Implementation of Learning Management System (LMS) in the Self-Development of Productive Teachers of Vocational Schools

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Abstract—**The development of information technology and computers has an impact on the development of e-learning. Learning Management System (LMS) as one of the software used to manage e-learning in the last decade has been widely used in schools. The implementation of LMS in vocational schools has consequences for vocational school teachers to be able to use LMS in the learning process. To use the LMS, the teacher must have adequate ICT competence so that the learning process can run efficiently and effectively. This study aims to determine the implementation of LMS in the self-development of productive vocational teachers. This research was conducted at the state vocational high schools located in the city of Bandung, Indonesia and has a program of expertise in electrical engineering and electronics engineering. We use a survey method with a qualitative approach and semi-structured interviews and documentation for collecting data. The results of the study show that the implementation of LMS greatly helps the self-development of productive vocational teachers to improve pedagogic and professional competencies by using ICT in the learning process, although in practice it still faces several problems according to the conditions and abilities of each school.**

Keywords—Learning Management System, self-development, productive teacher, vocational high school

I. INTRODUCTION

The development of Internet has led to various new applications, including applications in the field of education. One of the benefits of this technology is as a means for learning, that is, e-learning. *E-learning* is a type of learning that conveys teaching materials to students with the support of the internet, intranet, or other computer networks [1,2]. e-learning is formal and informal learning carried out through electronic media [3,4].

Infrastructure in the form of software in managing e-learning to deliver learning content, identifying and assessing learning objectives, checking all progress in achieving learning objectives and collecting/ present data to see the overall learning process is *Learning Management System* (LMS) [5]. This LMS is used for administrative purposes, documentation, finding materials, reporting on an activity, providing training or learning materials in the online learning process that is connected to the internet [6]. *Virtual Learning Environment (VLE)* is a management learning yang have benefits for providing material, supporting collaboration, assessing student performance, storing student data, and getting useful reports to improve efficiency and effectiveness in the learning process [7], content and display material in the form of multimedia-based content or text-based content with the aim that the content can be run by students anywhere and anytime [8].

The research regarding LMS implementation related to instructors yielded several opinions such as many instructors are not ready to use ICT in their teaching activities [9]. The low computer literacy of students is referred to as a weakness in learning with LMS. In the same work, it was highlighted that instructors' perceptions of the LMS, their beliefs, and attitudes play an important role in the integration of ICT into educational goals [10]. Perception is not the only problem in the use of learning management systems by instructors and students, but instructors and students use LMS on different devices, i.e., instructors mostly design lecture materials on laptops, while students use smartphones to access course content, causing problems to use of LMS [11]. Perceived usefulness and service quality are the most important factors influencing instructor satisfaction. Furthermore, instructor satisfaction positively affects distance learning course outcomes [12]. Perceived usefulness was defined as a key determinant of user satisfaction with an LMS in Tanzania, with quality-related factors (instructor and system) and information quality being the main predictors of perceived usefulness [13]. Student interaction is more frequent if the instruction is well designed and course requirements are well defined [14]. Quality has no impact on student satisfaction, while communicative has the highest influence on performance results [15,16], and factors perceived usefulness, perceived ease of use, intention to use, actual usage behavior significantly

affect the use of LMS effectively and efficiently in supporting the teaching and learning process [17].

In this research, we try to examine how the implementation of LMS in the self-development of productive teachers in vocational schools, because from previous research it seems that not many researchers discusses the implementation of LMS in teacher self-development.

II. METHODS

We use a survey method with a qualitative approach. And the technique for collecting data using semi-structured interviews and documentation [18]. Interviews were conducted with productive teachers, school ICT coordinators, heads of study programs, vice head of curriculum, and school principals. Documentation is used to obtain information on teacher data, use of LMS by teachers, and self-development of productive teachers in implementing school LMS. Our data were analyzed using the Miles and Huberman model with the following steps: data reduction, data presentation, and concluding. We implemented research phases at the state vocational high schools (SMKN) majoring electrical engineering and electronics engineering located in the Bandung City area, namely, SMKN 4, SMKN 6, SMKN 8, and SMKN PU with a population and research sample of 77 productive teachers.

III. RESULTS AND DISCUSSION

A. Results

The result of the study shows based on data collection and interview concerning the information about teacher status, the number of teachers, and teacher age is illustrated in Table 1.

