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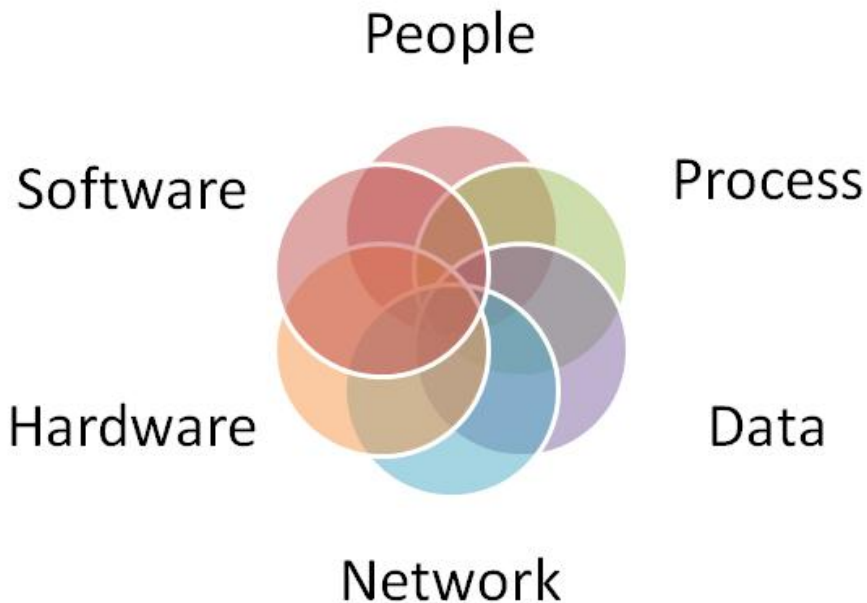
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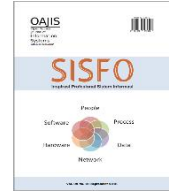
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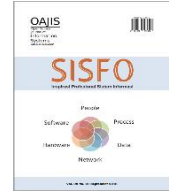
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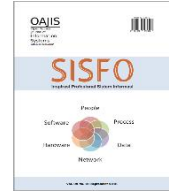
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Daftar Isi

The Conformance Checking Proses Mining SAP-SD (Sales and Distribution) dengan Metode Heuristic Miner

Alexander Hestu Kusuma, Gunawan, Joan Santoso 1

Analisa Perilaku Penonton Youtuber Cilik Di Indonesia Berdasarkan Komentar Di Media Sosial

Nur Aini Rakhmawati, Irfan Rifqi Susetyo, Dewi Septina Br Pelawi, Bima Triadi Ruslan, Anezka Clarissa Kayla, Anisa Gemelia Adini 13

A ERP Systems in Higher Education: A Systematic Literature Review

Osamah Alhadi A. Alloush dan Mahendrawathi ER 21

Decision Support System untuk Swasembada Jagung Nasional dalam mendukung Sustainable Food Security

Diesta Iva Maftuhah, Budisantoso Wirjodirdjo, Aisyah Nisrina Hamidah, Akbar Faktorial Sain..... 29

Evaluasi Penerapan Modul Plant Maintenance pada ERP untuk Proses Pemeliharaan dengan Metode Analisis Event Log (Studi Kasus PT. Freeport Indonesia)

Andre Parvian Aristio, Mudjahidin, Arrindika Pradana Ramadhansyah 41

Halaman ini sengaja dikosongkan

ERP Systems in Higher Education: A Systematic Literature Review

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Abstract

The digital world is a world of technology and information that has opened acceleration in various fields. One of them is in the field of education which also feels the rapid impact of the development of technology and information. Therefore, the government asks every college/university to improve performance effectively and efficiently in order to have good performance. Therefore, the implementation of an Enterprise Resource Planning System that is integrated with various service activities in higher education is seen as one way to improve the performance of higher education. Starting from the above, this research is intended to find out about the application of the Enterprise Resource Planning System in the world of higher education (universities). The literature review conducted by researchers is intended to illustrate the implementation of ERP systems in universities today and also the implementation of ERP systems in universities that have been studied in various previous studies.

