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Calistung E-Module Innovation For Strengthening Basic Literacy and Numeracy Student

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ABSTRAK

Kemampuan Calistung (membaca, menulis, berhitung) wajib dikuasi oleh siswa sebagai dasar dari literasi dan numerasi. Kurangnya pemahaman Calistung menyebabkan siswa kesulitan memahami materi pelajaran lainnya. Tujuan penelitian ini adalah untuk mengembangkan dan melihat kelayakan, kepraktisan dan efektifitas e-Modul Calistung dalam penguatan dasar literasi dan numerasi siswa. Penelitian ini merupakan jenis penelitian dan pengembangan (research and development) dengan model ADDIE. Peneliti mengumpulkan data dengan cara angket, ceklis dokumen dan dokumentasi. Subyek penelitiannya adalah siswa kelas I yang berjumlah 30 siswa. Teknik analisis data menggunakan analisis deskriptif kualitatif, kuantitatif, dan statistic inferensial. Hasil penelitian yaitu uji validasi dari ahli media dan desain pembelajaran didapatkan nilai rata-rata sebesar 3,6 (90%) yang berarti sangat valid, sedangkan uji ahli materi dan ahli bahasa masing-masing sebesar 3,75 (93,75%) dengan kategori sangat valid. Uji kepraktisan produk pengembangan diperoleh rata-rata skor sebesar 3,89 (97,25%) tdalam kategori sangat menarik. Hasil dari uji-t menunjukkan terjadi peningkatan yang signifikan pada rata-rata hasil belajar siswa setelah mendapat perlakuan yang berbeda yaitu menggunakan e-Modul Calistung. Dapat disimpulkan e-modul calistung ini praktis, menarik, dan efektif digunakan sebagai media pembelajaran.

ABSTRACT

Calistung skills (reading, writing, arithmetic) must be mastered by students as the basis of literacy and numeracy. The lack of understanding of *Calistung* causes students to have difficulty understanding other subjects. This study aimed to develop and examine the feasibility, practicality, and effectiveness of the *Calistung* e-Module in strengthening students' basic literacy and numeracy. This research is a type of research and development (research and development) with the ADDIE model. Researchers collected data using questionnaires, document checklists, and documentation. The research subjects were class I students, totaling 30 students. Data analysis techniques are using descriptive qualitative analysis, quantitative, and inferential statistics. The results of the study, namely the validation test from media experts and learning design, obtained an average value of 3.6 (90%), which means it is very valid, while the material expert test and linguist test each was 3.75 (93.75%) with a very valid category. The product development practicality test obtained an average score of 3.89 (97.25%) in the very attractive category. The t-test results showed a significant increase in the average student learning outcomes after receiving a different treatment, namely using the *Calistung* e-Module. The listing e-module is a practical, interesting, and effective learning medium.

1. INTRODUCTION

The concept of "literacy" has traditionally focused on reading, writing, and arithmetic (*calistung*). Literacy is the key to unlocking students' insights and knowledge. Students with strong literacy skills will be able to develop optimally and achieve positive results (Nabela et al., 2022; Priyambodo & Maryati, 2019). Unfortunately, various research data show that the literacy skills of Indonesian students are still far from expectations (Ali et al., 2021; Tryanasari et al., 2017). Indonesian students' literacy and numeracy skills must be improved. Based on the results of various surveys at the international and national levels, these

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two fields have not experienced a significant increase and even tended to decrease from year to year (Anderson & Boyle, 2019; Whale et al., 2018).

Reading culture in Indonesia is still in the low category. Based on the most recently released Program for International Student Assessment (PISA) data in 2018, Indonesia is ranked 73 out of 79 participating countries with a score of 279 (Argina et al., 2017; Chamisah, 2017). The Program for International Student Assessment (PISA) measures 15-year-old students' abilities in math and science. In addition, grade 4 elementary school students' reading interest in Indonesia ranks 45th out of 48 participating countries in the 2011 PIRLS report, with a score of 428. Then in 2012, UNESCO published Indonesia's reading interest index of 0.001, or one person per 1,000 Indonesians. who likes to read (Amanullah, 2020; Khikmiyah, 2021; Setiawan & Fikri, 2022).