TABLE I.   TEACHER STATUS, NUMBER OF TEACHERS, AND TEACHER AGE

School Name	Teacher Status							Teacher Age				
	ELECTRIC		ELECTRONIC		AMOUNT		AMOUNT	20-29	30-39	40-49	50-59	AMOUNT
	CST	HT	CST	HT	CST	HY						
SMK N 4	11	9	11	7	22	15	38	8	7	13	10	38
SMK N 6	7	5	6	8	13	13	26	3	7	9	7	26
SMK N 8	-	-	4	2	4	2	6	1	2	1	2`	6
SMK N PU	6	1	-	-	6	1	7	1	-	-	6	7
AMOUNT	24	15	21	17	45	32	77	13	16	23	25	77

Source: Interview results and school documents.

B. Discussion

The results of the interview show that in self-development, teachers with civil servant status (CST) have more responsibility than teachers with honorary teachers (HT) status because teachers with civil servant status must fulfill credit scores for promotions or positions [19]. Meanwhile, the e-learning efficacy decreased for teachers aged over 50 years in using the school LMS only for the benefit of the learning process as necessary and less interested in learning more about how to use all the features available in the school LMS. However for self-efficacy teachers under 50 years are higher and tend to be more prepared to accept school LMS because they are equipped with adequate ICT competencies and more interested in knowing more deeply how to use all the features available in the LMS. This shows that teachers who have work experience or an initial career of fewer than 5 years have the enthusiasm to adopt innovation [20].

1) School LMS implementation: The process of implementing the school LMS in each school is carried out by the conditions and abilities of each school. Our observations in the school context show several factors influencing the implementation of school LMS, namely school policies, problems experienced, and teacher self-development.

School policy is a statement of goals and one or more instructions on how the goals are achieved which are carried out together and provide a framework for the implementation of school programs [21]. School policies in the implementation of the school LMS are statements or guidelines or instructions made by the school through the principal in supporting the implementation of the use of the school LMS in achieving school goals, this is of course adapted to the school's vision and mission. School LMS as a tool or media in achieving school goals is largely determined by the school's ability to adopt school LMS to meet school needs. Learning Management System (LMS) in general is software designed to create, distribute, and manage the delivery of learning materials. The purpose of implementing the school LMS is the implementation of an efficient and effective learning process. The learning process in SMK uses a combination of two learning models (Blended learning), namely face-to-face learning and electronic learning (e-learning). Face-to-face learning is used in practical learning while electronic learning is used for theoretical material. School policies in implementing school LMS can be in the form of 1) LMS training in in-house training (IHT), 2) Every teacher is obliged to use school LMS or as an option in the learning process, 3) Name or type of school LMS used, 4) when it starts to be effectively used, 5) Responsible or human resources for school ICT, and 6) Costs required in the procurement and maintenance of school LMS [22], with the ICT team resource person or the school LMS provider, and continued with ongoing consultation

related to the problems that arise experienced by teachers, 2) For the use of school LMS by teachers, namely mandatory and optional, meaning that teachers must be able to use the school LMS is good but in its implementation, it is adjusted to the subjects taught because for practical subjects the practical teacher must immediately carry out the practice, in this condition the teacher can implement two learning models (blended learning) for theory using the school LMS and for practice it can be directly implemented practice. 3) For the name of the school LMS, it is adjusted to the wishes and characteristics of each school, for SMK N 4 Bandung the name is Learning SMKN 4 Bandung, for SMKN 6 Bandung it's called IT School, for SMKN 8 Bandung it is called Be3, and for SMK N PU Bandung it's called Impuls LMS. 4) For the effective use of school LMS, it only started in 2019 in the process of development and improvement, the quality of school LMS was tested for quality during the corona pandemic in early 2020 because all learning activities were carried out online. 5) For the person in charge of school ICT, it shows that all schools already have a special team or person in charge of school ICT independently even though the facilities and infrastructure of each school are different and adapted to the conditions and abilities of each school. 6) For costs in the procurement and development of school LMS, each school has allocated special costs, this is adjusted to the conditions and abilities of the school.

2) Problems in implementing school LMS: Problems that occur in the implementation of school LMS can be categorized into 3 factors, namely 1) teacher factors, 2) school support factors, and 3) technical support factors. Teacher factors include teacher motivation, teacher readiness, teacher responsibility, and equipment owned by the teacher. School support factor includes school policies, costs for procurement and maintenance of school LMS, internet facilities, and school computer facilities. School LMS technical support includes ease of use of school LMS, features available in school LMS, and development and progress of ICT in school LMS.