Keywords: Enterprise Resource Planning System, ERP System, Higher Education, Higher Education Management Strategic, ERP Implementation

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1. Introduction

In the last period, various universities tried to boost performance related to effectiveness, efficiency, and achievement both in terms of administrative services and in the world of research [1]. Therefore, higher education changes their views by implementing systems as strategies that can support their performance. Enterprise Resource Planning began to become known in the mid to late 1990s to be the choice of higher education to achieve efficiency and the ability to access various data quickly. The ERP system itself is an information system model that enables companies in this case higher education institutions to integrate various functions separately [2]. So by implementing an ERP system that is integrated with all systems in higher education related to finance, materials, human resources, it has helped universities to reduce the problem of cost use and administrative regularity into its own advantages offered by the ERP system in its use [3].

However, the implementation of ERP systems in various universities has failed as can be quoted from research conducted by L. Mehlinger who said that the application of Enterprise Resource Planning systems at universities had little or no 60 percent to 80 percent had failed [4]. However, this does not mean that ERP systems cannot be adopted at other universities in various countries. Assuming that each university has different situations and conditions as a determinant of the success of ERP system implementation. “This research to find out the implementation of ERP systems at colleges or universities”.

2. Goal Setting

This study aims to review a variety of studies that focus on the effects, benefits, and importance of implementing ERP systems in higher education. Therefore this research focuses on indicators that can be assessed from each variable.

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Table 1. Key data for review.

Key Data for Review	Description
Criteria of Inclusion and Exclusion Article	Based on year, language, main analysis, context, journal
Data Search	ScienceDirect, EmeraldInsight
Data Selection	Total search from the database will undergo a quality assessment of papers
Extract Data	Title, author information, year, purpose, result

Table 2. Applying quality.

Code	Journal Quality Test Questions
Q1	Does the journal related to the ERP system?
Q2	Does the journal related to the implementation of the ERP system at higher education?
Q3	Does the journal discuss the influence of the ERP system?
Q4	Whether the journal is related to the use of the ERP system at the university as higher education?

Indicators were obtained from data relating to the questionnaire presented in each selected journal. The systematic literature review provides an opportunity for researchers to get an overview and understanding of the effects, benefits, and importance of implementing ERP systems in higher education.

3. Determination of Review Question

To provide an overview of this review paper, the review questions that will be discussed are as follows:

- 1) QR1: What is the effect of ERP system implementation in higher education?
- 2) QR2: What is the role of the ERP system in higher education?
- 3) QR3: What are the benefits/ advantages of implementing an ERP system in higher education?

4. Methodology

The plan for making a systematic literature review is done by collecting related journals by looking for similarities in the words in the abstract, title, or journal keywords which are then filtered by journals based on the type of journal. Journal screening is also conducted based on the publication's title to limit the relevance of the field of study from the writing of this literature review. After journal screening, the journal is in the data and rated to determine the relevance of the contents of the journal through journal abstraction. Then the journal sequencing is based on the values obtained to determine the main journals and supporting journals used in this writing [5].

The journals used in this systematic literature review are sourced from Science Direct and Emerald Insight. The journal search process uses keywords: ERP System, ERP, Higher Education, University Management, Enterprise Resource Planning Systems in higher education contained in abstracts, titles or journal keywords.

In Table 1 is an explanation of each key data for review. The process of finding data in the form of papers using a search database, namely ScienceDirect and EmeraldInsight. Researchers chose the two databases because they have full access rights to search and download papers from the ScienceDirect and EmeraldInsight databases.

4.1. Applying Quality Assessment

A journal quality assessment is conducted to select and sort related journals that have been obtained at the previous screening stage. The quality of the journal is seen based on the relationship between the questions posed and the abstraction of the journal. The questions asked to test journal quality can be seen in Table 2.

Of the 23 journals that have been obtained, the quality of the journal is assessed by giving value or weight of (0-2) points in each journal of each question with the criteria for assessment scores as in Table 3.

From the values obtained, journal sequencing is carried out based on the values obtained. Of the 23 related journals, 14 were sourced from direct science and 9 other journals came from Emerald Insight. The journals obtained are then grouped into 4 categories based on the score obtained. The journal can be seen in Table 4

Table 3. Scoring scores.

