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The field trial of *Kelase-Tri Kaya Parisudha* platform to realize *Hybrid-Superitem* patterned blended learning for mathematics subject

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Abstract. The success of learning mathematics in the cognitive, affective, and psychomotor domains is difficult to realize if the use of blended learning in learning mathematics is not carried out optimally. This research had the main objective to provide information about the field trial results towards the platform usage of *Kelase* which was integrated with *Tri Kaya Parisudha* concept in order to realize blended learning which patterned of *Hybrid-Superitem* to support the mathematics learning effectiveness at the level of senior high schools/vocational schools in *Bali*. This research applied a development approach with the development stages, which followed the Borg & Gall design by focusing on the stages of field trial and field trial revision. Subjects who were involved in conducting field trials in this study were 184 people consisting of education experts, informatics experts, teachers, and students who came from several senior high schools/vocational schools which there were in Bali Province. The data collection tools were in the form of field trial questionnaires. The quantitative descriptive by comparing the effectiveness of the field trial results with the effectiveness standard that was referring to eleven scales was the data analysis technique used. The field trial results showed an effectiveness percentage average was 88.49% so that the platforms which developed were classified as good.

1. Introduction

Blended learning as an information technology-based learning model is very popular and needed today [1]. This happened as a result of the industrial revolution 4.0 emergence, which triggered a paradigm shift in the learning process [2-4]. The current paradigm and trend that is conventional learning through direct interaction in the classroom shifts to digital-based learning through information technology, which is accomplished both in full online and semi-online [5,6].

Unlike the case with e-learning, which is accomplished in fully online, blended learning as one of the ICT-based learning models that are done semi-online is able to facilitate learning with easy, fast access and still presents direct interaction that occurs between students and teachers [7]. Based on this, it is not surprising in the disruptive era as it is today; many schools tend to choose the blended learning model to be used in the learning process so that the quality of social interaction is maintained even though it is dominated by the presence of information technology as a learning resource and facility [8]. However, the facts that occur in the field (especially those that occur in *Bali*) show that there are still schools at the senior high school/vocational school level that are not able to apply the blended learning model optimally. This is caused by several factors, including the lack of supporting facilities for blended learning, the low ability of teachers to package blended learning content, and the

limited ability of teachers and students to operate a blended learning platform. From the three factors, it turns out that the most dominant factor causing schools not to implement blended learning is the unpreparedness of teachers to package their subjects to be more exciting and able to measure learning outcomes well in the affective, cognitive, and psychomotor aspects. If it is exemplified in Mathematics subject, of course, many mathematics teachers find it very difficult to package the materials they teach into interactive teaching materials and be able to measure the three expected aspects in student learning outcomes effectively. Besides, the cognitive aspect measured in Mathematics subjects must specifically be able to measure students' critical thinking skills from low to a high level.

Based on the facts and problems that arise, then one of the innovations that can be presented to anticipate it is in the form of a combination of the *Tri Kaya Parisudha* concept and the *Kelase* platform to realize blended learning which patterned of *Hybrid-Superitem*. This innovation is suitable for presenting blended learning that is able to support the effectiveness of the learning process (a case study of Mathematics) in the affective, cognitive, and psychomotor aspects through the implementation of the *Tri Kaya Parisudha* concept. The *Hybrid-Superitem* pattern can be obtained from the implementation of the *Kelase* platform with material content that is made in stages from the easiest to the most challenging material.

This research arises due to the results and limitations found in several previous studies. The research was conducted by Ikawati, Majid, and Anwar in 2019 [9] showed the successful application of the superitem learning model that trains students to think critically about questions/assignments ranging from low to high-level complexity. Through that superitem model, student achievement in the cognitive aspect can be more quickly achieved. The limitation of Ikawati, Majid, and Anwar's research was the *Superitem* model used in the learning process had not been able to realize student learning outcomes in the affective and psychomotor aspects because the model was more focused on the cognitive aspect. The research was conducted by Divayana in 2019 [10] showed the use of the *Kelase* platform to conduct blended learning on Assessment and Evaluation courses. The limitations found in Divayana's research were the content of the material, and the questions entered into the *Kelase* platform only refer to one aspect, namely cognitive, so that other aspects, such as affective and psychomotor, do not yet exist. The research was conducted by Harahap, Nasution, and Manurung in 2019 [11] showed a homemade platform using *HTML* (Hypertext Markup Language), *PHP* (Hypertext Preprocessor), and Java Script to realize blended learning. The limitation of Harahap, Nasution, and Manurung's research was that the content of the material in blended learning only focuses on the cognitive aspect. In contrast, the other aspects (psychomotor and affective) had not been addressed yet. Referring to the existing problems, innovation, and some previous studies which become the background of this research, the problem statement in this research: "how is the result of field trial on the *Kelase-Tri Kaya Parisudha* platform in realize blended learning which patterned of *Hybrid-Superitem* for Mathematics subject at the senior high school/vocational school in *Bali*?"

