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Development MEIS (Military Education Information System): HRIS (Human Resources Information System) Integration for Competence and Placement of Personnel Positions

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Abstract*: *MEIS (Military Education Information System) is an information system used in the field of education in military organizations, while HRIS (Human Resources Information System) is an information system in the HRD (Human Resources Department). The rapid development of technology has resulted in a lot of changes aimed at adjusting technology and meeting the needs of the organization, especially in the field of education. The research was conducted on previous research, by paying attention to how and when the development has been carried out. The research found that not too much research was carried out in the military sphere of education. Through several stages in the review of the literature that has been obtained, it is very helpful in a more structured selection. So, from the results of the literature research, it can be seen that there have been some technological updates that have been made, but some are still concepts and plans. The merger between MEIS and HRIS is an effort in optimizing the system so that problems in development related to budget and personnel limitations can be overcome. Problems in the budget and personnel are often found in developing countries that have limitations, especially in the issue of budget and personnel who are professional in their fields. The combination of two or more systems will be able to provide utilization of the system effectively and efficiently by adjusting to the needs of the organization, in this case, the military organization, which has a more complex organizational structure.

Keywords* : *Keywords: MEIS, HRIS, technology development..

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I. INTRODUCTION

Education is a general thing and very important. It is really needed a good education for everyone, besides to get knowledge as well as professional standards in getting a job. The development of technology which has been very rapid, also greatly influences various aspects in the field of education. Very much needed technology, especially a system that supports the implementation of educational operations, which starts from the beginning to the end of the educational process itself. This applies in all fields of education, including military education.

Basically the education system consists of several components that influence each other and are related in achieving goals and developing education. PH Coombs (1968) states there are twelve components in education, namely: goals and priorities, students, management, structure and time schedule, content or material, lecturers and implementers, learning tools and resources, facilities, technology, quality control, research and tuition fees.[1]

However, success and progress in implementing education, very much depends on the socio-economic conditions. No exception, this applies to all levels of education, both primary and higher education, including military education. Development greatly depends on the effectiveness of the economic and social resources where education is carried out. Likewise, the development of education for military personnel, who are also part of a country's education system, also has a very close relationship with development in the social and economic fields.[2] This applies in all countries, economic conditions in particular will be related to the budget used in the development of technology related to education, including information systems.

Various educational information systems have been developed in the military sphere which can be referred to as MEIS (Military Education Information System) in various countries. The information system developed is adjusted to the needs and abilities of a country. This is closely related to the educational goals and socioeconomic conditions of the country, including the technology used. However, the education component that must be considered in the information system, does not have much difference. Because all components of education are important and related to one another.

MEIS in its development will use a variety of information technology that continues to progress, such as WEB, the use of simulators, which will also cause sophistication of technology for teaching and learning systems.[3]

The use and implementation of the right technology for use in the educational process will lead to an increase in the professors or educators to achieve efficiency in the educational process and arouse students' interest.[4]

In an age of rapid military revolution, there have been developments in combat equipment, which were followed by the emergence of new combat operations. So the military academy must also be able to follow these developments, by increasing awareness and responsibility, developing new disciplines and new fields as well. Which in the end will assume that innovation is a new cultivation and there is a responsibility in the development for improvement. [5] Because this will be very related to the education information system used, which provides various facilities and facilities in supporting the implementation of educational operations.

Besides all that, there is also a need for personnel competency measurement in carrying out a task or operation. A system is needed that can make the selection of these personnel. MEIS can also be integrated with a system contained in the Department of Human Resources (HRD) called HRIS (Human Resources Information System). This effort is carried out with the aim of saving the existing budget by uniting two systems in order to provide convenience to the organization, in this case related to the military, in order to provide appropriate personnel in a strategic position in accordance with achievements, education, abilities, and other assessments have a relationship with competence. Because there are competency assessments based on all activities with various achievements, so as to provide evidence that the personnel already have competencies in certain fields.[6] There are also developments in the HRIS system, which uses information technology. With the integration of the two systems, it is hoped that it can also optimize the use of the system in data processing for various purposes.

