Measuring e-learning readiness of middle school with a class of athletes in central java

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***Abstract*—** This study aims to determine the level of readiness (e-readiness) of schools in Solo Raya region, Central Java that has a Sports talent class program. Sports talent classes are classes that gather and foster students with, sports talents such as soccer, martial arts, athletics or other sports. The background of this research problem is because the learning load for the students is still on par with regular class students at school, so their burdens increase. Therefore we need a learning strategy so that students in this sports class can be active in the achievement competition by still following flexible and structured learning through e-learning. Information is required in the form of e-readiness before implementing E-learning in schools. E-readiness includes four factors of readiness of the application of technology, namely readiness in terms of technology, innovation, human development, and self-development in implementing e-learning in schools. Data is collected by using questionnaires, interviews, field observations and documentation. This study uses the ELR Aydin & Tasci model to measure the readiness of implementing blended learning in schools. The final result is the conclusion that the e-readiness score in the 2 middle schools that were observed in Solo Raya, Central Java is 3,46 and 3,27. This means that these schools need improvement to be ready, especially in terms of human development, innovation, and self-development.

Keywords: Solo Raya, sports-class, e-learning, school e-learning readiness

I. INTRODUCTION

The rapid development of Information and Computer Technology (ICT) has changed the characteristics of learning. Learning is currently playing varied in terms of the range of learning areas to the method of gaining knowledge. Today's students can independently discover knowledge other than the world of unlimited information through the internet rather than learning resources in the form of conventional books, newspapers and magazines [1]. In the school world, teaching and learning activities that were initially only carried out in class and at school hours turned into teaching and learning activities that are flexible in space and time, so that learning activities can be done anytime and anywhere [2], [3].

One of the uses of ICT in education is known as electronic learning (e-learning). According to Waryanto [4], e-learning is defined as the delivery of learning content or learning experiences electronically using computers and computer-based media. E-learning allows teachers to make variations in the activity of teaching and learning, namely the teacher does not merely upload learning material that can be accessed online by students, but teachers can also evaluate, establish communication, collaborate, and manage other aspects of learning. With e-learning, students can study or review teaching materials at any time and anywhere. E-learning requires students to be more active in the optimization of existing learning resources [4] [5], [6].

E-learning becomes a good learning alternative for teacher and student because of the flexibility in setting the time and place of learning. According to Saifuddin [7], the latest generation of e-learning utilise a cloud-based software platform called Learning Management System (LMS) to carry out this learning. The definition of E-learning [8] is a learning method that represents the whole category of technology-based learning, while online-learning or web-based learning is a part of E-learning. However, in the recent technology development era, there is now a shift in the classic definition of e-learning into a more contemporary definition: namely Learning Management System. It is a platform of learning management through the internet or web media which includes material aspects, evaluation, interaction, communication and collaboration. all of which are on the LMS platform [9]. Blended Learning Strategy (learning mix that combines classical face-to-face in class with web-based distance-learning or utilising LMS) was chosen as a middle ground between distance learning with face-to-face needs between students and teachers [10].

However, before schools start implementing blended learning, analysis and evaluation are needed to prepare it. The application of e-learning requires readiness in both infrastructure and organisational culture [11], [12]. Assessment of e-learning readiness in the structure of an institution or organisation is carried out aimed at clearly knowing the level of readiness of the institution for e-learning[13]. By understanding the level, the organisation can determine what policies or strategies will be determined. According to Nur Hadi [4] the successful implementation of e-learning in an educational institution consisting of four factors: the quality of human resources (HR), reference to the implementation of e-learning, infrastructure and internet network readiness, organisational culture, and leadership.

The purpose of the study are: (1) to determine the level of readiness (e-learning readiness) in high schools with sports classes in Central Java, (2) to reveal which factors or areas are still weak and need improvement, and (3) to map which factors in the schools are considered successful or influential in supporting the application of e-learning in the learning process.

II. THEORETICAL CONTEXT

1. School with Sports Class Programme

The initial purpose of the SSC, according to UU no.20 / 2003 on the Indonesian National Education System chapter 5,

verse 4, is to bring up athletes who will raise the name of Indonesia in the national and even international exhibitions. The Indonesian Ministry of Education and Culture followed up by launching a special Class Special Sports Class (SSC) program in secondary schools in Indonesia, including Central Java. The primary purpose of the launching of the SSC class is to accommodate students who have talent and potential in the field of sports while still obtaining academic education under their level [14].