2. Methods

This research approach was development research. The stages of development in this study followed the Borg & Gall design, which focused on only two stages, including field trial and revision of field trial. Subjects were involved in conducting field trials include two education experts, two informatics experts, 60 teachers, and 120 students who used blended learning. This research was conducted in several senior high schools/vocational schools in 6 regencies in *Bali*, including *Denpasar*, *Gianyar*, *Tabanan*, *Badung*, *Buleleng*, and *Klungkung*. The questionnaires were used as tools to collect field data. The technique that was used to analyze the data that had been collected was quantitative descriptive. This analysis technique was done by comparing the percentage level of effectiveness of the field trial result with the percentage of effectiveness standards that refer to the eleven scales. The percentage of effectiveness was obtained using the formula shown in equation (1) [10], while the percentage of effectiveness standard with an eleven scales reference can be seen in Table 1.

$$\text{Percentage of Effectiveness} = \frac{\sum(\text{Respondents Answer} * \text{The Weight of Each Respondents Answer Choice})}{n * \text{Highest Weight}} * 100\% \tag{1}$$

Where: $\sum$ = total, while n = the total number of questionnaire items

Table 1. Percentage of effectiveness standard with eleven scale reference.

Category	Excellent	Good	Advanced	Intermediate	Enough	Elementary	Less	Very Less	Bad	Very Bad	Poor
Percentage	95-100	85-94	75-84	65-74	55-64	45-54	35-44	25-34	15-24	5-14	0-4

3. Results and discussion

This research had succeeded in obtaining the result of field trial on the *Kelase* platform that was integrated with the *Tri Kaya Parisudha* concept to realize *Hybrid-Superitem* patterned blended learning for Mathematics at the senior high school/vocational school in *Bali* Province. The number of subjects was involved in the field trial was 184 people. The result of the field trial in completely can be seen in Table 2.

Table 2. Field trial results of *Kelase-Tri Kaya Parisudha* platform to realize *Hybrid-Superitem* patterned blended learning.

No	Respondents	Items- 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Σ	Effectiveness Percentage (%)
1	Education Expert-1	4	5	4	3	4	4	4	5	4	4	5	4	5	4	5	64	85.33
2	Education Expert-2	5	4	5	4	5	5	4	4	5	5	4	4	4	5	4	67	89.33
3	Informatics Expert-1	4	5	4	3	4	4	4	5	4	4	4	4	5	4	5	63	84.00
4	Informatics Expert-2	5	5	4	4	5	5	5	4	5	4	5	4	4	5	4	68	90.67
5	Teacher-1	4	5	4	3	4	4	4	5	4	4	4	4	5	4	4	62	82.67
6	Teacher-2	5	4	5	4	5	4	5	4	5	4	5	4	4	5	5	68	90.67
7	Teacher-3	4	5	4	3	4	5	4	5	5	4	4	4	5	4	4	64	85.33
8	Teacher-4	4	4	4	4	4	4	5	4	5	4	4	4	4	5	4	63	84.00
9	Teacher-5	4	5	4	3	5	5	4	4	5	4	5	4	5	4	5	66	88.00
10	Teacher-6	4	4	4	4	4	4	5	5	5	4	5	5	4	5	5	67	89.33
11	Teacher-7	4	5	4	3	5	5	4	5	4	4	5	4	5	4	4	65	86.67
12	Teacher-8	4	4	4	4	4	4	5	4	5	5	5	5	4	5	5	67	89.33
13	Teacher-9	4	5	4	3	5	5	5	5	4	4	4	4	5	4	4	65	86.67
14	Teacher-10	5	4	4	4	4	5	4	5	5	5	5	5	4	5	5	69	92.00
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
63	Teacher-59	4	5	4	4	4	5	5	5	4	5	4	4	4	4	5	66	88.00
64	Teacher-60	5	5	4	3	5	4	4	4	5	4	5	5	5	5	4	67	89.33
65	Student-1	4	5	4	4	4	5	5	5	4	5	4	4	4	4	5	66	88.00
66	Student-2	5	4	4	3	5	4	4	5	5	4	5	5	5	5	4	67	89.33
67	Student-3	4	5	5	4	5	4	5	4	5	5	5	4	4	4	5	68	90.67
68	Student-4	5	4	4	3	4	5	4	4	4	4	4	5	5	5	4	64	85.33
69	Student-5	4	5	5	4	5	4	5	5	5	5	5	4	4	4	5	69	92.00
70	Student-6	5	4	4	4	4	4	4	4	4	4	4	5	5	5	4	64	85.33
71	Student-7	4	5	5	4	5	4	5	5	5	5	5	4	4	4	5	69	92.00
72	Student-8	5	4	4	3	4	4	4	4	4	4	4	5	5	5	4	63	84.00
73	Student-9	4	5	4	4	5	4	5	5	5	5	5	4	4	4	5	68	90.67
74	Student-10	5	4	5	4	4	4	4	4	4	4	4	5	5	5	4	65	86.67
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
183	Student-119	4	5	5	4	4	4	4	5	5	5	5	5	5	4	5	69	92.00
184	Student-120	5	4	4	3	5	5	5	4	4	4	4	5	4	5	4	65	86.67
																Average	**88.49**