II. MEIS

The rapid development of information technology and includes integration in the field of education and teaching can provide prospects through innovations, especially in the improvement of education. Is an important contradictory way in solving educational problems in the new era, and is one of the efforts in providing education that increases community satisfaction.[7] MEIS is part of the education found in the community but has a specificity because it is intended for personnel who have been selected and in a specific field. Although in education there is general science, education for the deepening and understanding of military problems that do not exist in other education systems is the main thing.

In the development of MEIS, there are several reform ideas in six dimensions, namely: the reshaping of ideas about training, making improvements and improvements to laws and regulations, improvement and development in the educational environment, changes to improve teaching processes, innovating in evaluation methods and development in the educational environment.[7] These dimensions are related, as are the education components. Because if only one of the dimensions is implemented, then the reform will not be able to succeed optimally.

Thus, in educational institutions for the military such as military academies, it is very necessary to use the information technology to improve the achievement of results and influence on personnel from the military training carried out and to improve and develop training and education models and to provide personnel capabilities in the current information warfare. this has evolved. So, it is very necessary to develop existing information resources, using new technology. This aims to improve the quality of education and training carried out in the military sphere as well as being the main thing in the development of education, especially in military education institutions.[8]

MEIS is also a system that illustrates that the development of information technology can provide new technology which ultimately provides a change in military education. An example is higher military education and learning methods in military education become lifelong learning.[9]

III. HRIS

The human resources department in a company needs a knowledge-based system because the scope of their tasks relates to all personnel with a variety of different desires. But human resource management must be able to manage and control matters relating to personnel, both goals, and motivations.[10] HRIS provides many facilities to HRD in carrying out their duties. Through various features and technologies used, HRD can easily manage personnel data according to their needs. These include the level of competence of personnel, specifically related to the placement of positions and personnel performance data.

For improvement in the recruitment and selection process of personnel, it can be identified through: (1) There is a specific and standardized method to support the objective evaluation and by comparison with professional descriptions and (2) Building the established methods into an information system.[6]

IV. METHODOLOGY

In this research, a methodology is used by conducting a comprehensive literature review of previous research. With a discussion that includes educational information systems in the military sphere, which can be either training or education itself. Besides, there is also an analysis of the systems that have been used in HRIS, particularly those related to competency measurement.

The process of conducting research is carried out through several steps, namely: (1) determination of the research topic; (2) determination of data sources or papers in previous studies; (3) determining keywords and word patterns in the process of searching data or paper; (4) analyzing the criteria and grouping of information (5) describing the development and relationship of the system in response to research. Literature is conducted on various publications, from 2015 to 2019.

A. Search Process about MEIS

As for the sources of literature are:

- Emerald Insight (www.emeraldinsight.com)
- Springer Link (link.springer.com)
- Wiley Online Library (onlinelibrary.wiley.com)
- Taylor Francis (http://taylorandfrancisgroup.com/journals/)
- Citeseerx(http://citeseerx.ist.psu.edu/index)
- Science Direct (www.sciencedirect.com)
- ACM Digital Library (dl.acm.org)
- IEEEXplore Digital Library (http:/ieeexplore.ieee.org)
- Lain-lain

Search by keywords is a Boolean approach. To filter the data properly, there is a priority for searching data using symbols. The Symbols and Boolean operators use OR and AND, and their combinations, namely:

- education AND (military OR army OR navy OR air force) AND information system
- (military OR army OR navy OR air force) AND education AND (information system OR computer system)
- (education OR learning OR training) AND (military OR army OR navy OR air force) AND (information system OR computer system)
- military education information system
- military education system

B. Inclusion and Exclusion Criteria in MEIS

In searching by keyword in the literature source, relevant papers will be found according to keywords. The entire paper is a source of data that has a link to the research to be conducted and is called "Founded Study".

Furthermore, after finding several papers according to keywords, it will be re-selected with due regard to the title of the paper. The title of the paper must be consistent with the topic of the research carried out, then proceed concerning the abstraction of the paper. If you find compatibility, then the paper will be used as data for the next process, and is referred to as "Candidate Study".

After that, the data selection process is continued with the reading of the entire paper. If it meets the criteria according to the research topic that have been set then the paper becomes data that will be used as literature in research or can be referred to as "Selected Study". This study uses a paper with a period of 2015 to 2019, to find the most recent development of MEIS that have been used so that there is no bias with information systems that have been used in the previous period.