For this reason, strategic efforts are needed to strengthen literacy and numeracy from an early age. As a basic for literacy and numeracy, students must master the basic skills of reading, writing and arithmetic (*calistung*). The lack of understanding of *Calistung* causes students to have difficulty understanding other subject matter. Therefore, for students in the lower grades to improve their reading skills, teachers must pay special attention to them (Anggraeni & Alpian, 2019; Mahendra et al., 2022). But it turns out that some students have difficulty learning letters. In particular, the aspect of how learning is carried out in schools is considered one of the most influential in early reading learning (Batubara & Ariani, 2018; Cai et al., 2019). Therefore, teachers need to create a learning environment that is able to students' attention by utilizing a variety of creative, innovative, and diverse learning media (Fahyuni & Fauji, 2017; Mustikawati, 2015). Teachers and students are required to have knowledge of technological advances in education in the 4.0 era. With the advances in technology that we have now, the conventional approach is no longer valid (Festiyed et al., 2019; MZ & Syafi'i, 2021). Not all printed teaching materials have an impact. Teachers will more easily convey knowledge to students through the use of technology, which will also improve the quality of learning (Ayuningtyas et al., 2018; Syakur et al., 2020). Through interesting and varied teaching, it will foster students' enthusiasm for learning.

The reality of the problems that occur at Muhammadiyah 1 Pucanganom Elementary School is that grade 1 students have not mastered *calistung* fluently. So the literacy and numeracy abilities of students are still low. The school makes the *calistung* module a supplement in addition to using textbooks as learning resources. However, the package books and modules used are still conventional in printed form. This causes a lack of interest in reading and student learning motivation (Kintoko et al., 2021; Susantini et al., 2021). An interactive electronic module (e-module) is needed to optimize learning. Electronic modules are electronic learning resources designed systematically and attractively containing material, methods, limitations, and ways of evaluating to achieve competencies according to the curriculum (Afwan et al., 2020; Nakamura et al., 2018).

Previous studies have proven that the developed e-module is in a very feasible category with a percentage of 88.89% for positive student responses and 87.50% for student learning completeness results. These results can be used as evidence that teaching materials in the form of e-modules are an alternative learning process because they can be accessed on electronic devices that have been supported by existing facilities and infrastructure in schools (Handley et al., 2020; Průžek et al., 2020). This is in line with other research which states that the results of testing e-module teaching materials on students get a score percentage of 85.18% in the very good category, and based on the results of the questionnaire responses students get a feasibility score percentage of 85.18% (Motsa & Morojele, 2019; Sultoni et al., 2018). So that e-module teaching materials are very effective and positive in the learning process (Laili et al., 2019; Sari et al., 2021; Sidiq, Ricu., 2020). It can be concluded that the use of e-module teaching materials is very suitable for use in an interactive and exciting learning process. In addition, e-modules also keep up with the times so that they are easily accepted by students (Asshiddiqi et al., 2021; Widya et al., 2021).

The urgency in this research is to provide learning facilities for students to understand calistung by using e-modules because there are various worksheets that can stimulate children's independent learning power. The novelty in the research is the existence of technology in the form of interactive digital-based worksheets making it easier to access and can be used anywhere flexibly. Based on the description above it is necessary to do research on the *Calistung* E-Module to know the feasibility, practicality, and effectiveness of its use in strengthening basic literacy and numeracy. This module is digital and interactive. It is said to be interactive because the user will experience interaction and be active, for example actively paying attention to pictures, paying attention to writing that varies in color or moves, sounds, animations and even videos, and films. Interactive conditions will increase the very high value of communication, meaning that information can not only be seen as a print, but can also be heard, as well as form simulations and animations that can be uplifting and have high graphic value in their presentation.