Ideally, schools with Special Sports Classes (SSC) classes have different learning characteristics from schools in general. Less learning activities than school students generally because students in it must practice seriously and focus on sports championships [15]. According to Sumaryanto [14] the SSC is implemented in public schools, and it has to get academic education like schools, in general, are intended, so that students remain ready to continue to higher education. This school model has been disseminated into several well-ready schools in Indonesia, including Central Java, trusted to hold the SSC classroom coaching.

Furthermore, in the SSC, besides having a Physical Education hour once a week, the SSC's students also receive training in each of the sports that are occupied. They even have to practice outside of school hours. Student activities outside of school are very dense, namely sports extracurricular activities at school, training at sports clubs according to their respective branches [16], [17].

As a result, face to face with the teacher in the classroom becomes less. Therefore, subject assignments, formative tests, or summative tests are missed. Probably, in public schools, gaps in learning and evaluation of knowledge can be overcome with a replacement schedule. However, for this sporting class, if almost all of the students leave the face-to-face learning class with random and different times according to the needs of their sports branch, this must be addressed with an appropriate learning method or strategy[15]. For example, the Sports Special Class (SSC) at Muhammadiyah 1 Klaten High School, Central Java fosters a large number of sports including futsal, basketball, martial arts, tennis, even fencing [17]. These different sports branches require an appropriate learning management system software (LMS) to manage the learning schedule [9].

2. Blended Learning

A learning system needs to be designed that are suitable for developing academic and sports aspects [18]. The learning model at SSC certainly has to be different from general high schools, whose academic activities start from morning to evening and there are assignments at home (homework) for their students. The main task of an athlete is to practice. Therefore it may become ineffective for athlete students, that they have to get morning to practice, then enter a conventional class to sit and study at classroom until noon, then they should be doing evening practice, and at after that doing their homework. If the learning system in the SSC is still similar to the conventional class, of course, the objectives being targeted are challenging to find results, so that sports and academic achievements become lame[19].

Learning innovations in the 21st century may provide the right solution for solving problems for the SSC [20]. The rapid development of electronic-based learning resources now allows students to be able to learn anytime and anywhere. Some online and offline learning resources, for example, interactive multimedia, online learning, mobile learning, and others can be used as a design of learning systems that enable the SSC students to learn more flexibly[21], that is, the demands of sports gifted learners for many more a lot of practising sports can be missed with this learning system.

Blended learning is seen as being able to compensate for these demands because this learning model is not the same as distance learning (e-learning with distance learning approach) [22], nor is it like face-to-face learning. Blended Learning combines flexible distance learning and conventional face-to-face learning where teachers can provide motivation and emotional closeness to their students [23]. However, it is necessary to know how ready the school with the SSC to accept this Blended Learning learning innovation, so it is essential to conduct research and observation related to the readiness [24], [25]. The results of the study are used as a basis for developing learning innovations in Blended learning-based sports schools.

3. E-learning Readiness

An evaluation is necessary to determine the level of school readiness for the implementation of e-learning in the learning process at school. The assessment is used to study the profile and IT capacity of the school and evaluate its adequacy to achieve its goals. From the results, it will be known the level of school readiness in the application of e-learning [4].

E-learning model Readiness Index (eLRI) is an evaluation model to measure the extent to which aspects involved in implementing e-learning are in accordance with their original purpose[26]. In principle, the model built for eLRI can be analogous to the measurement model of the Net-worked Readiness Index (NRI).

There are some evaluation and analysis models, one of which was developed by Aydın and Tasci [25]. This model is widely used in developing countries with four factors, namely (1) technological factors (2) innovation factors (3) human factors (4) self-development factors.

The Technology Factor considers ways to make the adaptation of technological innovation effective, namely E-learning in a school or organisation. Aydin and Tasci [25], [27] mentioned that technological factors include computer and internet access, the ability to use computers and the internet, as well as being positive in using technology.