Scores	Criteria
0	Irrelevant
1	Quite relevant
2	Very relevant

Table 4. Journal groupings.

Grouping	Value Range	Journal Number
Very Related	8-Jul	7
Related	6	11
Enough Related	5-Apr	6
Less Related 0-3	—	—
“ERP System” AND “Higher Education”	1	0
“ Management University” AND “ERP System”	3	0

4.2. Search for Literature

The importance of implementing an ERP system for higher education performance is to support academic activities in higher education and be an indicator of performance in the supervision process. And the advantages of implementing an ERP system in tertiary education are increasing access to planning and managing information for tertiary education, reducing risks in business processes in tertiary education, improving services for students, employees, and teachers and being able to increase revenue as a result of increased efficiency [6]. The effect or impact of ERP system implementation on higher education performance is to improve performance by increasing availability, clarity in integrating data and information accurately to improve efficiency and minimize performance errors [7].

5. Result

Based on the search for each keyword, a search is performed by combining keywords to perform efficiency in searches in the hope of filtering journals detected by more than one keyword. So the results are as shown in Table 5.

Determining the characteristics of the paper found can be done by inclusion and exclusion. The researcher has determined the inclusion and exclusion criteria in accordance with the RQ which can be seen in Table 6. From the journal obtained, journal screening is carried out with restrictions based on the type of journal and the title of the publication. As for this writing, the journals used are research journals, proceedings, or review journals that have been published from 2015 to 2019: Journal International Conference on Communication, Management and Information Technology Journal, Journal of Systems and Software, Information and Software Technology Journal, Journal Interactive Technology and Smart Education and Journal of Enterprise Information Management. Except for some journals from the year 2009. Based on these limits the number of journals is obtained as in Table 6

From the journal search and screening process, there are now 23 journals, with a composition of 14 related journals sourced from Science Direct and 10 related journals sourced from Emerald Insight and one of them is a case study journal. Of the 23 journals obtained, the quality of the journal will be assessed by weighting, which will then be rated

Table 5. Search results based on keywords.

Keywords	ScienceDirect	EmeraldInsight
“Enterprise Resource Planning”	25	70
“ERP System”	18	10
“Higher Education”	26	23
“Management University”	116	5
“ERP System” AND “Higher Education”	5	7
“Management University” AND “ERP System”	15	5
Keywords Merging	—	—
“Enterprise Resource Planning” OR “ERP System” OR [“ERP System” AND “Higher Education”] OR [“Management University” AND “ERP System”]*	81	17

Table 6. Criteria of inclusion and exclusion.

Keywords	ScienceDirect	EmeraldInsight
“ Enterprise Resource Planning”	4	2
“ ERP System”	21	8
“ Higher Education”	6	3
“Management University”	5	2
“ERP System” AND “Higher Education”	1	0
“ Management University” AND “ERP System”	3	0
Keywords Merging	—	—
“ Enterprise Resource Planning” OR “ ERP System ” OR [“ERP System ” AND “ Higher Education”] OR [“Management University ” AND “ ERP System”] *	22	5

Table 7. Journal quality selection results.

No.	No. Journal	Source	RQ1	RQ2	RQ3	RQ4	Score
1	1	ScienceDirect	2	1	2	2	8
2	2	ScienceDirect	2	2	2	2	8
3	3	ScienceDirect	1	2	2	2	8
4	4	ScienceDirect	2	2	2	0	7
5	5	ScienceDirect	2	2	2	2	8
6	6	ScienceDirect	2	2	2	0	6
7	7	ScienceDirect	2	2	2	0	7
8	8	ScienceDirect	2	2	2	0	6
9	9	ScienceDirect	0	2	2	2	6
10	10	ScienceDirect	2	2	2	0	7
11	11	ScienceDirect	2	2	2	0	6
12	12	ScienceDirect	2	2	2	0	6
13	13	ScienceDirect	2	2	2	0	6
14	14	ScienceDirect	2	2	2	0	7
15	15	EmeraldInsight	2	2	2	0	7
16	16	EmeraldInsight	2	2	2	2	7
17	17	EmeraldInsight	2	2	2	0	6
18	18	EmeraldInsight	2	2	2	0	6

from the highest to the lowest weight. From the results of the ranking, the main journals and supporting journals that will be used in this literary writing will be determined.