2. METHOD

Research and development methods are used in this study to make certain products and test how well these products work (Spatioti et al., 2022; Sugiarto et al., 2018). The model used is the design of the ADDIE development model. There are five stages of the ADDIE development model, namely Analysis, Design, Development, Implementation, and Evaluation. The stages of the ADDIE model research activities can be seen in the Figure 1.

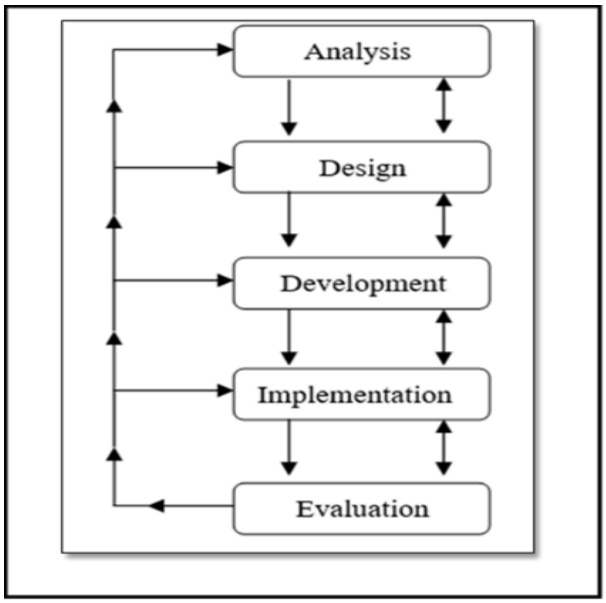

Figure 1. ADDIE model development stage

The analysis phase involves identifying problems faced by students during teaching and learning activities. Design/design begins with setting learning objectives and making appropriate learning media. The media is in the form of an interactive *Calistung* e-Module. The development stage is the stage of realizing the *Calistung* e-Module product that has been designed at the design stage. To prove that this e-module can be used, validation has been carried out. The implementation phase is a product application that has been tested and evaluated in the field. Before being tested on a large scale, individual trials were carried out with 3 students as research subjects, then tested on 10 students, and then tested on 30 students to determine the level of students' understanding of product prototypes. At the evaluation stage checking, monitoring and control are carried out to assess the success of the product. The purpose of the evaluation at this final stage is to solicit responses or feedback from e-module users before they are disseminated, and make revisions according to the unfulfilled evaluation of the new media. The validation instruments are presented in Table 1 and Table 2.

Table 1. Expert Team Validation Instrument

Assessment aspect	Indicator
Media and Design	a. Easy to use
	b. Media fascination
	c. effectiveness in use
	d. Communicative (language is easy to understand, good, correct and effective)
	e. Choose the type and size of the font used
	f. Text readability
	g. suitability supporting image _ ingredient
	h. Creative and innovative
	i. Layout settings
	j. Colour composition
Material	a. The suitability of the material with learning outcomes
	b. The suitability of the material with the learning objectives
	c. The actuality of the material presented
	d. Material benefits

Assessment aspect	Indicator
	e. The material is presented systematically
	f. Encourage curiosity
	g. Increase interest in learning
	h. Ease of use
Languange	a. The accuracy of the sentence structure represents the message and information to be conveyed.
	b. The effectiveness of the sentences used
	c. Standard terms used according to function
	d. Facilitate understanding of messages or information
	e. Able to motivate students
	f. Conformity with the intellectual development of students
	g. The accuracy of the grammar used
	h. Spelling accuracy used

Table 2. Student Response Questionnaire

Assessment aspect	Indicator
Student interest	a. The appearance of the *Calistung* E-Module is interesting
	b. The *Calistung* E-Module motivates learning
	c. Calistung E-Module learning materials are fun
Usage prosess	a. The material for the *Calistung* E-Module is by the material at school
	b. The *Calistung* E-Module fosters interactive learning.
Benefit	a. The *Calistung* E-Module is easy to use anywhere and anytime
	b. The E-*Calistung* module helps to understand the lesson.