The Innovation Factor considers the experience of human resources in schools and organizations in adopting a new innovation, E-learning. In addition, this model states that acceptance and rejection of an innovation can be a measure of readiness for the application of E-learning. The innovation factor includes the obstacles in E-learning, the ability to adopt E-learning, and the attitude of openness to E-learning innovation. So the innovation factor can be a benchmark in evaluating the readiness for implementing E-learning[15].

The Human Factor considers the characteristics of the existing human resources at the school or organization. The model developed by Aydin & Tasci further explains the human factor exemplified by experienced human resources, pioneers of E-learning, providing E-learning, as well as human ability to learn with technology [27].

The Personal Development factor is a form of consideration of school and organizational confidence in self-development in the application of e-learning. Self-development factors discuss the E-learning budget, the ability to manage time, and confidence in self-development [25], [29]

The ELR model will produce a score which can determine an institution's e-learning readiness ranking. Whoever develops the ELR model can help leaders not only measure the level of readiness of the institution to implement e-learning, but more important is to uncover which factors or areas are still weak and require improvement and which areas have been deemed successful or influential in supporting the implementation of e-learning [29] [30].

The aims of the study are: (1) to determine the level of readiness (e-learning readiness) in high schools with sports classes in Central Java, (2) to reveal which factors or areas are still weak and need improvement, and (3) to map which factors in the schools are considered successful or influential in supporting the application of e-learning in the learning process.

III. METHODS

This research is a quantitative descriptive study which is synergized with qualitative research through observation and interviews.

A. Participants

Participants in this research are two SSC in Central Java province, namely SMA Muhammadiyah 1 Klaten and SMPN 1 Surakarta.

B. Data Collection

This study uses a checklist method by giving a checkmark (v) to the appropriate answer choices in the assessment sheet. Scores used are 5, 4, 3, 2, 1 for each assessment of answers to each question. The questionnaire contained 37 questions based on the ELR Aydin & Tasci model for four factors, namely human, self-development, technology and innovation. The scale used to analyse is the Aydin & Tasci e-readiness scale by giving questionnaires to school headmaster or administrators, teachers, and school staff as a quantitative measure, with each scale having open questions asked to research subjects [31]. The type of data in this study is quantitative data in the form of e-learning readiness scores.

The model used in this study is the ELR Aydin & Tasci model [27], [29] to measure the readiness of implementing e-learning by using four factors of readiness. This research instrument used questionnaires, interview sheets, and observation sheets/field documentation. Finally, the conclusion is made according to the data and its analysis.

C. Data Analysis

After collecting data from respondents, the data were then analyzed using the ELR Aydin & Tasci model. The analysis is a). The scores used in the assessment sheet are 5, 4, 3, 2, and 1 for each question. b). After the assessment sheet is filled in by the respondent and generates a total score, the average of the score is calculated using the formula:

$$\bar{x} = \frac{\sum x}{n}.$$

Keterangan :

$\bar{x}$ = final average
$\sum x$ = number of total score n
n = number of respondent

The rating scale of the ELR Aydin & Tasci model is then used to assess the rating of that category. The categories used to categorise are readiness and application of e-learning "can be continued", "ready but needs a slight increase", "not ready and need a slight increase", and "not ready and need a lot of improvement", as the figure follows:

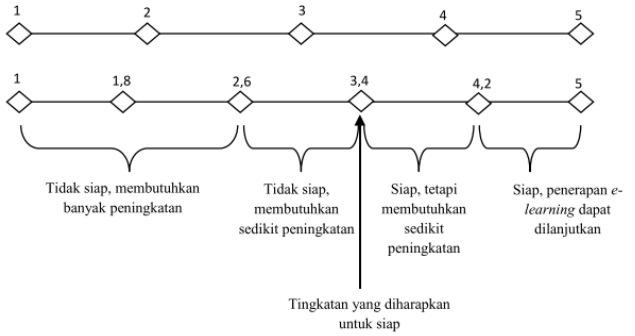

Figure.1 Aydin & Tascii assessment scale [27]

Based on the image of the model, the minimum average score for the level of readiness for implementing e-learning is 3.41, so $x_{elr} = 3.41$, which means the average rating of each question, the average rating of items for the same factor and score the total average of all items must be $x \geq x_{elr}$ to be considered ready in applying e-learning. For the range of values and categories as in Table 1 below.