In addition to providing an assessment of each question in the field trial, several respondents also gave suggestions for improving the *Kelase-Tri Kaya Parisudha* platform that was developed. Some of these suggestions can be seen in Table 3.

Table 3. Suggestions from respondents on *Kelase-Tri Kaya Parisudha* platform to realize *Hybrid-Superitem* patterned *Blended Learning*.

Respondents	Suggestions
Education Expert-2	Facilities should be made to allow students to see the progress of the learning process
Informatics Expert-1	Make facilities for students to be able to see the progress of the learning process that is equipped with a display value of each learning activity
Teacher-8	Make a forum to make it easier for students or teachers to make the language of instruction used in blended learning
Teacher-25	Please make facilities for students to see the value of each learning activity and its achievement status
Student-20	A container should be made that can be easily used by students to see the progress of learning progress
Student-118	Make a facility to change the language in the platform

Based on the suggestions given by those respondents, a revision of the *Kelase-Tri Kaya Parisudha* platform was able to be developed to realize *Hybrid-Superitem* patterned blended learning to be more effective. The display of the revision can be shown in Figure 1 and Figure 2.
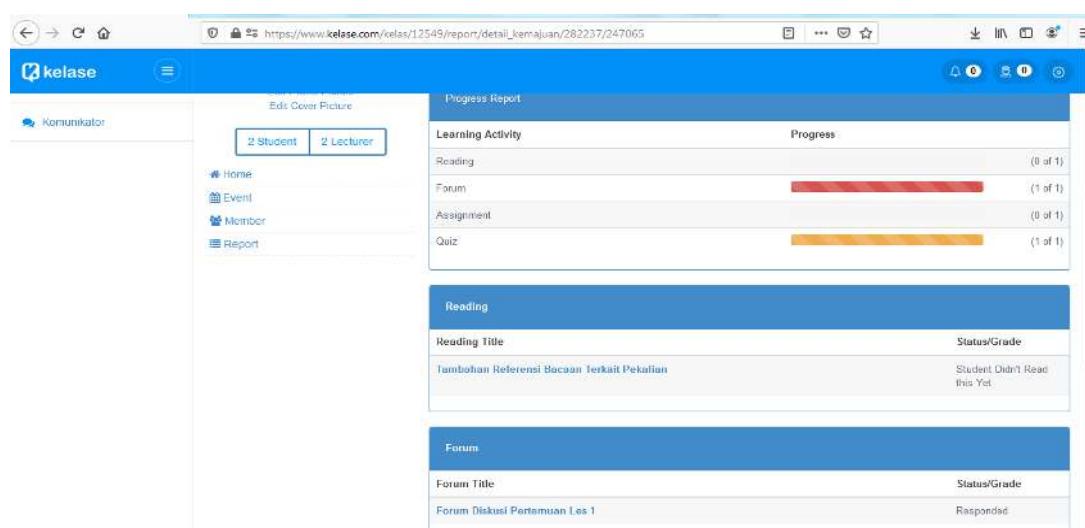
Figure 1. Display of facilities to see the learning process progress.
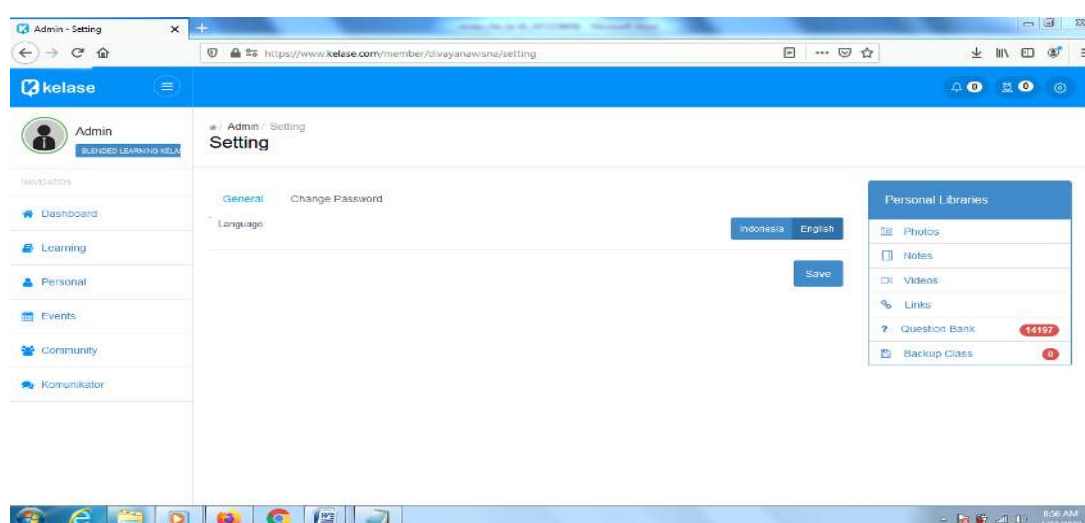
Figure 2. Display of Facilities for setting the instruction language in the platform.