Data collection techniques use a) questionnaire b) document/observation checklist c) documentation. The questionnaire was given to 30 students in the class I SD Muhammadiyah 1 Pucanganom Sidoarjo to measure their *calistung* skills. The document checklist is given to the expert team to see the feasibility of the e-module. Documentation in the form of photos and school documents related to the development of the *calistung* e-Module. Data analysis technique using linear regression. The criteria for assessing instrument validation can be seen in Table 3.

Table 3. Validity Assessment Criteria

Intervention score	Assessment category	Remarks
3.6 ≤ P < 4	Very Valid/Very High	No revisions/Very good
2.6 ≤ P < 3.5	Valid/high	Minor revisions/Good
1.6 ≤ P < 2.5	Invalid/moderate	Many revisions/Enough
1 ≤ P < 1.5	Invalid/poor	Unusable/Bad

3. RESULT AND DISCUSSION

Result

This research uses the ADDIE model and produces learning media innovation products in the form of *calistung* e-Modules. The needs analysis stage in this study includes problem identification which will be made a reference for researchers in developing research products. Based on the results of the analysis conducted through field observations and interviews at SD Muhammadiyah 1 Pucanganom Sidoarjo. In this study it was found that in delivering learning materials, teachers are still textbooks, namely referring to printed textbooks and modules. The conventional learning method makes students uninterested so that it does not create learning that involves students. The lack of learning media affects the lack of value or learning outcomes obtained. Whereas the use of media can streamline learning, and can also make it easier to convey new things to students. Analyze the formulation of learning objectives by looking at the curriculum and learning materials. The curriculum used in the research is the independent curriculum. In this curriculum the teacher is only a facilitator and encourages students to be more active. This is in accordance with 21st century skills, namely learning and innovation skills including critical thinking, communication, collaboration, creativity. The material used in this study is reading, writing, and counting.

calistung is a very important material as the basis for mastering students' literacy and numeracy competencies.

In the design stage, interactive learning media products are designed based on the results of the analysis stage. Researchers chose to use the liveworksheet application so that the resulting module could be interactive. To make it look more attractive, this liveworksheet application is combined or inserted into the book creator application. So that when used, this module looks like a printed book that can be opened per page but in digital form. In the preparation of the *calistung* e-Module material, it is adjusted to the learning outcomes and learning objectives contained in the Indonesian Language and Mathematics lessons.

The development stage is a continuation of the design stage to realize the product in the form of e-Module *calistung* media. The initial development step is to make the *calistung* e-Module prototype. The steps for making the *calistung* e-Module prototype can be seen in Figure 2.

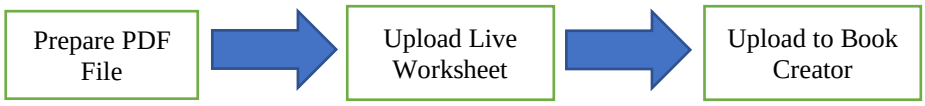

Figure 2. Prototyping Flow

The files that have been uploaded in the liveworksheet are adjusted as needed. The liveworksheet application has 9 variations of interactive questions including: students can answer questions by drawing lines, dragging and dropping, recording sound, and listening to the sound of this application. This is in accordance with the needs of the *calistung* material where students can find out how to read correctly independently. To make it look more attractive, the liveworksheet file is uploaded to the book creator application. The result of this development stage is a *calistung* e-Module prototype that can be accessed through an online link. Students can easily access this learning media through gadgets, laptops and computers. The display of the *calistung* e-Module can be seen in Figure 3.