C. Data Extractionsin MEIS

In the data extraction, based on the keywords used, 490 papers were found. However, after the adaptation to the title and abstract were carried out, there were 100 papers, as well as 49 papers that can be taken as literature data in this study, can be seen in the following table:

Table- I: Data From Extraction Process

	FOUND	CANDIDATE	SELECTED
• Emerald Insight (www.emeraldinsight.com)	71	5	2
• Springer Link (link.springer.com)	69	0	0
• Wiley Online Library (onlinelibrary.wiley.com)	1	0	0
• Taylor Francis (http://taylorandfrancisgroup.com/journals/)	20	0	0
• Citeseerx(http://citeseerx.ist.psu.edu/index)	80	4	0
• Science and Engineering Research Support Society(http://www.sersc.org/)	0	0	0
• Science Direct (www.sciencedirect.com)	22	0	0
• ACM Digital Library (dl.acm.org)	1	1	1
• IEEEXplore Digital Library (http:/ieeexplore.ieee.org)	71	11	5
• Lain-lain	155	79	41
JUMLAH	**490**	**100**	**49**

D. Literature Result MEIS

In the "Table- II", year with the highest number was in 2017 with 17 (35%) of paper, whereas in 2015 only 5 (10%) of paper, in 2016 the sum of 5 (10%) of paper, in 2018 a total of 15 (31%) of paper, and in 2019 only 7 (14%).

Table- II: Source of publication: #year

No.	YEAR	#	%
1.	2015	5	10%
2.	2016	5	10%
3.	2017	17	35%
4.	2018	15	31%
5.	2019	7	14%
		49	100%

Besides the years, it will be seen more clearly in "Table-III", the type of paper. This type consists of journals, conferences, reviews, reports, books, and dissertations. The highest number of conferences is 27 papers and 17 journals. Meanwhile, for the other types, dissertation, report, book, and review, only amounted to 1.

Table- III: Source of publication: #type

No.	TYPE	#	%
1	Journal	17	37%
2	Conference	27	55%
3	Dissertation	1	2%
4	Report	2	2%
5	Book	1	2%
6	Review	1	2%
		49	100%

Meanwhile, based on the institutions of the authors, there are several institutions, both military and general. Details of the data are shown in "Table- IV".

Table- IV: The Authors Institutions

Institutions	#	%
University General	17	35%
University/Academy of Air Force	6	12%
University of Defense	8	16%
Navy	1	2%
University/Academy of Army	6	12%
University/Academy of Naval	4	8%
Military University/Academy	6	12%
Police University/Academy	1	2%
	49	100%

The authors come from several countries, China is a country that has published many papers relating to information systems or technology in the field of education in the military sphere. Can be seen in "Table- V".

Table- V: The Authors Country

Country	#	%	Country	#	%
Baltic	1	2%	Poland	1	2%
Bosnia and Herzegovina	1	2%	Republic of North Macedonia	1	2%
Bulgaria	5	10%	Romania	2	4%
Canada	1	2%	Russia	2	4%
China	17	35%	Slovakia	1	2%
Czech Republic	2	4%	South African	1	2%
Greece	2	4%	Sweden	1	2%
Hungary	1	2%	Turkey	1	2%
Indonesia	1	2%	*Ukraine*	1	2%
Korea	1	2%	USA	5	10%
Norwegia	1	2%	JUMLAH	49	100%

Discussions related to military education information systems or technology that have been developed, mostly carried out by the field of information systems or computer science, especially those related to education. Data can be seen in "Table- VI".

Table- VI: Academic Background

Academic Background	#	%	Academic Background	#	%
Computing Machinery	1	2%	Dissertation	1	2%
Military Tecnology	2	4%	Modeling, Simulation and Optimization Technologies and Applications	2	4%
Engineering Education	1	2%	Advances in Intelligent Systems Research	1	2%
Mathematics and Computers in Sciences and in Industry	2	4%	Military Learning	1	2%
Intelligent Human-Machine Systems and Cybernetics	1	2%	Social and Humanities	1	2%
Knowledge-Based	5	10 %	Contemporary Education	1	2%
Land Forces Academy Review	1	2%	Security & Development	1	2%
Social Science, Education and Humanities Research	8	16 %	Interservice/Industry Training, Simulation, and Education	1	2%
Military And Strategic Studies	1	2%	Social Science	1	2%
Advances in Education	2	4%	Ergonomics Society	1	2%
Environmental & Science Education	1	2%	Environmental & Science Education	1	2%
Education Reform, Management and Applied Social Science	2	4%	Earth and Environmental Science	1	2%
Social-Behavioural Sciences	1	2%	General	8	16%
				49	100 %

In the next stage, researchers classify the research that has been done from the perspective of technological development in MEIS. The classification consists of several parts so that clearly seen the use of technology that has been used, and that is still in the form of a concept for development. "Table- VII" can be seen how and whether the technology and information systems that have been used in MEIS and it can be described as in "Fig. 1".