Table 1. The range of grades and categories of the ELR model Aydin & Tasci

Value range	category
$1 \leq \bar{x} \leq 2{,}6$	Not ready, needs a lot of improvement
$2{,}6 \leq \bar{x} \leq 3{,}4$	Not ready, needs a little improvement
$3{,}4 \leq \bar{x} \leq 4{,}2$	Ready, but needs a little improvement
$4{,}2 \leq \bar{x} \leq 5$	Ready, the application of e-learning can be continued

IV. RESULTS AND DISCUSSION

Based on the results of filling in the questionnaire by research subjects, two tables can be made as follows.

Table 2. ELR score results of SMPN 1 Surakarta

Factor	Total Scores	Total Score in the ELR	Category
Human	120	2,67	Not ready, needs a little improvement
Innovation	117	3,65	Ready, but needs a little improvement
Technology	241	4,05	Ready, but needs a little improvement
Self-development	162	3,34	Not ready, needs a little improvement
ELR total	640	3,46	Ready, but needs a little improvement

Table 3. ELR Muhammadiyah 1 High School Klaten's score results

Factor	Total Score	Total Score in the ELR	Category
Human	247	3,05	Not ready, needs a little improvement
Innovation	176	3,26	Not ready, needs a little improvement
Technology	368	3,41	Ready, but needs a little improvement
Self-development	303	3,37	Not ready, needs a little improvement
ELR total	1094	3,27	Not ready, needs a little improvement

Based on the results of the ELR score in Table 2, SMP Negeri 1 Surakarta is ready for the implementation of e-learning. SMP Negeri 1 Surakarta has an ELR score x = 3.51> 3.41. This result means that SMP Negeri 1 Surakarta is ready for e-learning implementation, but requires a slight increase. Improvements were made to the ELR factor which had a low ELR score. Human factors and self-development have an ELR score x <3.41, so it requires a slight increase.

1. Readiness Level of SMP N 1 Surakarta with Special Sports Classes (SSC)

Based on the results of the ELR assessment scores with the Aydin & Tasci models in Table 3 it is known that SMP N 1 Surakarta has an ELR score x = 3.46> 3.41. SMP N 1 Surakarta is ready in implementing e-learning, but it needs a little improvement. Improvement is needed on ELR factors that have fewer scores.

ELR factors in SMP N 1 Surakarta have a value of x> 3.41. It shows that each ELR factor is ready to apply blended learning; only the human factor and self-development need a little improvement. The improvement can be sought based on the reference to the question item whose ELR score x <3.41.

The increase in the ELR factor is used to indicate the parts that need further attention, including in:

a. Human Factor ELR Score

An increase in the human factor can be done with the following efforts.

1) Adjustment in the selection of new student admissions. so that new students entering SMP N 1 Surakarta, especially the SSC class, have academic grades that meet the criteria of a public school standard.

2) Improvement in the quality of teachers in SMP N 1 Surakarta. This improvement can be done with e-learning-themed training, such as the use of LMS, blended learning models, sharing experiences from experts, and simulations.

3) Improvement of students in SMP N 1 Surakarta by providing training and learning about belended learning or also the use of effective LMS according to LMS criteria. The goal is that students are able to use and utilize e-learning optimally.

4) Improving the quality of interaction between students, students and teachers, and teachers and employees as administrators in learning. If these three components have a strong and harmonious interaction, improvement in the quality of this learning mix can increase.

b. ELR Score for Personal Development

Improvements can be made by looking at the questions in the questionnaire, i.e. the following efforts are made.

1) Improve the student self-development at SMPN 1 Surakarta. Students are expected to be able to take time to independently learn e-learning outside of school so that Blended Learning can be applied well. Teachers can give assignments using LMS, so SSC students can learn to access it outside of school, even when they are going to compete or compete in sports competitions.
2) Confidence in implementing Blended Learning in SMP N 1 Surakarta can be done with confidence if all components understand that blended learning can improve student learning outcomes and provide more value to learning in SSC classes.
3) Increase in the budget allocation for the implementation of Blended Learning in SMP N 1 Surakarta. Improvements to budget planning before implementing Blended Learning need to be well discussed in the committee or school board.