The journal used in this writing is a journal with a minimum test value of 6, or with related and highly related categories. From the results, 18 journals will be used to write this systematic literature review. The results of the selection of journal quality assessment results can be seen in Table 7.

Summary of the obtained article are presented in the Table 8.

5.1. The Role of Enterprise Resource Planning Systems in the Higher Education

The ERP system primarily concerned with information in the implementation stage. It provides students, faculty members, staff and staff at the university institutions to provide internal services (such as admission, registration, technology, etc.) and external services to record all their operations and then compile them into databases Centralized data are analyzed, presented and presented to managers in the form of reports, which are considered in relation to plans and objectives, and in light of environmental case studies and strategic direction to take effective decisions that bring the organization closer to achieving its objectives. Units of the management system of the university institution includes:

- 1) Enterprise Management System Units.
- 2) Registration and Admission Units: These units in the ERP College aim to operate the registration and acceptance procedures in the scientific institution with ease.
- 3) Fees Units: This unit manages payment of fees through fully secure gates for payment of fees.

Table 8. Summary of journal.

No.	Author Name & Year	Summary
1	Raminder Pal Singh, et.al, 2018	This paper presents the ERP system used in the education system to be used in educational institutions in the future
2	Ashwaq AlQashami, et.al, 2015 [8]	This paper examines literature that focuses on the determinants of the success of ERP implementation in higher education institutions throughout the world
3	Mohamed Soliman, et.al, 2017 [9]	This research is intended to get a correct understanding of the success of adopting ERP in higher education institutions that occur in Egypt
4	Saravanan Venkadasalam, 2015 [10]	Through this research, it can be distinguished from linear programming functions as a system used to produce higher learning
5	Ahmad A. Rabaa'i, et.al, 2009 [11]	This research is a descriptive study that states in detail about the ERP system and its alternatives that have been applied in the Queensland technology university
6	Mohamed Soliman, et.al, 2016 [12]	This paper aims to reveal the implications and advantages of implementing ERP systems
7	Gheorghe Sabau, et.al, 2009 [13]	This paper examines the application of ERP systems using SWOT analysis at Romanian universities
8	Ashraf Ahmed Fadelelmoula, 2016 [14]	The need for determinants of success to support the achievement of the objectives of implementing a system in an institution or company
9	Florian Schwadea, et.al, 2016 [15]	The challenge of implementing ERP systems taught to students from different disciplines is a way to find the best teaching concepts
10	Amin Y. Noaman, et.al, 2015 [3]	Higher education institutions have successfully implemented the ERP system as a current review requirement
11	Umar Ruhi, 2016 [16]	The study of the management of teaching both in theory and practice is connected with the implementation of the erp system in a curriculum
12	Yaser dalveren, 2014 [17]	Unity integrated in ERP systems aims to design a form or model of learning curriculum
13	Mona Althonayan, et.al, 2017 [18]	The ERP system approach to education and training is a work concept that contributes practically
14	Brenda Scholtz, et.al, 2014 [1]	This research provides an understanding of the quality of performance displayed by the environment that applies the ERP system
15	Ahmed Abugabah, et.al, 2015 [2]	Information systems have an impact on the quality of the system used by users
16	Shahira El Alfy, et.al, 2018 [19]	Higher education institutions become quality proof containers for the implementation of UP
17	Dimitra Skoumpopoulou, et al., 2017 [20]	System information strategy implemented in higher education
18	Neil Pollock, et.a, 2014 [21]	Analytical study regarding the development and application of specific ERP systems in higher education in the UK
19	Christoph Klima, et.al, 2014 [22]	This paper presents the design of ERP systems in information systems education
20	Rafaat George Saade, et.al, 2016 [23]	This study aims to reveal the application of ERP systems and the factors that support the effectiveness of this system.
21	TFlorian Schwade, et.al, 2016 [15]	A study at a German university that examined the concept of teaching as the standard for implementing the ERP system.
22	Abdulrahman Alharthi, et.al, 2017 [24]	Identify synthetically the work concept from the determinants of the success of ERP systems at various universities in Saudi Arabia.
23	Indra Gamayanto, et.al, 2018 [25]	ERP Education connected can be made an android-based application and can also be made a special website to be able to connect between university-companies.