Table- VII: Technology Classification in MEIS

Mobile interconnection	• Online learning	[7]; [31]
E-learning	• Web conference • e-Campus • Communication of skills • Real-time of cameras • Intelligent environmental for sensing facilities	[3]; [4]; [8]; [37]; [34]; [35]; [39]; [5]; [42]; [51]
Smart Classrooms with E- Materials	• Smartboard of class • Interactive face-to-face • Audio recording • Web-based realtime for lectures • Evaluation for the results	[4]; [25]; [27]
Simulation-Based Training	• Replay of simulation • War game by simulation • Choose for the best tactics • Measure and record of performance by automatically • Simulated for weapons and equipment • Simulation of training scenario • Real system • Combat of flight • Civilian behavior	[4]; [8]; [15]; [17]; [30]; [36]; [40]; [5]; [44]; [48]; [50]; [51]
Intelligent Tutoring Systems (ITS) and Intelligent Team Training Systems (ITTS)	• Compare of student performance • Change for the study selection • Changes in learning of models	[4]; [11]; [44]; [48]; [50]
KMS (Knowledge Management System)	• Consists classes and objects • Powerful for full text engine searching • Input, edit, correct for all information • Create of associations and properties • Integral component; knowledge updating • The previous study of class • Relevant for the competencies • Synchronous data patterns • Construction of Curriculum • Expert system • Connection of Neural network • Functional for illiteracy	[2]; [13]; [18]; [20]; [21]; [19]; [23]; [33]; [34]; [35]; [36]; [39]; [40]; [5]; [44]; [45]; [47]; [48]; [50]; [51]
DSS (decision support system)	• Classification for the problem • Define of evaluation criteria	[17]; [16]; [22]; [44]; [47]

	• Built on command and Control processing	
Virtualization technology	• Battlefield virtual experience • High availability for the service cluster • Capability of communication • Computer assisted exercise (CAX) • Module of virtual briefcase	[8]; [15]; [17]; [33]; [36]; [40]; [48]; [50]; [51]
Security information	• Real time • Intelligent for monitoring • Environment for Security • Cyber space • Role based of security control	[8]; [17]; [28]; [33] [43]; [44]
AI (artificial intelligent)	• Very large volumes of data processing • Data mining techniques	[29]; [44]

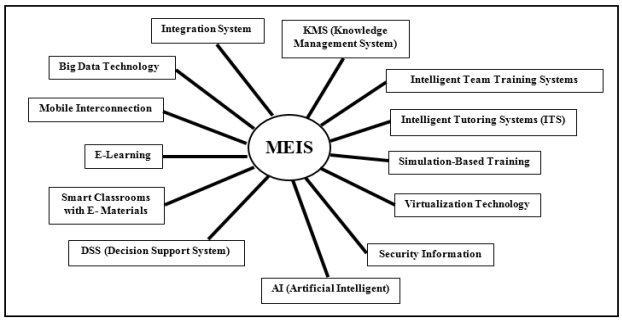

Fig. 1. The technology has been used in MEIS from "Tabel-VII"

V. TECHNOLOGY USED IN HRIS

In this study, the technology that has been used in HRIS is related to the measurement of personnel competence. There are several technologies used, including KMS, integrated systems, and infographics. Can be seen in "Fig. 2".

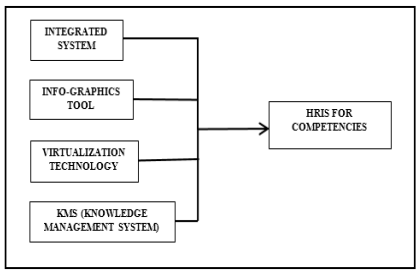

Fig. 2. The technology has been used in HRIS for competence. [6]; [10]

While in "Table- VIII", you can see the details of the technology that has been used in HRIS for competence. In general, it will also be seen that some of the technologies used have similarities with MEIS.