2. Readiness Level of SMA Muahmmadiyah 1 with Special Sports Classes (SSC)

Based on the results of the ELR assessment scores with the Aydin & Tasci models in Table 3 it is known that SMA Muhammadiyah 1 Klaten has an ELR score x = 3.46> 3.41. SMA Muhammadiyah 1 Klaten is ready to implement e-learning, but it needs a little improvement. Improvement is needed on ELR factors that have fewer scores.

ELR factors in Muhammadiyah 1 Klaten High School have a value of x> 3.41. It shows that each ELR factor is ready to implement e-learning by mixing methods, only the human factor and self-development need a slight increase. The improvement can be sought based on the reference to the question item whose ELR score x <3.41.

The increase in the ELR factor is used to indicate the parts that need further attention, including in:

a. Human Factor ELR Score

An increase in the human factor can be done with the following efforts:

1) Adjustment in the selection of new student admissions in the special sports class, so that new students entering SMA Muhammadiyah 1 Klaten especially the SSC class have academic abilities that are adaptive to technology.
2) Improve the quality of teachers in SMA Muhammadiyah 1 Klaten. This improvement can be done with e-learning-themed training, such as the use of LMS, Blended learning models, sharing experiences from experts, and simulations.
3) Improve the students at SMA Muhammadiyah 1 Klaten by providing training and simulating Blended learning or also the use of effective LMS according to LMS criteria. The goal is that students are able to use and utilize e-learning optimally.
4) Increasing the quality of interaction between students, students and teachers, and teachers and employees as administrators in e-learning. If these three components have a strong and harmonious interaction, improvement in the quality of this learning mix can increase.

b. ELR Score for Personal Development

Improvement in self-improvement factors can be done by looking at the questions on the questionnaire, i.e. the following efforts are made:

1) Improvement of students' self-development in Muhammadiyah Surakarta High School. Students are expected to be able to take time to independently learn e-learning outside of school so that Blended Learning can be applied well. Teachers can give assignments using LMS, so SSC students can learn to access it outside of school, even when they are away competing or competing in sports competitions.
2) Confidence in implementing Blended Learning in SMA Muhammadiyah 1 Klaten can be done with confidence if all components understand that Blended learning can improve student learning outcomes and provide more value to learning in the SSC classroom.
3) Increase in the budget allocation for the implementation of Blended Learning in SMA Muhammadiyah 1 Klaten. Improvements to budget planning before implementing Blended Learning need to be well discussed in the committee or school board.

c. ELR Score for Innovation

Improvements to the innovation factor can be made with the following efforts:

1) Improve the students' self-development in Muhammadiyah Surakarta High School. Students are expected to adopt e-learning in learning by getting them used to use cellular devices for learning instead of other functions such as social media or browsing.
2) Openness and adaptation by teachers to the use of devices in learning also need to be improved, because in this case the teacher's position is quite essential in the implementation of learning by using smart devices or cellphones. Teachers are also expected to continue to be adaptive to changes in the progress of gadget-based learning technology
3) The parents of students are also involved in the socialisation of the use of devices in learning. The goal is that when students at homework on assignments or collaborative learning using devices or smartphones, parents do not feel disturbed or feel that their children only play devices instead of learning. With the support of parents at home, the continuity of e-learning learning can continue is grown

V. CONCLUSION

The conclusion that can be drawn from this research is, based on the E-learning readiness Aydin & Tasci model, SMP N 1 Surakarta is included in the ready category with a score of 3.5 (> standard score of 3.41), but requires a slight increase in human factors and self-development. The human factors and self-development are in the category of not ready with a little extra. This unpreparedness can be improved by increasing the quality of inputs, the interaction of learning components in schools, and training so that all are familiar with Blended Learning. The Muhammadiyah 1 Klaten High School is in the category of poorly prepared with a score of 3.27 (> standard score of 3.41), so it still requires a lot of improvement, especially from human factors, innovation, and self-development. The technology factor is the only factor that is in the ready category with a little extra development. This unpreparedness can be improved by increasing the quality of inputs, the interaction of learning components in schools, and related training so that school members are increasingly familiar with e-Learning with all the variants of their devices.

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