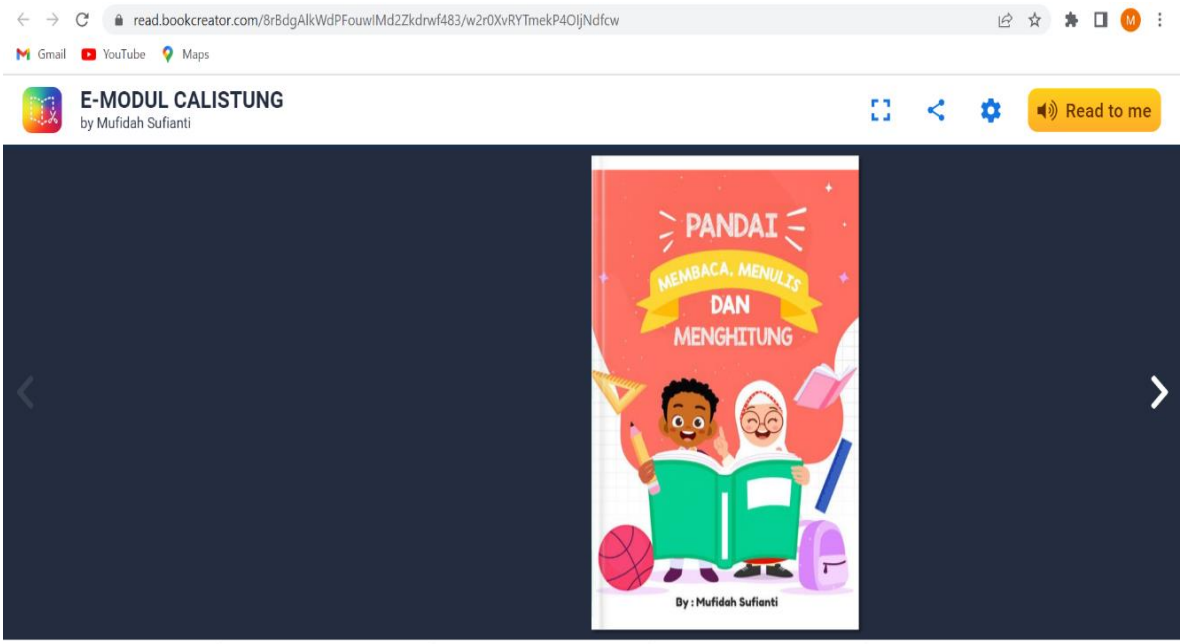

Figure 3. *Calistung* e-Module Display

Whether or not a product to be developed before being tested on students must first be reviewed and validated by a team of validators. The results of the product testing analysis in the form of e-Module *calistung* involved validation from 3 teams of experts consisting of 1 expert in the field of media and learning design, 1 expert in the field of material, and 1 expert in the field of language. The results of the media and design expert validation assessment can be seen in Table 4.

Table 4. Media and Design Expert Validation Results

No	Aspects assessed	Validator	Criteria

1	Easy to use	3	Valid
2	Media attractiveness	4	Highly Valid
3	Effectiveness in use	3	Valid
4	Communicative (language is easy to understand, good, correct and effective)	4	Highly Valid
5	Selection of font type and size used	4	Highly Valid
6	Readability of text	4	Highly Valid
7	Suitability of images that support the material	4	Highly Valid
8	Creative and innovative	3	Valid
9	Layout arrangement	3	Valid
10	Color composition	4	Highly Valid
Average		**3,6**	**Highly Valid**
Percentage		**90%**	

Based on **Table 4**, the total average value of aspects is 3.6 if referred to the criteria for determining the level of validity of the media and learning design that has been determined, it can be concluded that the results of the validity of the *calistung* e-Module that has been developed have a level of validity that is very valid with a score of 3.6 (90%). Material expert validation results is show in **Table 5**.

