration and has the ability not only to acquire but also to produce. (and publishing) information also grew significantly (Bøe, Gulbrandsen and Sørebø, 2015).

According to Darmawan (2012) a management information system is a system that aims to collect data to be processed (including summarized, classified, and projected) in such a way that the data set produces meaningful information in decision making, measuring implementation, monitoring progress, and presentation of knowledge for the purpose of management supervision that can be achieved. Donald & Watson (1984) states that a management information system is a process that provides direction to managers that supports the setting of goals and policies through an organization. Cash (2015) explains that the education management information system (SIMP) is perceived by the existing literature under various conceptual terms, from student information systems, student management systems, information technology in education management, and also as simple information systems. From a theoretical perspective, SIMP can be perceived as information systems capable of generating, managing and disseminating educational data and information as part of their IT infrastructure (Tolley &Shulruf, 2009). The existence of SIMP aims to raise awareness about the possible direct impact simp quality may have on the actual (and sustainable) use of the system, on student satisfaction, and regarding the emergence of other benefits (Balaban, Mu and Divjak, 2013). Although conceptually considered a tool for those who have a planning and administrative role to manage the education system (i.e. schools) in a more efficient and effective manner, the reality is that each of these systems has evolved to a more complex point of system, which includes initial features and course-related features (Abdul-Hamid, 2017; Akaranga, 2016).

In an ever-changing competitive environment, organizations are constantly required to make substantial internal modifications to compete successfully in the global marketplace (Defee &Stank 2005; Tobias 2019; Wu & Barnes 2011). Supply chain management (SCM) emerged in the early 1980s as a result of a rapidly changing and challenging business environment in many industries. SCM is a consequence of the increasing need for holistic consideration within, among and across business activities and resources within and between marketing channels, to improve overall performance towards the end consumer (Svensson, 2002). SCM is intended as an activity in which businesses with different backgrounds work with each other to coordinate logistics and creation planning and maintain data flow across shared tasks. Based on this understanding, it can be concluded that SCM is the integrated planning, coordination, and control of all business processes and activities in the supply chain to share superior consumer value. According to González-Loureiro, et al (2015) SCM is the key to the successful deployment of strategies to compete in the global market. A SCM who focuses on the world of education understands the supply chain area of universities, where if there is a problem such as the gap that occurs between the number of college graduates and graduates absorbed by the industry is very large then he will analyze either the overall analysis of the supply chain or partially (Erturgut & Soyşekerci, 2011). Where there are several types of supply chain measurement / analysis. With this analysis can be concluded the performance of each supply chain and the entire supply chain. So that it can be given what is the right solution to improve the performance of the supply chain. As well as the supply chain in universities, it is necessary to analyze either partial analysis in each supply chain or overall analysis so that between suppliers, namely high schools with absorbers there is a balance.

NFE (NFE) services business,ranging from early age group to adulthood is a profitable business (Sihombing et al., 2018). Business courses and training emerged as a result of the high entry requirements to such formal and informal school. Course and training institutions is one form of non-formal education unit organized for people who need knowledge, skills, life skills, and attitudes to develop themselves, develop professions, work, independent businesses, or continue education to a higher level (Lakitan et al., 2012). Those who wish to include their children in this institution, are required to be able to fulfill certain skills as a requirement to pass the entrance exam. This continues, even to the level of higher education and even in the process of job search.

Information system management is part of the implementation of education management that must be prioritized for the advancement and development of education (Zhao et al., 2020), so that the output is in accordance with the tujaun made. The fact based on data from many institutions, both the government and PNF organizers, especially course and training organizers in the city of Semarang do not have the awareness to manage information systems properly. The scope of the problems in this study related to the need for educational information systems, SCM, and non-formal education businesses that can be used as a foundation in compiling information systems in NFE businesses by optimizing supply chain management in business. The aim of the study was to analyze and describe the effectiveness of the SCM information systems model in NFE businesses.