- 4) Student lifecycle modules: The goal is to take into account the available resources and help to understand the needs and provide them in a timely manner. Payroll and Human Resources Units: Helps to collect and analyze employee data from the biometric system or through internal records.
- 5) Monitoring and Attendance Units: These units are responsible for monitoring and monitoring the ERP system of the college. Addressing the attendance requirements of the faculties, and conducting all relevant reports quickly to make the process of decision-making and support as soon as possible.
- 6) Student Activity Units: This module transfers strategic and operational objectives and supports the operation and implementation of extracurricular activities at the college.
- 7) Library units: The purpose of the library is to assist in the search for books and practical messages, the issuance of books, the management of members and the circulation of books.

5.2. *The Advantages of Using ERP System in Higher Education*

This research is important as a scientific supplementary material for the education sector in order to increase student and university staff awareness about the role played by information systems in these institutions from information storage, processing, and broadcasting activities, as well as communication and coordination between various activities in the institution. Supporting the decision-making process in these institutions as the importance of the subject comes from the following considerations:

- 1) Unification of the entire campus system.
- 2) Increase the efficiency of the communications system.
- 3) Completely eliminate manual operations.
- 4) Smooth and fast data access in a timely manner.
- 5) Enable the strategic decision-making process by analyzing strategic data.
- 6) Increased growth in follow-up and planning capabilities.
- 7) Establish and integrate self-service environments for students, staff, and faculty.
- 8) Obtain an administrative system capable of providing quick and flawless services.
- 9) Integration of the administrative and educational processes.
- 10) Smooth data access in order to identify and coordinate the work of the organization's management.
- 11) Improving the quality of university administration services, staff, and students.
- 12) Reduce the cost of stationery.
- 13) Increased access to results.

6. Discussion

At present many universities in various parts of the world have implemented ERP systems to improve services for students, teaching staff and, staff. The successful use of an ERP system is determined by various factors including change management factors, emotional behavior, communication and approaches, the process of implementation and system functionality. And also staff training becomes a very important process for the success of ERP in higher education to get more benefits from this system. Enterprise Resource Planning or ERP is the application of various multi-integrated modules in software packages that function to run various business processes. However, it requires a large amount of costs in implementing it and requires ICT readiness as a whole.

The ERP system has indeed become the best system in running business processes within the scope of higher education which requires effectiveness and efficiency as well as accuracy in receiving factual information. However, some universities have not been able to implement this ERP system because they chose to use an integrated information system that is also useful in serving all components in the university. An integrated information system is a series of several sets of information that are linked together in an organized manner with a view to gathering clear information in a planned manner. The use of IIS can integrate data into databases so as to reduce redundancy, speed up access, reduce storage costs, facilitate data retrieval, as well as with integrated information systems that can provide more service benefits by having technically coordinated reports that are feasible. However, IIS has weaknesses in its use, namely the existence of smaller data redundancy, the spread of errors that cause damage to basic data, the need for more sophisticated hardware and software technology as well as security, data backup and data recovery which is very minimal.

So basically the use of ERP systems at the higher education level is indeed very much needed but depends on the readiness of the university both financially and in infrastructure systems.

7. Conclusion

University management requires a modern and integrated information system to plan the available resources. It collects and releases results and outputs from the sub-system in the form of complete and final reports for beneficiaries and provides adequate information protection. This research has shown the importance of implementing ERP systems in the world of education, especially higher education. ERP systems and technology play a very active role in improving university performance and enable them to manage it efficiently and transparently, and improve communication and coordination between organizational units within the organization and with organizations in the external environment and help improve the performance of functions and processes at the middle administrative level and low with high speed and much cheaper cost.

An important recommendation is for educational institutions to review their organizational structure and reengineer their operations in line with developments in information systems and ERP systems, and adopt information management strategies for their role in reengineering company processes.

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