The teacher's motivational factor in learning and using the school LMS is a very decisive capital in shaping teacher self-efficacy or the level of teacher confidence about his ability to use the school LMS [20]. If the teacher's self-efficacy is high, the teacher will have confidence in their ability to organize and complete a task required to achieve certain results in various forms and levels of difficulty. This will have an impact on self-ability is also high. He will be able to effectively manage the experience of learning in various ways to achieve optimal learning outcomes. Low self-efficacy will greatly affect someone in completing their tasks to achieve certain results. different levels of self-efficacy are influenced by several factors [23], namely (1) the nature of the task at hand, the more complex and difficult a task is for a person, the greater the doubt about his abilities and vice versa, (2) a person's status in the environment. Someone who has a higher social status will have a high level of self-efficacy compared to someone with a lower social status, (3) Information about self-ability. Self-efficacy will increase if a person gets positive information

about himself, and vice versa, self-efficacy will decrease if someone gets negative information about his abilities. The readiness and responsibility of teachers in using the school LMS is an indicator of the level of teacher self-efficacy in implementing the school LMS [20]. The research shows that the problem of productive teacher motivation can overcome with special assistance to each teacher according to the needs of teachers in learning and using school LMS to the level that teachers can independently use school LMS and feel the ease and usefulness of implementing school LMS. So that by feeling the ease and usefulness of implementing a school LMS, teachers will also prepare themselves better and build better teacher responsibilities as well [24].

The problem of school support in this study shows that the school has carried out various maximum efforts according to the conditions and abilities of each school. Regarding school policies, it shows that all schools have also made special policies regarding the implementation of school LMS. Regarding the cost of implementing a school LMS, it shows that all schools have made special budgets for the procurement, development, and maintenance of school LMS by the conditions and abilities of each school. Regarding the shortage of computers, especially for teachers, schools make a BYOD (Bring Your Own Devices) model policy that is every teacher must have a laptop, and the results of the study show that each teacher already has a laptop although there are still teachers who have laptops that do not meet the expected specifications but can still be used.

The problem of technical support in the research shows that the implementation of the school LMS has started from 2019 and as ICT develops and the passage of time each school evaluates the results of the school LMS implementation and continues to gradually improve the shortcomings experienced in the implementation of the school LMS. Along with the corona outbreak at the beginning of 2020, it became a challenge for schools where all learning processes had to go through online or online media this showed how ready schools were to use school LMS to the fullest. Repair and development of hardware continue to be carried out in stages to be able to achieve the maximum expected needs in the implementation of school LMS. Regarding school LMS software, each school gradually makes improvements and improvements according to the conditions and abilities of each school, this is proven by the existence of a special team formed by schools that handle school ICT, one of whose tasks is the development of school LMS. To measure the performance of e-learning, it can be seen from four aspects, namely cost, quality, service, and speed [25].

3) Implementation of LMS in the self-development of SMK teachers: Teacher self-development is part of a continuous professional development process [26] as an effort or effort to improve the technical, theoretical, conceptual, and moral abilities of teachers by the needs of the teacher's job or position through education and training [27,28]. The integration of ICT in the 2013 curriculum demands an increase

in teacher competence in the ICT field, especially the increase in pedagogic competence and teacher professional competence [29]. The integration of ICT in improving pedagogic competence can be carried out in the learning process, starting with lesson planning, learning implementation, and learning evaluation [30]. Meanwhile, the integration of ICT in improving the professional competence of teachers can be carried out in the preparation of learning materials by the field of competence or field of expertise [30]. The professional competence of productive teachers of electrical engineering and electronics engineering expertise programs is the ability possessed by productive teachers of electrical engineering and electronics engineering expertise programs in compiling and mastering electronic learning materials, such as in the form of electronic articles, electronic modules, power points, learning videos and animations. From the results of field observations, it shows that productive teachers have been able to make electronic learning materials such as electronic articles, electronic modules, and power points. As for the new learning video, some teachers can make this because it requires good equipment and takes a long time, for animation it seems that the teacher can't make it because to make animation requires special skills,

Teacher self-development is part of the continuous professional development process for teachers. One aspect that is demanded in teacher self-development is the use of ICT in the learning process. Therefore, the implementation of the school LMS in SMK is carried out in stages starting from socialization through IHT and continuing to provide personal assistance to teachers who have problems in using the LMS until the teacher can independently use the school LMS with the aim that all teachers have the maximum ability in utilizing school LMS in the learning process so that the learning process is expected to run efficiently and effectively [19]. This shows that the implementation of the school LMS is very helpful in the self-development of vocational school teachers who can produce graduates who are by the demands of the 21st-century workforce, namely workers who have 4C skills or abilities, critical thinking and problem-solving, innovative and creative, communication, and collaboration [31].

IV. Conclusion

Based on aforementioned explanation started from the school LMS implementation process with training through IHT, continued with assistance by a special team from school ICT and peers to teachers until the teacher may independently use the school LMS, so the implementation of school LMS is very helpful in improving the ICT competence of teachers both pedagogical and professional competences.

We conducted this research in limited population of productive teachers in the electrical and electronic engineering expertise program, so the future work might be continued with a larger population data, for instance, with all productive teachers in all fields of expertise.

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