Table 5. Material Expert Validation Results

No	Aspects assessed	Validator	Criteria
1	Suitability of material with learning outcomes	4	Highly Valid
2	Suitability of material with learning objectives	4	Highly Valid
3	Actuality of the material presented	3	Valid
4	The usefulness of the material	4	Highly Valid
5	The material is presented systematically	4	Highly Valid
6	Encourage curiosity	4	Highly Valid
7	Increase learning interest	4	Highly Valid
8	Ease of use	3	Valid
Average		**3,75**	**Highly Valid**
Percentage		**93,7%**	

Based on Table 5, it can be seen that the validity of the *calistung* e-Module from the material expert gets a very valid rating with a value of 3.75 (93.75%). Then language expert validation results is show in Table 6.

Table 6. Language Expert Validation Results

No	Aspects assessed	Validator	Criteria
1	Accuracy of sentence structure to represent the message and information to be conveyed	3	Valid
2	Effectiveness of sentences used	4	Highly Valid
3	The standardization of terms used is in accordance with the function	3	Valid
4	Facilitate understanding of messages or information	4	Highly Valid
5	Able to motivate students	4	Highly Valid
6	Appropriateness to students' intellectual development	4	Highly Valid
7	Accuracy of grammar used	4	Highly Valid
8	Accuracy of spelling used	4	Highly Valid
Average		**3.75**	**Highly Valid**
Percentage		**93.7%**	

From Table 6, the total average value of aspects is 3.75 (93.75%) which is referred to the criteria for determining the level of validity by linguists, it can be concluded that the *calistung* e-Module that has been developed has a level of validity, which is very valid. Based on the input from the expert team, improvements or revisions were made to the *calistung* e-Modules that had been developed in order to

obtain e-modules that were in accordance with the needs of students. Revisions or improvements to the *calistung* e-Module can be seen in Figure 4.

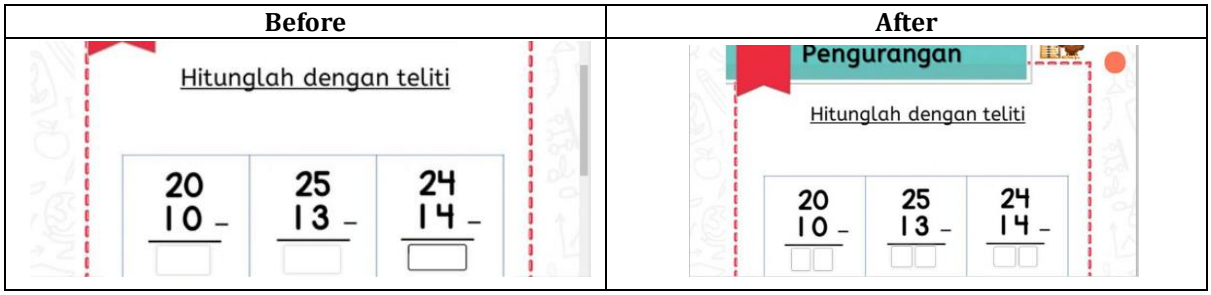

Figure 4. Revision e-Modul *Calistung*

Implementation Stage. To test the practicality of the e-Module *calistung* media, a small group test was conducted involving 5 students with high, medium, and low academic abilities in grade I students of Muhammadiyah 1 Pucanganom Elementary School in Sidoarjo. The results of the small group test assessment can be seen in Table 7.

Tabel 7. Small Group Product Test Results

No	Aspects assessed	s1	s2	s3	s4	s5	Average	Criteria
1.	The appearance of the *calistung* E-Module is attractive	4	4	4	4	4	4	Highly Valid
2.	*Calistung* E-Modules motivate learning	4	3	4	4	4	3.8	Highly Valid
3.	E-Module *calistung* learning material is fun	4	4	3	4	4	3.8	Highly Valid
4.	The *calistung* E-Module material is in accordance with the material at school.	4	4	4	4	4	3.8	Highly Valid
5.	*Calistung* E-Modules foster interactive learning.	4	4	4	4	4	4	Highly Valid
6.	*Calistung* E-Modules are easy to use anywhere and anytime	4	4	4	4	3	3.8	Highly Valid
7.	*Calistung* E-Modules help to understand the lesson.	4	4	4	4	4	4	Highly Valid
	Total Aspect Score	4	3.86	3.86	3.86	3.86	**3.89**	Highly Valid
	Percentage						**97.25%**	