Based on the results shown in Table 2, it is clear that in general, the *Kelase-Tri Kaya Parisudha* platform has been able to effectively realize *Hybrid-Superitem* patterned blended learning to support the mathematics learning process at the level of senior high schools/vocational schools in *Bali*. This is evidenced from the result obtained in field trial showed the effectiveness level of the platform included in the good category because the average score of effectiveness percentage was 88.49% in the range of scores of 85-94 in the percentage of effectiveness standard with reference to the eleven scales.

Suggestions provided by Education Expert-2, Informatics Expert-1, Teacher-25, and Student-20 had been answered by the presence of the facilities shown in Figure 1. Figure 1 shows the facilities contained in the *Kelase* platform that enable students to view the report of their learning progress. The progress report consists of several components of learning activities, including reading, forums, assignments, and quizzes. Each component of the learning activity is also equipped with facilities that can show grades and achievement status.

Suggestions from Teacher-8 and Student-118 had been answered with the existence of the facilities shown in Figure 2. Figure 2 shows the facilities available on the *Kelase* platform that allows users to change the language of instruction in the platform (Indonesian or English). The way to set or change the language of instruction in the *Kelase* platform is to click on the "Indonesian" or "English" button then proceed by clicking the "Save" button.

The result of this study was generally able to answer the limitation of the research was conducted by Ikawati, Majid, and Anwar, research was conducted by Divayana, and research was conducted by Harahap, Nasution, and Manurung. The efforts that had been made through this research to solve the limitations of some of those studies was by presenting blended learning that contains mathematics material content that refers to the cognitive, affective, and psychomotor aspects. Through the content of mathematics material covering three aspects, it is expected that students will be able to be more critical and wise in responding to the dynamics of mathematics development in the field from various dimensions so that it is not rigid only on cognitive ability. This is in accordance with Fisher and Kusumah's statement in 2018 [12], which stated that in addition to cognitive intelligence, character development is also expected to occur through Mathematics learning to prepare students' abilities in facing problems and the development of Mathematics implementation in the field.

Although, in general, the research related to a field trial on the *Kelase-Tri Kaya Parisudha* platform had shown a good result, but there is still a possibility of obstacles. The obstacle found in this research was that there wasn't an accurate instrument to measure the concept of Wacika in the Kelase platform, so it wasn't known for certain which students really had a good attitude or not.

4. Conclusion

Field trial of *Kelase-Tri Kaya Parisudha* Platform in realizing *Hybrid-Superitem* patterned blended learning for Mathematics at the senior high school/vocational school in *Bali* had been running optimally with an average percentage of effectiveness indicating the good category. Nevertheless, there are also obstacles encountered. The future work offered to be able to overcome the obstacle in this research is to create an online instrument that refers to the *Wacika* concept and then put the instrument into the platform (especially in the discussion/forum section). The existence of online instruments in forum facilities will make it easier for teachers to assess student attitudes based on conversations/discussions that have been carried out through that forum.

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