METHODS

This research is quantitative research of descriptive statistics with quasi-experiment research design. Quasi experiments are experiments that have treatments, impact measurements, experimental units, but do not use random assignments to create comparisons in order to infer changes caused by treatment (Chu, PH. and Chang, 2017). The quasi-experiment used in this study is Quasi-Experiment: One-Group Pretest-Posttest Design which is a quasi-experiment in which a group is measured and observed before and after treatment (treatement) is given as shown in the following figure:

Table 1. Research Design

O_1	X	O_2

O_1 = pre-test (before treatment)
X = model supply chain management information system in non-formal education business
O_2 = test pos (after treatment)

This research population is prospective participants and organizers of Course and Training Institute (LKP), Job Training Institute (LPK), Community Learning Activity Center (PKBM), Course Institute, and Tutoring (Bimbel) in Semarang city. The sampling technique used is Proportionate Random Sampling, a sampling method in which researchers divide a limited population into subpopulations and then apply random sampling techniques to each subpopulation. The population in the study was 1,026. Based on sampling calculations using Isaac and Michael, the number of samples in this study was 260. The study's data collection uses the UTAUT evaluation scale. To find out the information system researchers use the UTAUT evaluation concept where one external variable that is widely studied is the individual characteristics of technology users, namely gender, age, education level and experience. In the theoretical model UTAUT (Unified theory of Acceptance and Use of Technology) proposed by Venkatesh et al, (2003), gender, age, experience and nature of use, is a moderating effect on the use of an information system. While the variable predictor is performance expectancy, effort expectancy, social influence and facilitating condition. The UTAUT model is the result of an evaluation of eight leading user accpetance models integrated into the new model. The process of Integration of User Acceptance was carried out by experts before because of the emergence of confusion in using models to analyze user acceptance (Nasir, 2013). The concept of UTAUT can be seen in the Table 2.

Table 2. Information Systems Evaluation Model

Concept of UTAUT	The Roots of Model Conception	Source
Performance Expectancy	Perceived Usefulness	(Williams, Rana and Dwivedi, 2015)
	Extrinsic Motivation	(Im, Hong and Kang, 2011)
	Job Fit	(Andreas, 2012)
	Realtive Adventage	(Zhou, Lu and Wang, 2010)
	Outcome Expectations	(Oh and Yoon, 2014)
Effort Expectancy	Perceived Ease of Use	(Lawson-Body *et al.*, 2020)
	Complexity	(Shachak, Kuziemsky and Petersen, 2019)
	Ease of Use	(Escobar-Rodríguez and Carvajal-Trujillo, 2014)
Social Influence	Subjective Norm	(Conch et al., 2012)
	Social Factors	(Zhou, 2011)
	Image	(Oye, A.Iahad and Ab.Rahim, 2014)
Facilitating Conditions	Perceived Behavior Control	(Andreas, 2012)
	Facilitating Conditions	(Oh and Yoon, 2014)
	Compatibility	(Andreas, 2012)

Analysis of the study's data using the average difference between two paired sample groups (Paired Sample T-Test) aims to compare the average of two groups that pair up with each other.

RESULTS AND DISCUSSION

Respondents in the study effectiveness of the Supply Chain Management information system model in non-formal education businesses with male sex 29.4% and the number of respondents with fe-

male sex 70.6%. Meanwhile, based on the age group of respondents with an age range between 26-35 years, it is 33.1% and 22.1% less than 25 years. Re-

spondents with an age range of 36-45 years amounted to 21.3% and the age range of respondents 46-60 years reached 23.5%.