Based on Table 7 show the results of the small group test assessment by 5 students on the *calistung* e-Module, the average value is 3.89 (97.25%). Thus the results of the small group evaluation by 5 students which can be seen in Table 5 show that the *calistung* e-Module developed is in the category of very valid and practical to use as a learning media for *calistung*. To measure the effectiveness of the e-Module *calistung* media, pretests and posttests were conducted on 30 students. Data on the results of improving student learning outcomes can be seen in Figure 5.

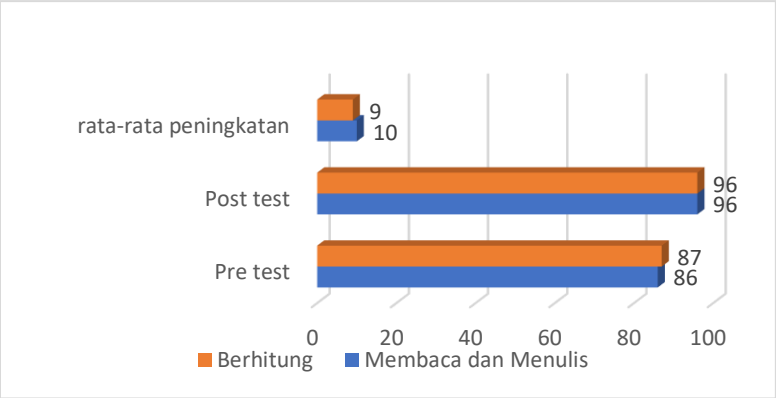

Figure 5. Pretest and posttest results

Based on Figure 5 show the average value of the increase in learning outcomes for reading and writing materials is 10% while in counting materials the increase is 9%. With details of the number of students who experienced an increase in learning outcomes there were 15 students, who remained 10 students, and who decreased there were 5 students in reading and writing materials. This means that 50% of students experienced an increase in learning outcomes in reading and writing materials after using the *calistung* e-Module. In the counting material, there were 17 students who experienced an increase in learning outcomes, 9 people remained, and 4 people experienced a decrease. If referred to the criteria for determining the level of learning success that has been determined, it can be concluded that the number of students who experienced an increase in learning outcomes by using the *calistung* e-Module that has been developed has a success rate of High/Effective with an achievement of 50% for reading and writing and 57% for counting. Pretest and posttest learning test results of counting materials is show in Table 8.

Table 8. Pretest and posttest learning test results of counting materials

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	pretest - posttest	-9.033	12.325	2.250	-13.635	-4.431	-4.015	29	.000

Based on the mean or average value in Table 8 above, it can be seen the difference between pretest and posttest student learning outcomes in counting material, namely the pretest results show an average value of 87.23 and posttest results show an average value of 96.27. Because the p-value or sig. (2-tailed) is 0.00 which means (<0.05), it can be concluded that Ho is rejected and Ha is accepted. This means that the Calistung e-Module has a significant effect on the average pretest and posttest scores. Pretest and posttest learning test results for reading and writing materials is show in Table 9.

Table 9. Pretest and Posttest Learning Test Results For Reading and Writing Materials

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	pretest - posttest	-9.600	17.478	3.191	-16.126	-3.074	-3.008	29	.005

Based on the mean or average value in Table 9, it can be seen the difference between the pretest and posttest student learning outcomes of reading and counting material, namely the pretest results show an average value of 86.40 and the posttest results show an average value of 96.00. Because the p-value or sig. (2-tailed) is 0.005 which means (<0.05), it can be concluded that Ho is rejected and Ha is accepted. This means that the Calistung e-Module has a significant effect on the average pretest and posttest scores. This data shows a significant increase in the average student learning outcomes after receiving different treatments, namely using e-Modul Calistung.