Table- VIII: Technology classification on HRIS for competence

Technology	System Capability	Source of publications
Integrated System	· Standard of assessment · Professional network · Factors of normalization	[6]; [10]
Info-Graphics Tool	· Classification · Calculation of algorithms · Make a competency comparison chart	[6]
Virtualization Technology	· Professional visual expertise · Visual graphics with synthetic view	[6]
KMS (Knowledge Management System)	· Competency enhancing data · Structure of taxonomy · Knowledge-based enterprises	[6]; [10]

VI. MEIS AND HRIS

From the comparison obtained based on various technologies used in MEIS and HRIS, it can be seen that there are several advantages of each system. To be able to provide optimal and maximum results of information, especially on the measurement results of personnel competencies for various positions with various levels of responsibility and expertise, both strategic and tactical, the merger of the two systems can be carried out.

This can be done, when the system that is already running is separate. Also, due to budget constraints in its development. It can be seen in "Fig. 3", how between MEIS and HRIS collaborate by providing a complementary mix of data. However, there will be various policies in accessing data, with the background of the confidentiality of data in each section. Data access will occur in the data needed and following the agreement of the two sections, namely the department of education and HRD.

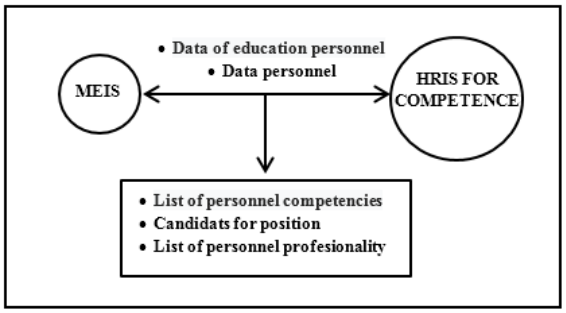

Fig. 3. Merging of MEIS and HRIS in the competence and placement of personnel positions

The use of combined technology can be seen in "Table-IX", which shows what technology between MEIS and HRIS that can be integrate.

Table- IX: Technology classification on HRIS for competence

Technology	MEIS	HRIS
Integrated System	• Deep integration system [7] • Modernization [7] • Systematic [8] • Monitoring [8]	• Standard of assessment.[6] • Professional network.[6]
Info-Graphics Tool		• Make a competency comparison chart. [6]
Virtualization Technology	• Module of virtual briefcase [33]	• Visual graphics with synthetic view. [6]
KMS (Knowledge Management System)	• Powerful for full text engine searching. [13] • Input, edit, correct for all information. [13] • Relevant for the competencies [21]	• Competency enhancing data. [6] • Structure of taxonomy. [6]

Measurement of competence is carried out during education or during service, therefore the incorporation of competency results in different situations and conditions can show more accurate measurement results to get the right personnel in a particularly strategic position.

In military organizations, education is very important in the career development and expertise of personnel. In general, there is special knowledge and education, which also exists in the military sphere and has a very large influence, and this can be a consequence of HRD policy on personnel, namely: (1) Providing vertical mobility for personnel without any restrictions (2) Provide an increase in the value of personnel and self-confidence (3) Give confidence to the leader is higher than before (4) Provide changes to the structure of power. [10]

VII. CONCLUSION

MEIS is a very important system in the field of education in the military sphere. Along with the development of technology, there have been many developments in the use of these technologies. But until now there are still many technological developments in MEIS which are still in the form of concepts and plans. HRIS is also experiencing more rapid development, which can also be a basis for MEIS to further enhance the ability of the system to be optimal and meet the demands of organizational development.

The integration between MEIS and HRIS is one way specifically in minimizing the budget and personnel, especially in developing countries. As well as in the process, with complementary data between MEIS and HRIS, it will be able to provide more accurate and complete results, so that personnel with the right qualifications and competencies are in line with the organization's needs for a position.

Further research is needed, which can reveal the extent to which the effectiveness and efficiency of the merger of MEIS and HRIS. Also, with the need for infrastructure, and others, research can be carried out for integration with other systems, such as logistics, financial and other systems, following organizational needs.

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