Table 3. Characteristics of Respondents

No.	Category	Frequency	Perentase
	Gender		
1	Man	40	29,4%
2	Woman	96	70,6%
	Age		
1	<25 years	30	22,1%
2	26-35 years	45	33,1%
3	36-45 Years	29	21,3%
4	46-60 Years	32	23,5%
	Level of Education		
1	SD	5	3,7%
2	Junior High School Equivalent	1	0,7%
3	High School Equivalent	13	9,6%
4	D3	2	1,5%
5	S1	95	69,9%
6	S2	20	14,7%
	Position		
1	Widyaprada Young Expert	1	0,7%
2	Institution Manager	75	55,1%
3	Instructor	4	2,9%
3	Pamong Studied	11	8,1%
4	Tutor	14	10,3%
5	Administrative Personnel	6	4,4%
6	Prospective Participants	25	18,4%

Table 2. Provide information that respondents in the study effectiveness of the SCM information system model in NFE businesses with a male gender 29.4% and the number of respondents with a female gender 70.6%. Meanwhile, based on the age group of respondents with an age range between 26-35 years, it is 33.1% and 22.1% less than 25 years. Respondents with an age range of 36-45 years amounted to 21.3% and the age range of respondents 46-60 years reached 23.5%.

Respondents' education levels also varied including elementary school education level 3.7%, First Menegah School 0.7%, Upper Menegah School 9.6%, Diploma 1.5%, Strata 1 which is 69.9% is the largest number of respondents, Strata 2 amounted to 14.7%. In addition, respondents in this study were dominated by those who had worked and had certain

positions whose criteria included Widyaprada Young Expert 0.7%, Institution Manager 55.1%, Instructor 2.9%, Pamong Studi 8.1%, Tutor 10.3%, Administrative Personnel 4.4%, and Prospective Participants 18.4%.

A total of 136 respondents of prospective participants and organizers of The Institute of Course and Training (LKP), Job Training Institute (LPK), Center for Community Learning Activities (PKBM), Course Institute, and Tutoring (Bimbel) in the city of Semarang participated in this research. Overall respondents agreed to engage in research as evidenced by *informed consent*. The evaluation of respondents on educational information systems both before and after *the Supply Chain Management* information system model in non-formal education businesses can be seen in able 4.

Table 4. Pretest and Postest Data Description Tests effectiveness of SCM Information System Model in NFE Business.

Treatment	N	Lowest Score	Highest Score	Sum	Average	Standard Deviation
Pretest	136	23	41	4276	31,44	3,943
Postest	136	31	52	5608	41,23	4,312

Based on Table 3. Obtained a score before applying the SCM information system model to nonformal education businesses in Semarang City is known to have an average score on the education information system which is 31.44 with a standard deviation of 3.94. Meanwhile, the score after applying the SCM information system model in nonformal education business is 41.2 with a standard deviation value of 4.31. Categorization of assessment scores on educational information systems in Semarang City both before and after implementing the SCM information system model on NFE businesses in Semarang City is presented in Figure 1.
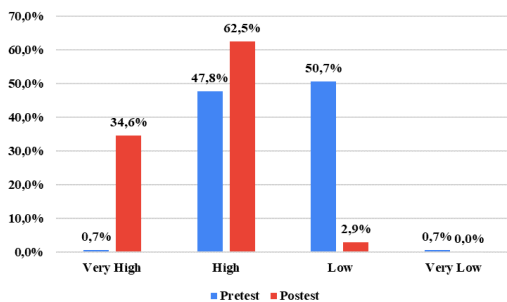
Figure 1. Educational Information Systems Experiment Before and After Applied NFEInformation System Model in NFE Business

Figure 1. Provide percentage value information before implementing the SCM information system model in NFE businesses in very high categories of 0.7%, in high categories 47.8%, in low categories 50.7%, and in very low categories effectiveness of 0.7%. While after the implementation of the SCM information system model in NFE businesses in very high categories 34.6%, in the high category 62.5%, in the low category 2.9%, and not in the very low category. Hypotheses in this study were tested using *the paired sample t test* technique by conducting a difference of two-average differences before and after being given utilizing educational information systems. The averages can be seen in the Table 5.