Discussion

Based on the results of the validation trial of the E-Module *calistung* by media and design experts, material experts, and linguists, the results are obtained in very good qualifications so that they are suitable for use in the learning process (Jablan et al., 2019; Rhosyida et al., 2021). Based on this, it means that the *calistung* E-Module developed is very suitable for use as a learning media for elementary school students. Theoretically, learning that is carried out for children in elementary school really needs supporting media that is interesting and concrete (Haerani et al., 2020; Pakistyaningsih et al., 2019; Zashchirinskaia, 2020). The content validity of the E-Module *calistung* media received high validity criteria by the material expert. *Clistung* E-Modules that are in accordance with the learning material will make it easier for students to learn (Nurdyansyah et al., 2019; Saleh et al., 2019). The content of the material in the *calistung* E-Module is displayed very clearly. Clearly presented learning materials will also make it easier for students to understand (Anderson & Boyle, 2019; Lisauskienė, 2018; Mishra Sr. et al., 2018).

The level of practicality of this e-Module *calistung* is said to be practical to use, because it can be proven by the results of product trials in small groups of 5 students in the category of very valid and practical to use as a learning media for calistung. This Calistung E-Module was developed to activate students in the teaching and learning process (Alves et al., 2020; Stehle & Peters-Burton, 2019).The level of effectiveness of this e-Module *calistung* is obtained from student learning outcomes based on field trials with SPSS 16 analysis. The mean or average value on the pretest and posttest student learning outcomes of reading and counting materials shows the e-Module *calistung* is effective because it has a significant effect on the average pretest and posttest scores.

The development of a digital-based *calistung* e-Module allows the material to be accessed or downloaded via the internet using a computer, or laptop, or smartphone; so that students can learn it anytime and anywhere repeatedly (Herry Setyawan et al., 2019; Matenda et al., 2020; Pombo et al., 2017). Furthermore, the *calistung* e-Module is an innovation in learning, and can be a solution for through existing applications, such as Google Classroom, Zoom Meting, and Google Meet (Alegre De La Rosa & Villar Angulo, 2019; Ellis & Rowe, 2020). The developed *calistung* e-Module is able to create interactive, fun, and meaningful learning (Bessarabova & Kurysheva, 2020; Ritter et al., 2019). This can help students learn independently, without compromising the essence of the subject matter being taught, even if it has to be done online. The results of this study provide some significant potential implications. The use of e-modules for the teaching and learning process can improve teacher competence, especially teacher techno-pedagogical skills (Aguiar et al., 2019; Bacete et al., 2021; Padmadewi & Artini, 2017).

Although there are some advantages gained from using the *calistung* e-Module, this study has some limitations. These limitations include: (1) the developed *calistung* e-Module is only focused on *calistung* material for grade I elementary school students. For this reason, this e-module needs to be further developed with a broader topic (2) the trials conducted to test the effectiveness of this e-module are still very limited. The e-module was only applied to 30 students. To further ensure the effectiveness of this e-module, a wider trial is needed with a different socio-cultural context. Based on these implications and limitations, it is recommended for teachers to use the *calistung* e-Module as teaching material because it has been proven to improve student literacy and numeracy, especially student *calistung* learning outcomes. In addition, it is recommended for other researchers to develop e-modules with different topics and for other classes or levels of education.

4. CONCLUSION

The developed *calistung* E-Module is effective in improving the literacy and numeracy skills of elementary school students. Students who are taught using the *calistung* e-Module get better learning outcomes than those taught using ordinary textbooks. Therefore, it is advisable for elementary school teachers to use the *calistung* e-Module which has been developed in learning especially for grade I elementary school students. Because there are some limitations of this research, it is also recommended for other researchers to develop e-modules with various topics and different levels of education.

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