In Table 5. It can be seen that the average (*mean*) before applying, the SCM information system model in NFE business amounted to 31.44. While the average (mean*)* after applying the SCM information system model in NFE business amounted to 41.23. Based on the average value of the the SCM information system model in NFE business above, there is a noticeable increase in the value before and after the SCM information system model is applied to NFE businesses. After knowing the differences, it further tested the effectiveness of the increased application of the SCM information system model in NFE businesses presented in the Table 6.

Table 5. Average – Average Educational Information System Before and After Implementing the SCM information system model in NFE Business

Paired Samples Statistics			
	MeanN	Std. DeviationStd.	Error Mean
Paired 1Pretest	31,44136	3,94	,33
Postest	41,23136	4,31	,36

Table 6. Testing the Effectiveness of SCM Information System Models in NFE Businesses

		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pretest Postest	-9,794	4,193	,359	-10,505	-9,082	-27,236	135	,000

In table 6. It is known that the difference in average results before the SCM information system model in NFE businesses is 9.79. The magnitude of the calculated value $_{is}$ 27.23 with a probability of 0.000. When compared to the value of the α used (0.05) then the calculated probability value is less than the value

of the α, so it is concluded that there is a significant increase in the value of implementing the SCM information system model in NFE businesses. The percentage increase in the value of pretest to posttest is $\frac{41,23-31,44}{31,44} x 100\% = 31,13\%$. based on the above, it was concluded that there was a significant increase

in the implementation of the SCM information system model in NFE businesses.

This is in line with the findings of research by (Riswandi, 2017) which examines the development of management information systems in elementary schools. The development of educational management information systems in schools is the main effort of the school in dealing with the rapid development of information and communication technology. Educational management information systems ideally prepare inputs, produce outputs and communicate educational activities and conditions themselves. These functions can enlarge the use of computer-based educational SIM services that will be provided for school development and can be tailored to the needs of internal and external users. Referring to the context of the school, the content processed by the education driver's license in the school is the student student component, educators and educators, learning curriculum, infrastructure facilities, school environment and culture, Student Services, education financing. The findings of Echeverría et al., (2012) state that EMIS serves to collect and analyze management indicators related to the education sector, and aims to support the process of strategic planning, resource assignment, monitoring, policy formulation and decision making in Higher Education Institutions (IHE).

The energy of this system can be used to assist management in managing and optimizing enterprise knowledge resources in accordance with the potential of the enterprise in order to improve business performance as a whole and sustainably. Business process management is built as a comprehensive management approach helping enterprises to operate and achieve enterprise business objectives, related to logistics, manufacturing, financial services, health, education, or other enterprise-related (Mustafid (2015). Petter et al. (2008), the information system for SCM must be accessible, compatible, user friendly, stable and reliable, requires minimal training and offers strong after-sales service. The system quality features included in the standard are ease of use, ease of learning, system accuracy, flexibility, sophistication, integration and customization capabilities. It further includes information quality features, such as usability, understanding, relevance and brevity. Seth et al. (2015) showed that education and training have a positive influence on the successful implementation of SCM information systems. The proposed model confirms that the following factors play an important role during the implementation of SCM information systems top management support, user engagement, pre-implementation analysis, user training, change management, data accuracy and communication.

Process models and success determinants will provide useful guidance for industry practitioners who plan to implement SCM information systems in HR management organizations.

CONCLUSION

Based on the results of penelitian it is known that the implementation of SCM information system in NFE business is effective as significant as a NFE information system. SCM information systems are considered to provide ease of use, ease of information, system accuracy, flexibility, sophistication, and integration capabilities. Referring to the findings it is recommended that non-formal educational institutions can utilize SCM information systems in NFE businesses in order to access the implementation of non-formal education to fit their needs and close to where they live. Thus, SCM-based educational information systems that are often applied to business education at the higher education level are also relevant to be applied to NFE businesses. For the next researcher, can contribute ideas in the framework of the development of further research.

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